

# Demographic change, human resources constraints and economic growth

The EU challenge compared to other global players

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Human resources constraints will affect economic growth in the EU, the US, China and other global players. In most (not all) of these regions the inescapable decline of working-age population will impose restrictions on future employment and economic growth. Higher productivity growth will eventually become the only way to sustain a positive rate of economic growth in the EU and many other parts of the world including some of the emerging economies. Whereas the developed, industrialised world will have to generate higher productivity growth through continuous innovation and strong investment in skills and education, emerging economies will still be able to reap a higher productivity by reallocating productive resources, mainly human resources, from low value-added economic activities in agriculture to more productive industrial and service activities. However, evidence suggests that emerging economies such as China and India are not solely reliant on those structural productivity gains. They are also increasingly investing in human capital formation. Hence, it can be expected that the EU will face more acute global competition in the decades to come, not only in markets related to cheap labour and products of low value-added, but also on premium products and high quality services.

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## Summary

Analysis of EU demographic projections gives rise to major employment policy concerns given the intense and prolonged decline in the EU's working age population (WAP)<sup>2</sup>. When looking at Europe's future in terms of human resources, it seems appropriate to take account of evolving EU-trends as well as global trends in allocating human resources, since Europe is part of an increasingly interdependent global environment. This paper applies the same methodological framework used in Peschner and Fotakis (2013), focusing on the human resources potential for employment and economic growth from the perspective of five important global actors.

Three of these — the EU, the USA and Japan — belong to the developed world. The two others — China and India — are the most important emerging economies, with a combined WAP of almost six times the EU's. The annex complements the analysis by providing key trends and model findings for a number of other significant economies from all continents, selected on the basis of their population size and/or their economic importance globally.

The analysis across countries presented in this paper is particularly relevant to both EU2020 policy and the G20 employment objectives set in Brisbane on 14 November, 2014. It reveals two main trends. Firstly, most of the countries representing important global economic actors are undergoing significant socio-demographic changes that are often very different to those of the EU. Secondly, the analysis shows an increasing reliance on productivity growth for sustaining economic growth, not only in the developed world but also in most developing countries. In the case of emerging economies, the figures show that a considerable proportion of the contribution to economic growth stems from productivity increases — an important source being the reallocation of underutilised human resources from the rural economy to higher-productivity activities in manufacturing and services at comparatively low wages. Although the scope of such factor reallocation probably has its limits, it nevertheless represents a considerable potential in terms of productivity growth. Europe and the rest of the developed world no longer have access to the same extent to such 'productivity dividend'. They will need to promote, more so than the developing world, knowledge-intensive, high value added economic activities that generate genuine productivity growth, based on innovation, capital deepening, better organisation and greater investment in education and skills for a higher-quality workforce.

However, given that China will also have to contend with a shrinking WAP it will need to follow a similar path if it is to sustain its economic growth. The evidence suggests that China, in particular, and other emerging economies such as India, do not only rely on productivity gains through reallocation away from agriculture, but increasingly devote resources to human capital formation as well. Hence, it is envisaged that in the decades to come, the EU will find itself in more direct competition with these economies — also in the global market of premium products and services.

Finally, to complete the global picture, a brief overview of several other countries in different continents is annexed to the paper. It reveals a growing north-south polarisation in terms of labour reserves which will remain abundant only in the poorest regions of the planet. In order to sustain future economic growth, the developed world's policy agenda needs to take due account of these global imbalances.

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<sup>2</sup> In the 2013 publication on the EU Member States, the term WAP refers to the population aged between 20 and 64 years, which is the target group for EU's 2020 employment objective. Data availability issues make it necessary to revise this definition here; in the present paper WAP refers to people of working age in the 15 to 64 age group.

## 1 Introduction

Demographic trends echo a fairly old but still open debate on the relationship between population change and economic growth. By the end of the 18th century, classical economists had set up a simple model, based on Malthusian assumptions, showing that steady population growth would ultimately restrict economic growth due to diminishing returns on nature's fixed supply of land and food.

This pessimistic view dominated the academic debate for almost two centuries. According to Malthusian principles, the population can keep on growing until diminishing returns push real wages back to subsistence levels, where both population growth and economic growth stop. Until the third quarter of the 20th century, the debate focused mainly on the risks associated with an explosive population growth, particularly in Asia, driven by the combined effects of falling mortality rates and high fertility rates. As recently as 1968, Paul Ehrlich still asserted that 'The battle ... is over. In the 1970s hundreds of millions of people are going to starve to death.'<sup>3</sup> In retrospect, rapid population growth may indeed have diverted substantial investment towards the emerging consumption needs of a growing population, reducing the level of productive investment. Nevertheless, overall, the alarmist Malthusian predictions proved to be largely unfounded. In the second half of the 20th century these 'pessimistic' views were increasingly contested due to their failure to anticipate the enormous effects of both technological progress and demographic transition.

The neo-Classical theory considered population growth as an exogenous variable supporting the Malthusian notion of diminishing returns when the population (labour) increases due to declining capital endowment per worker. Nevertheless, it introduced the notion that population growth could co-exist with real GDP per capita growth, thanks to technological progress. Empirical research also provided evidence showing that even when the economic growth patterns of countries with rapidly growing populations were found to be slow, this negative correlation typically disappeared once other factors such as country size, openness to trade and educational attainment were taken into account. The view that technological progress and changing incentives could prevent an economic deadlock through price changes or institutional arrangements became more prevalent. Economic theory attracted increasing importance to factors other than physical capital endowments, particularly technology and human resources development.

These more recent non-alarmist views regarding the effects of population growth include several positions ranging from one suggesting that population growth is, in itself, neither favourable nor unfavourable to economic growth to a more optimistic outlook where population growth is regarded as a favourable factor in economic growth.<sup>4</sup> Economists such as Simon Kuznets and Julian Simon argued that as population increases, so does the stock of human ingenuity. 'Larger societies — with the capacity to take advantage of economies of scale — are better positioned to develop, exploit and disseminate the increased flow of knowledge they receive'.<sup>5</sup> Simon, in his influential book 'The Ultimate Resource' (1981), showed that rapid population growth can actually lead to a positive impact on economic development.<sup>6</sup>

<sup>3</sup> Prologue of 'The Population Bomb', 1975 republication, p. xi.

<sup>4</sup> For a more detailed overview of the historical debate on the impact of population growth on economic growth, see: Allen Kelly (1992).

<sup>5</sup> Cited by Bloom *et al* (2003), p. 15.

<sup>6</sup> J. L. Simon (1981).

The debate was redefined once more during the last quarter of the 20th century when demographers started warning about impending and unavoidable rapid population ageing, first across the industrialised world and then on a broader global scale.<sup>7</sup> Attention again shifted to population, with particular emphasis this time on changes related to age structure, including dependency ratios and, in particular, the observed differential between changes in the WAP and total population.

The time-lag between these two parameters can exceed 15 years in developed countries. Indeed, countries such as Japan that have had very low fertility rates and relatively modest migration inflows for more than two decades have shown a rapid increase in their demographic and economic dependency ratios. An increasingly ageing population puts constraints on employment growth rates and increases the pressure on social welfare. Conversely, countries with declining fertility rates but a growing WAP — mostly in the developing world — benefit from the favourable effects of an increasing WAP and a steadily declining dependency ratio. Analysts regard this situation as a window of opportunity, usually lasting 20-30 years, as it leads to faster economic growth for the countries concerned. Many authors refer to this state as the 'demographic dividend'.<sup>8</sup> These relatively recent developments have once more drawn economists' attention to the role of population in the process of economic growth, although on quite different terms to the classical Malthusian debate and despite the meanwhile prominent notion of endogenous growth which emphasises the role of technological progress in determining an economy's long-term growth potential.

The analysis by Peschner and Fotakis<sup>9</sup> in 2013 provided quantitative evidence of the negative impact that a decline in the WAP could have on the future employment and economic growth of each Member State and the EU as a whole. Europe's decline in the WAP coincides with a period of increased global competition for market share and skilled human resources. This paper therefore aims to extend the analysis to include some of the world's most important global players while maintaining the methodological framework used by the authors in their 2013 paper. The paper analyses the human resources potential for employment and economic growth in a number of countries selected on the basis of their economic importance and/or their demographic characteristics. To reduce data caveats related to harmonisation issues, the analysis makes use of international data sources<sup>10</sup> which enable comparisons to be made across countries.

The comparative analysis takes stock of specific population characteristics in the countries in question, namely age, sex and educational attainment. It also takes account of the situation on the respective domestic labour markets, since many countries have significant pools of unused labour capacity often related to specific population groups, namely women, young people, older workers, immigrants and minorities.

Section 2 explains the methodological approach and provides information on the assumptions made and data used. Section 3 sets the scene, explaining the EU's situation in the global context. In Section 4, the stylised model is first applied to the EU. Sections 5 and 6 look at four typical cases, two from the developed world — the United States and Japan (Section 5) — and the two most important emerging economies —

<sup>7</sup> Lutz *et al* (2004).

<sup>8</sup> Bloom *et al* (2003).

<sup>9</sup> J. Peschner, C. Fotakis: Growth potential of EU human resources and policy implications for future economic growth, European Commission (2013).

<sup>10</sup> These are data collections from international institutions, mainly the UN for demographic projections and the World Bank for economic and labour statistics. For more details on the data sets used, see United Nations, Department of Economic and Social Affairs, Population Division, World Population Prospects, 2012 revision ([http://esa.un.org/wpp/unpp/panel\\_indicators.htm](http://esa.un.org/wpp/unpp/panel_indicators.htm)) and the World Bank country-specific databases (<http://data.worldbank.org/country>).

China and India (Section 6). The analysis provides a snapshot of their human resources characteristics and their potential for future economic growth. Section 7 concludes with a policy-relevant discussion on global growth perspectives, taking account of the demographic and economic context. Annex 1 extends the analysis to other important regions and countries around the globe.

## 2. Core questions, model specifications and data use

Our analysis does not extend to economic forecasting, nor does it aim to replace economic forecasts — which can be risky in the light of the unstable economic environment and complex, non-economic factors that can influence long-term growth trends. Instead, we start out from standard demographic projections which offer a fairly reliable picture of future WAP trends. Then we look at ‘potential’<sup>11</sup> employment growth and its implications for future economic growth. Following this logic, the proposed methodological approach aims to provide answers to the following core questions:

1. *Assuming that the economic conditions in coming years will allow employment to grow at a pace equal to its average growth rate for the period preceding the economic crisis (2000-08), how long can the country in question sustain its rate of employment growth given the projected decline in the WAP?*
2. *Given the employment growth perspectives, what will their impact be on economic growth?*
3. *What is needed in terms of productivity growth to compensate for poor or negative employment growth?*

### A stylised model

The model used delimits the range of feasible future active population growth paths by defining a maximum (high) and a minimum (low) activity scenario for each country, based on a set of assumptions regarding age- and gender-specific activity rates and educational attainment levels. In the sober *low activity scenario* it is assumed that age- and gender specific activity rates will not progress any further in the future as they will remain constant at current levels. By contrast, the *high activity scenario* provides for several policy-related behavioural effects leading to what is assumed to be the most optimistic performance in terms of activity rates. More specifically, the assumptions used in the high activity scenario are the following:

- A **gender effect**, assuming that labour market participation rates for all working-age female groups will catch up with those for males by 2030. However, this assumption appears to be unrealistic in countries where female labour market participation today is very low. Hence, to stay consistent it is also assumed that the annual increase in the female labour market participation rate would not exceed two percentage points. This implies that for several countries in the developing world (discussed in Annex 1), the assumed catch-up process may extend well beyond 2030.<sup>12 13</sup>

<sup>11</sup> Future WAP trends do not enable employment levels to be predicted but they are able to show when a certain employment growth rate becomes unsustainable due to demographic constraints.

<sup>12</sup> It is also possible that an increase in female employment rates may impact on fertility and hence on future workforce trends. Existing empirical evidence does not enable safe conclusions to be drawn in relation to these effects, which vary from positive to negative depending on a variety of socio-economic factors such as income, social policy environment, cultural background and education. For this reason they are not taken into account in this analysis.

- An **educational effect**, assuming continued educational progression and hence a positive effect on activity rates, across all age groups.<sup>14</sup> Unfortunately, harmonised data showing participation rates by educational attainment are currently only available for OECD countries.<sup>15</sup> Given the absence of harmonised data for China and India, the average participation rates of OECD countries by educational attainment is used to calculate the educational effect on the WAP in these two countries. The proportion of people with a low, medium and high education is projected on the basis of the five-year interval time series from 1995 to 2010 (World Bank Statistics<sup>16</sup>). For the young age groups (25-34 years), a log-linear extrapolation of past trends up to 2060 is applied.<sup>17</sup> This projection method was used for both the proportion of people educated to a high and low level, while the remainder of this projection represents those with a medium level of education. Finally, the projection assumes no further educational progress for the older age groups (35-64).<sup>18</sup>

Both the low and high activation scenarios are no forecasts but purely technical tools to define the maximum range of possibilities to generate higher activity rates through activation policies. We test the sustainability of a given employment growth path within these limits of the active population as defined by the respective activity scenarios. This implies that the low activity scenario may not necessarily reflect the 'worst case' in terms of future active population growth. At the same time the impact on employment growth is difficult to foresee. As the gap between activity and employment rates refers to unemployment, success in reducing unemployment would depend on the nature of unemployment, the effectiveness of policies in place and the economic environment (see Box 1 on the case of Japan, displayed in more detail in Annex 2).<sup>19</sup>

### **Data sources used**

In order to be able to compare the situation in the EU with that of other regions in the world, as well as for data availability reasons, the methodological approach uses the World Bank's definition of working age as people aged 15 to 64 years. The analysis of EU countries, however, is still based on Eurostat's Europop 2013 demographic projections. Demographic assumptions for all other countries make use of the medium variant of the UN's World Population Prospects (2012 Revision). With respect to the underlying labour market data, especially activity and employment rates, the analysis relies on Eurostat's EU-Labour Force Survey data in the case of EU countries and on the World Bank's country-specific databases for all the other countries reviewed.<sup>20</sup> The World Bank database contains estimates of a country's employment and labour market participation rates. The projections made here need to be interpreted cautiously in that it is not known to what extent the prevalence of undeclared work — a major issue particularly in developing countries — affects the estimates.

<sup>13</sup> Feedback on female labour market activity and fertility rates is highly probable, but cannot be taken into account in the framework applied in this paper.

<sup>14</sup> There is ample evidence across the world suggesting a strong positive relationship between educational progression and labour market outcomes in general and activity rates in particular.

<sup>15</sup> The educational effect is based on OECD statistics: labour force participation rates by educational attainment, see Employment Outlook 2014, p. 275.

<sup>16</sup> World Bank EdStats database: <http://datatopics.worldbank.org/education/>.

<sup>17</sup> That is, the projection is to be seen as a rough trend as it is based on only very few observations.

<sup>18</sup> For example, the proportion of highly educated people in the age group 35-39 years in year  $t$  is assumed to be equal to the projected share of 30-34 year olds in  $t-5$ .

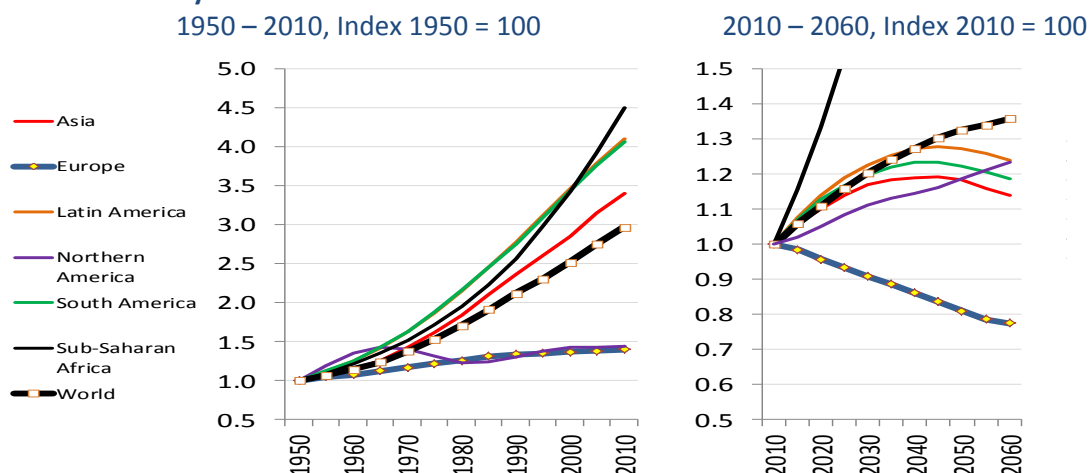
<sup>19</sup> In reality, the low activation scenario will rarely coincide with positive employment growth: As employment growth continues it would not only necessitate recruitment from among the ranks of the unemployed but also require the activation of people who had been inactive thus far. We would thus see higher activity rates — leaving the theoretical grounds of the low activation scenario which implies stagnant activity rates.

<sup>20</sup> 'Countries and Economies' databases available at: <http://data.worldbank.org/country>.

### 3. Setting the scene: global trends in working age population and their role in future employment and economic growth

The beginning of the 21st century has been characterised by a slowdown in global WAP growth. According to the UN's 2012 Population Prospects (medium variant), global WAP (15-64 age group) is projected to increase by 20 % in the period 2010 to 2030. This growth projection, though substantial in absolute terms, represents a significant slow-down compared to the past 20-year period when the corresponding increase was 40 %. The regional analysis of global trends reveals growing diversification across world regions. Most countries of the most developed parts of the world have already entered a long phase of decline in their WAP while other countries, including the poorest regions, will continue to see their WAP increase for many more decades.

**Graph 1: Working age population since 1950 in selected countries/regions as projected by the UN**



Source: UN Population Estimates, Medium Variant

Graph 1 illustrates the UN's breakdown of WAP by geographical regions<sup>21</sup> from 1950 to 2010 and the projections for the period 2010 to 2060. In the 2010-30 period, Sub-Saharan Africa will see a 77 % increase in its WAP — the strongest of all regions. North America will grow modestly by 11 %. South America, Latin America and Asia will evolve in line with the world average until 2030, growing by around 20 % — with significant variation across countries. In these regions the decline will start only after 2040. By contrast, Europe's WAP growth had ended already by 2010. In the period 2010-30, Europe will face a decline of 9 %. This brief review of regional trends indicates that, behind the global slowdown in WAP growth, there is a gradual polarisation between the ageing and shrinking WAP in the developed world and the growing and mostly under-utilised workforce in the world's poorest regions.

An examination of the same trends at country level shows that WAP and contraction are prevalent in Japan, followed by the Russian Federation, South Korea and the EU. China will also be faced with a rapid decline in its WAP, as will be shown in more detail further on. The WAP in these countries will decline steadily over the next 50 years. The United States is facing a different demographic pattern: the country will continue to see an increase in WAP mainly due to relatively higher fertility rates and sustained net migration inflows. By contrast, most of the developing countries reviewed in this paper, namely Nigeria, India, Pakistan and Egypt, will continue to see their WAP grow

<sup>21</sup> For the exact definition of regions consult <http://esa.un.org/wpp/Excel-Data/country-classification.pdf>.

at a rapid annual rate of above 1 % over at least the next 40 years. Latin American countries deviate from this demographic pattern. Mexico, Brazil and Argentina, the most populated countries in this group, show a more modest pace of WAP growth, which will begin to decline well before the middle of this century.

Table 1 illustrates some of these contrasting profiles for a set of representative world countries. The second column shows that the only countries maintaining positive growth in their WAP rate are either certain developed countries with a sustained inflow of migrants i.e. Australia, Canada, USA, or developing countries in Africa and South Asia whose fertility rates are still considerably higher than the generation replacement level.<sup>22</sup> The last column of the table summarises the findings of the model presented further on. It assesses each country's human resources potential for sustaining the pattern of recent employment growth in the years ahead.<sup>23</sup> More specifically, given the activity constraints set by the high and low activity scenarios, the column shows for how long in the future each country could sustain the level of employment growth observed during the period before the economic crisis (2000-08). In most developed countries, this level of pre-crisis employment growth will be possible for less than 10 years, depending on the rate of WAP decline and progress in mobilising the remaining pools of idle human resources — mainly women, but also migrants, young people and discouraged workers. Despite a more favourable demographic outlook in many parts of the developing world, labour market participation remains low, mainly due to extremely low female labour market participation, which is below 40 % in a number of regions. This represents a key constraint for future employment growth in the developing world.

<sup>22</sup> Replacement level fertility rates are fertility rates that at given mortality conditions ensure that new-born girls will bear, on average during their lifetime, the number of children required to keep population size unchanged. In most of the given countries, replacement level fertility rates vary from 2.05 to 2.1.

<sup>23</sup> Details on individual countries can be found in the analysis to follow and the country fiches in annex.

**Table 1: The potential impact of a decline in WAP on employment growth: past trends and future constraints**

Country/Region	Year of max working age population	Average empl. growth period 2000-08 (%)	Number of future years workforce could meet labour market needs assuming same rate of empl. growth.
EU28	2009	1.1	6-10
USA	keeps growing throughout the period	0.5	more than 50 years (1)
Canada	keeps growing throughout the period	1.6	5-6
Australia	keeps growing throughout the period	2.3	1-3
Russian Federation	2010	1.1	2
Brasil	2035	2.4	5-10
Argentina	2045	3.2	2-5
Mexico	2045	2.0	10-26
Turkey	2040	0.9	38-more than 60 years
Egypt	keeps growing throughout the period	3.1	6-28
Iran	2040	3.1	4-20
Saudi-Arabia	2040	5.5	0-2
Nigeria	keeps growing throughout the period	2.6	more than 60 years
South Africa	keeps growing throughout the period	2.0	22-30
Japan	1992	-0.2	5-23
Republic of Korea	2015	1.0	4-11
China	2015	1.1	3-4
India	2050	1.7	13-41
Pakistan	2060	3.9	3-16

**Note**

(1) The US empl rate has been for during several years within the reference period 2000-08 resulting in a modest average empl. growth figure.

If for the sake of comparison we assume the same future employment growth rate as in the case of the EU (1.1) the number of years the US workforce could sustain this pattern of growth would be considerably reduced to 10-18 years.

Employment growth constraints represent a major concern for economic growth, particularly in developed economies. Their economic growth will have to rely mainly on productivity growth. The analysis below shows that sources of potential productivity growth are strongly linked to the stage of economic development, and the country's ability to innovate and attract both physical and human resource investment.

Most developing countries still have significant pools of redundant labour capacity, both in the form of inactivity/unemployment or due to high concentrations in very low productivity jobs in the primary sector and other backward economic activities. Hence, for developing countries these large reserves represent great potential for significant productivity gains by reallocating human resources away from less productive activities towards higher-productivity jobs in the industrial or service sectors. However, reaping this potential is not an easy goal. Governance and institutional weaknesses, instability, corruption and other distortions may discourage the flow of investment and capital formation that is necessary for these countries to make the most of their human resources and speed up their economic growth. The extent to which these productivity gains could be reaped by developing countries and emerging economies may have an impact on how market share, income and hence world welfare will be globally redistributed over coming decades. Developed countries have relatively limited potential to generate productivity growth through major labour reallocation shifts since the workforce that is engaged in very low productivity activities (mainly in the agricultural sector) is already comparably small and the cost of labour is much higher.

These important global trends affect Europe's growth perspectives since Europe is increasingly intertwined with the global economy. The EU27's exchange of services with China has more than tripled since 2004, amounting to 32 billion euros or 2.5 % of GDP

in 2013.<sup>24</sup> Indeed, large and fast growing economies such as China and India play an increasingly significant role when it comes to the exchange of goods and services on the world market. At the same time, migration inflows from Asia, Africa and Latin America increased sharply in the period before the economic crisis in 2000-08. As the world outside Europe continues to rapidly generate a large pool of mobile and better skilled labour, the EU's own employment and growth position will be increasingly affected.

#### 4. Future EU trends in the working age population<sup>25</sup> and their implication for employment and economic growth

Despite growing global competition, the EU has maintained its position as the world's largest exporter. Nevertheless, Europe, and in particular the EU periphery, was hit hard by the economic crisis and the future outlook remains challenging given the level of public debt in the Eurozone, the persistently high unemployment in most Member States and the growing economic polarisation of the EU regions.

Past evidence indicates that economic recovery after financial crises has tended to be rather slow and sluggish given the need for fiscal consolidation, stronger private sector deleveraging<sup>26</sup> and restructuring of the economy towards more competitive (tradable) sectors to restore profitability.<sup>27</sup> In the years ahead, Europe will have to address these challenges in the face of the demographic developments which are expected to impact strongly on its potential for economic growth.

The EU's WAP (15-64 age group) reached its maximum level of 333 million in 2010 and has been shrinking ever since — triggering a long period of decline which, according to Eurostat's Europop 2013 main demographic scenario, is expected to last for at least five decades.

The main findings at EU level are illustrated in Graphs 2 and 3. Graph 2 shows how long a hypothetical annual employment growth of 1.1 % can be sustained in the two (high and low) activity scenarios (dotted green lines). The 1.1 % employment growth assumption serves as a benchmark. It corresponds to the average EU performance during the reference period before the economic crisis (2000-08). At the same time, this rate of employment growth is consistent with the 'Europe 2020' employment target for 2020, starting in 2013.<sup>28</sup> Whereas the bold black line shows the WAP (15-64 age group) as projected by Eurostat, the red and blue lines depict the active population in the low and high activity scenarios, respectively. The right side of the chart shows employment and activity rate as a percentage of WAP.

<sup>24</sup> Source: Eurostat. See [http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search\\_database,table\[bop\\_its\\_det\]](http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database,table[bop_its_det]).

<sup>25</sup> The present analysis looks at the EU as a whole and does not consider individual EU countries as these are reviewed in depth in Peschner and Fotakis (2013) and in its forthcoming update. In addition, as explained on page 3, for the sake of global comparability the present analysis employs a slightly different set of data and focuses on the specific questions raised in this paper.

<sup>26</sup> See European Commission, Autumn Economic Forecast 2013 for many countries.

<sup>27</sup> See European Commission, Product Market Review 2013, especially p. 3.

<sup>28</sup> The most recent Labour Force Survey Data is from 2013. The core of the EU 2020 strategy is the employment rate target. The employment rate for the 20 to 64 age group should be at least 75 % of the population of that age group, starting from around 69 % in 2013. Progress since the start of the strategy (2010) has been very limited.

For the sake of policy relevance and in order to reflect the recent G20 policy objectives which aim to increase female labour-market participation, there are two supplementary scenarios in Graph 2 in addition to the main high and low scenarios:

1. The dotted blue line in both charts adds the educational progression effect on labour market participation to the high activity scenario as calculated in Peschner and Fotakis (2013).
2. The dotted grey line depicts the objective set in Brisbane on 14 November 2014 by the G20 to 'reduce the current gap in participation between men and women in G20 economies by 25 per cent by 2025 as a reference for action'.<sup>29</sup> The objective is to bring 'more than 100 million women into the labour force.' To take the G20 Brisbane scenario on board we assume that, starting now, the female activity rate will rise by 2025 by one quarter of the difference between the current female and the male activity rate. A linear continuation of the Brisbane trend is expected post-2025, meaning that the Brisbane scenario will, in the long run, result in a situation with no gender gap in activity rates. Hence, by 2060, the Brisbane scenario will approach the high activity scenario.

The findings of this projection reveal both the impact of demographic trends and the role of behaviour, i.e. relating to female participation in the labour market and the effect of education. Looking at the low activity scenario, we find that the trend in employment will become negative by 2021 as all labour reserves (assumed to be only the unemployed) would be exhausted. The Brisbane scenario would have no noticeable effect by then as growth in female participation is assumed to be gradual.<sup>30</sup> In the case of the high activity scenario, the employment rate of 15-64 year-olds would rise to levels close to 78% by 2030, thanks to the hypothetical fast progress in female participation. In that case Europe would be able to postpone its employment bottleneck for another five years. Two more years can be added when account is also taken of the assumption on educational progress and its favourable impact on labour market participation.<sup>31</sup>

It is obvious that a negative trend in employment is practically unavoidable under all of these scenarios. As seen in Graph 3, if pre-crisis GDP growth (+2.1 % p.a.)<sup>32</sup> were to be maintained in the long run, the rate of productivity growth would have to double after 2020 under the low activity scenario to compensate for negative employment growth.<sup>33</sup> Nevertheless, under the high activity scenario, successful female activation policy could extend the period of employment growth for an additional five years, thus providing more time for making the necessary reforms to an economy which will have to rely exclusively on productivity yields for its economic growth in the long run.

<sup>29</sup> G20 Australia 2014 Policy Note, 'Lifting employment and workforce participation'.

<sup>30</sup> However, in 2025, the year targeted by the summit in Brisbane, reducing the gender gap would generate some 4 million workers EU-wide.

<sup>31</sup> The difference to the findings in Peschner and Fotakis (2013) is due to the update of Eurostat's demographic projections, the non-inclusion of an 'older worker effect' in the present model and a different definition of WAP (15-64 instead of 20-64).

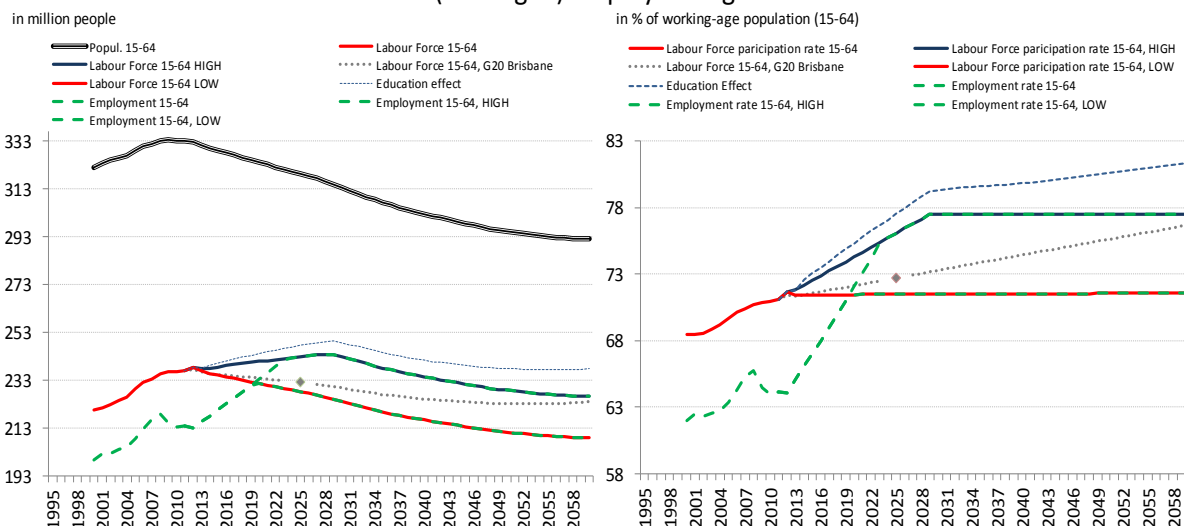
<sup>32</sup> This rate of economic growth is equivalent to the EU long-term average until 2008 — the start year of the crisis.

<sup>33</sup> It is interesting to note that several EU Member States will already face significant labour shortages in the next 2-5 years. For a more detailed illustration at Member State level, see Peschner and Fotakis (2013).

**Graph 2: Potential employment path assuming different activity scenarios, EU28**

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)

Assumed (envisaged) employment growth: 1.1 %



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario); World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

See also Peschner/Fotakis (2013), pp. 13-15.

#### Box 1: 'Low activity scenario' does not mean pessimistic — evidence from Japan

*The low activity scenario need not be regarded as a 'pessimistic' worst case. In fact, lessons learnt from the Japanese experience indicate that a decline in employment immediately after the peak in the WAP is possible. This is demonstrated in **Annex 2**, based on a counter-factual ex-post analysis of the Japanese case where we compare the high and the low scenarios, hypothetically starting in 1995 — the year that Japanese WAP reached its maximum — against actual employment and WAP developments since. In Japan, the decline of WAP was followed, almost immediately by a decline in employment without any substantial increase of activity or decline in unemployment. The Japanese experience indicates that if poor economic conditions across most EU Member-States persist, Europe may face a similar challenge given the declining trend of its WAP and the current stagnant economic climate.*

The findings confirm that, given the EU demographics, pursuing higher productivity will be challenging but essential to sustaining economic growth. Using a growth-accounting approach, van Ark *et al* (2013)<sup>34</sup> have identified 'weak productivity performance' in both services and goods-producing sectors in most EU Member States. Projections up to 2025 confirm that productivity will be the 'critical factor' in Europe's future economic growth. Rincon-Aznar *et al* (2014)<sup>35</sup> have also found that there is a considerable EU productivity gap relative to the US, highlighting the importance of labour market institutions in supporting the more efficient diffusion of technology and

<sup>34</sup> Van Ark, B. *et al* (2013), see

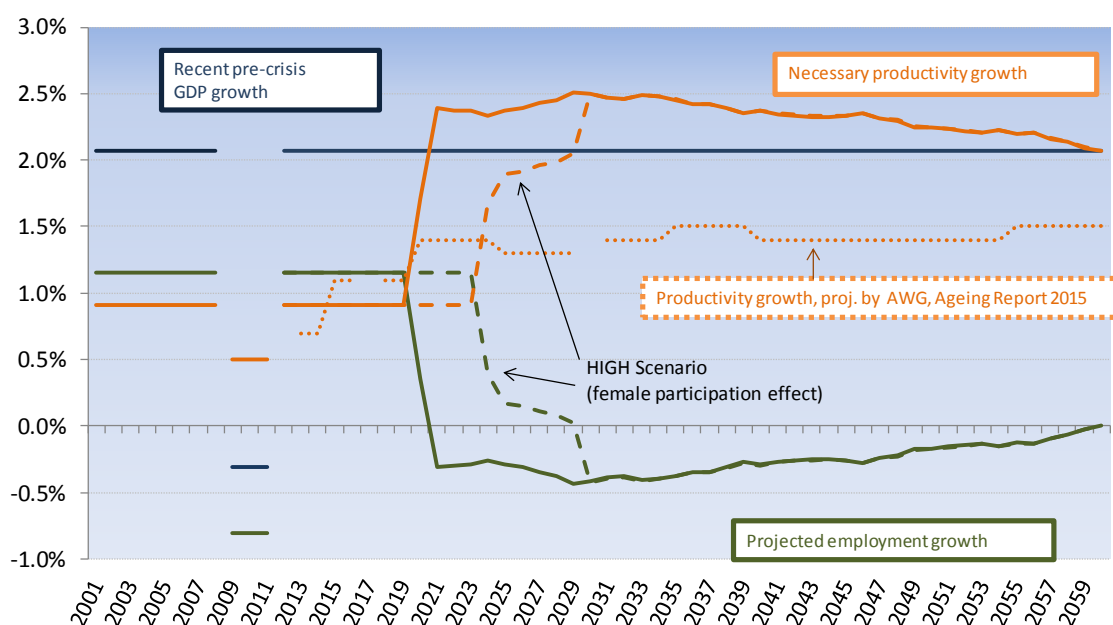
[http://ec.europa.eu/economy\\_finance/publications/economic\\_paper/2013/ecp485\\_en.htm](http://ec.europa.eu/economy_finance/publications/economic_paper/2013/ecp485_en.htm).

<sup>35</sup> Rincon-Aznar *et al* (2014).

a reduction in inefficiencies in production. This is even more important if one takes into account that Europe will not be able to compete with the emerging economies on the global markets in a range of labour intensive, low-productivity sectors for both demographic and economic reasons.

**Graph 3: Employment and required productivity growth at 2 % GDP growth (% p.a.), EU28**

Future employment growth potential and levels of productivity growth required to sustain 2.1 % GDP growth



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario);  
World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>)  
Productivity growth projection according to European Commission, Ageing Working Group, Ageing Report 2015, p. 409

See also Peschner/Fotakis (2013), pp. 13-15.

In this context, it is crucial to bear in mind that the 'necessary productivity growth' as shown in Graph 3 is neither an assumption nor a projection of potential future productivity gains. It is merely a technical indicator of productivity growth were the EU to attain the same economic growth rates as in the past. Assumptions on how productivity growth could develop in the future were taken on board in the 2015 Ageing Report produced jointly by the European Commission and the Economic Policy Committee's Ageing Working Group (AWG).<sup>36</sup> According to the AWG, productivity growth could eventually reach 1.5% p.a., falling half a percentage point behind the 'necessary' productivity gains in both of the above scenarios. Consequently, potential GDP growth would drop to only 1.5% in the long run — consistent with the AWG projection.

<sup>36</sup> See p. 409 of the 2015 Ageing Report, Underlying Assumptions and Projection Methodologies.

## 5 Future growth perspectives of the developed world: the cases of United States and Japan

### 5.1 The case of United States

At the start of the 21st century, the US economy was the biggest in the world. Prices were stable and unemployment was at its lowest level in almost 30 years, while the stock market was experiencing an unprecedented boom. Since then, however, the US economy has been faced with two major economic crises. The stock market crash of 2000-02 resulted in the loss of \$5 trillion in the market value of companies from March 2000 to October 2002.<sup>37</sup> A few years later, when the US subprime mortgage bubble burst in 2006, the US and other countries went into a lengthy recession. The US activity rate had already started to decline before this due to an unfavourable economic climate. According to the US Bureau of Labor Statistics, key factors behind the decline in active population growth included: the ageing of the baby boom generation; the fact that women's activity rates had already peaked; and an increase in the number of discouraged workers during two US downturns. This decline is expected to continue over the next decade.<sup>38</sup> Despite continuing progress in education, the projections of the US Bureau of Labor Statistics, anticipate a further decline in the US labour force growth down to +0.5% annually (compared to +1.2% during the 10 years up to 2002), taking account of both demographic and economic factors. In 2022, the US participation rate is projected to reach a level last seen in 1978, though it will be quite different in qualitative terms. In 2022, US WAP will be more diversified in terms of ethnic composition, its age structure will be relatively older and the average education level significantly higher.

The two economic downturns and the moving of millions of jobs offshore to places in China and other Asian countries with cheaper labour costs resulted in significant job losses, particularly in manufacturing and some services. This also contributed to a decline in participation rates. The 2001 and 2007-09 recessions caused a lasting decline in employment rates from 73% in 2000 to 66% in 2012 (see Graph 7 below). US unemployment increased from 4% in 2000 to more than 9% in 2009-11, creating a large number of disillusioned workers. According to the US Bureau of Labor Statistics, a number of structural factors are fuelling the decline:

Firstly, looking at the US labour supply in the period between 2012 and 2022, it is evident that the bulk of the massive baby boom generation is entering the older worker group (55 years and above), their participation rate today being only half that of the 25 to 64 age group: 40.5% versus 81.4% in 2012.

Secondly, the massive entry of women into the US labour market, one of the main reasons for the fast growth in participation rates, peaked at the turn of the century. Female participation is projected to decline slightly over the next few years.

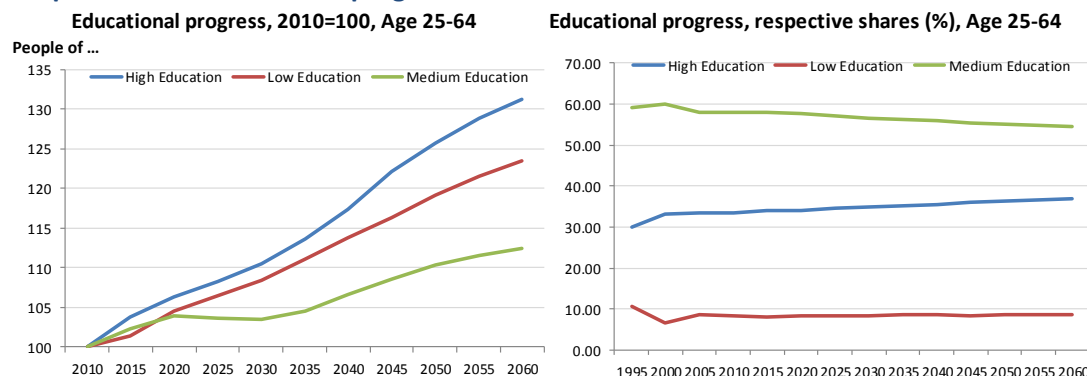
Finally, the substantial progress in education — normally associated with higher participation rates — has tended to delay people's entry into the labour force, women's in particular. In light of this upward trend since 1995 (see Graph 4b), progress in education is expected to be slower in the coming years. The share of highly educated people

<sup>37</sup> Gaither/Chmielewski (2013).

<sup>38</sup> P. 3 in 'Labor force projections to 2022: The labor force participation rate continues to fall' by the US Bureau of Labor Statistics (2013).

aged 25-64 years is projected to increase very moderately, and mainly at the expense of the medium educated. Hence, the main driver behind the increasing supply of skilled workers will continue to be demographics (Graph 4a) as the WAP in the US will continue to increase in the coming decades, albeit more slowly than previously (see Graph 7).

**Graph 4: Educational progression in the US**



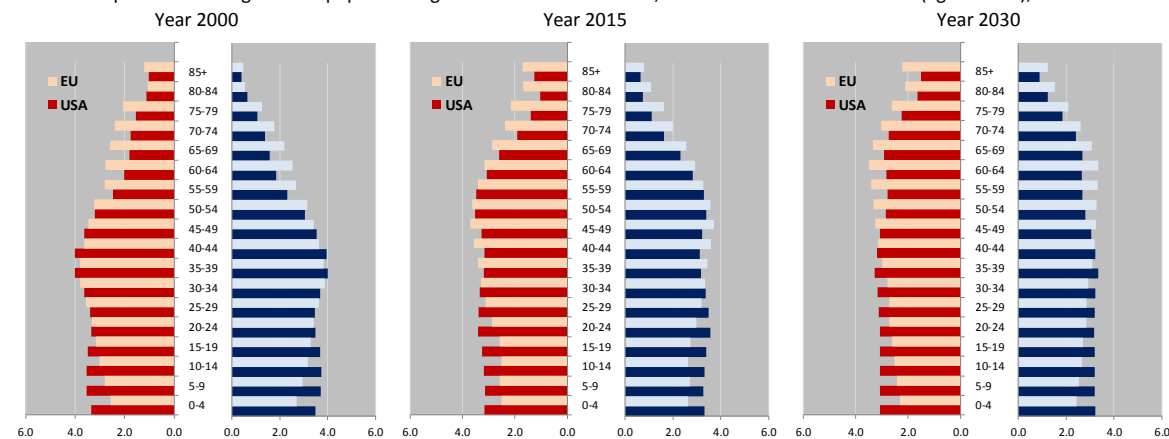
Source: Based on UN population projections, 2012 revision; and World Bank Education Statistics (EdStats)

Rhs: log-linear extrapolation done by the authors of the 1995-2010 trend for the 25-34 year-olds; no progression for older cohorts

On the basis of demographic trends, the US population is ageing more slowly than that of the EU. Graph 5 illustrates the difference between the US and EU populations in the evolution of age pyramids between 2000 and 2030. This difference is mainly due to a relatively higher US fertility rate and greater net migratory inflows.

**Graph 5: The USA's population pyramid 2000 – 2030**

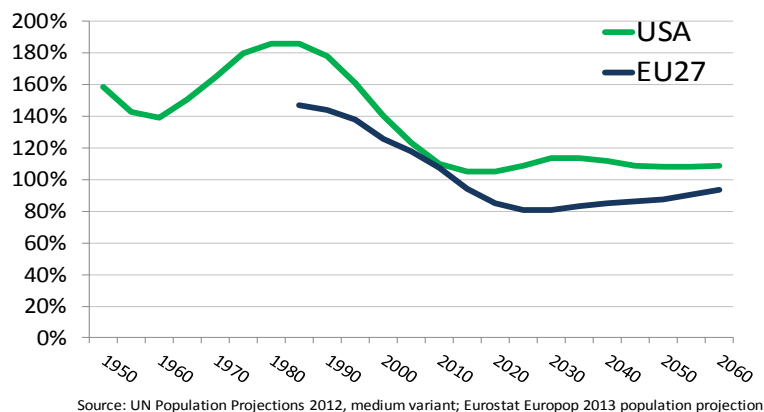
A comparison of changes in the population age structure between 2000, 2015 and 2030: USA vs the EU (light colour), % of total



Source: UN Population Projection 2012, medium variant, Eurostat Europop 2013 population projections

Given the relatively slow rate of population ageing, the WAP (15-64) is expected to keep on growing until 2060, albeit at a slower pace than in the past.

**Graph 6: Cohort balance in the US**  
Entering (age 15-29), relative to  
outgoing (age 50-64) cohorts



Graph 6 provides a comparison between the US (green) and the EU (blue) cohort balance for the entry and exit cohorts in the WAP. The graph clearly shows the rapid decline in this balance in the US over the past 30 years. Nevertheless, whereas the EU has had a negative balance since 2013, the US will maintain a steady, positive pace in the years ahead, despite its past fall.

Another concern relates to the rapidly changing population composition in terms of ethnicity and its potential impact on both the educational structure of the WAP and labour market outcomes. US population projections indicate that the Hispanic population will more than double, from 53.3 million in 2012 to 128.8 million in 2060. So far, Hispanic workers have had the lowest educational attainment of any major ethnic group. Thus, according to the US Dept. of Labour, *'unless Hispanic youth and immigrants raise considerably their education record, their growing presence in the job market will lower the educational base of the labor force at the very time when the demand for skills is continuing to increase'*.<sup>39</sup>

### Model findings for the USA

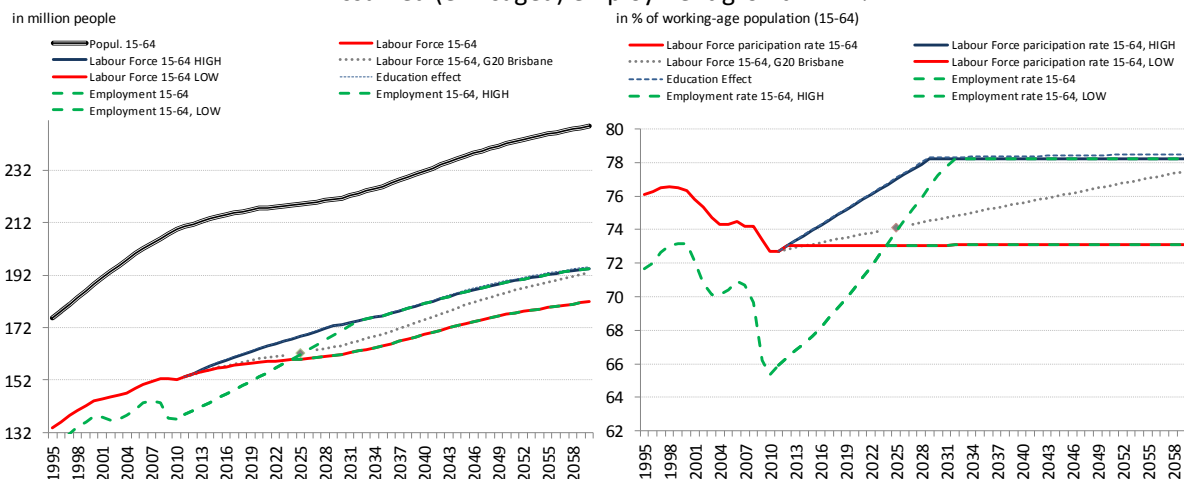
The main findings are illustrated in Graph 7 which shows how long a hypothetical annual employment growth of 1.1 % can be sustained in the two activity scenarios. The 1.1 % employment growth assumption corresponds to the one applied to the EU above which facilitates comparison between the two. The US's 'own' pre-crisis employment growth path between 2000 and 2008 corresponds to an annual average increase of just 0.5 %. It may, however, be biased by the crisis which started earlier in the USA than in the EU.

It can be observed that in the low activity scenario, employment growth will drop to zero by 2025 as all labour reserves (assumed only to be the unemployed in this scenario) will be exhausted. In the case of the high activity scenario which assumes the employment rate to climb to levels close to 78 % by 2035, the US would postpone its employment bottleneck for 10 more years. Unlike the case of the EU, none of the two scenarios will result in negative employment growth as the US WAP keeps increasing throughout the projection horizon.

<sup>39</sup> US Dept of Labour: Futurework, ch1 Febr1, 2001  
<https://www.dol.gov/oasam/programs/history/herman/reports/futurework/report/chapter1/main.htm>.

**Graph 7: Potential employment path assuming different activity scenarios, USA**

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: 1.1 %



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario);  
World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

Graph 8 shows that the necessary annual rate of productivity growth would need to increase from the 1.5% average seen over the period before the economic crisis (2000-08) to 1.8 % after 2025 under the low activity scenario to compensate for a loss of economic growth caused by the decline in employment growth. Nevertheless, under the high activity scenario, successful activation policies could extend the period of unlimited employment growth by almost one decade.

As of productivity: the average pre-crisis productivity growth (between 2000 and 2008) in the US was higher than in the EU (around 1.5 % vs 0.9 %). Therefore, the additional effort needed to accelerate productivity growth appears to be feasible for the US economy. Nevertheless, it is worth noting that long-term projections by the OECD assume a moderate decline in productivity growth to 1.3 % annually in the long run.<sup>40</sup>

Hence, in terms of future growth perspectives, the US is in a more advantageous situation than the EU for two main reasons:

- The US maintains a leading position in the world in science, technology and innovation. As a result, US productivity growth has been higher than in the EU for decades. The developments in the ICT sector are one explanation, but not the only one. There is strong evidence that the institutional surrounding in the US is more effective, compared to the EU, in promoting innovative research and technologies and diffusing their outcome across industries.<sup>41</sup>
- The US WAP is projected to keep on increasing, albeit at a slower pace. The main policy challenge for the US economy in this area will be to address the range of non-demographic issues related to the declining labour force trend.

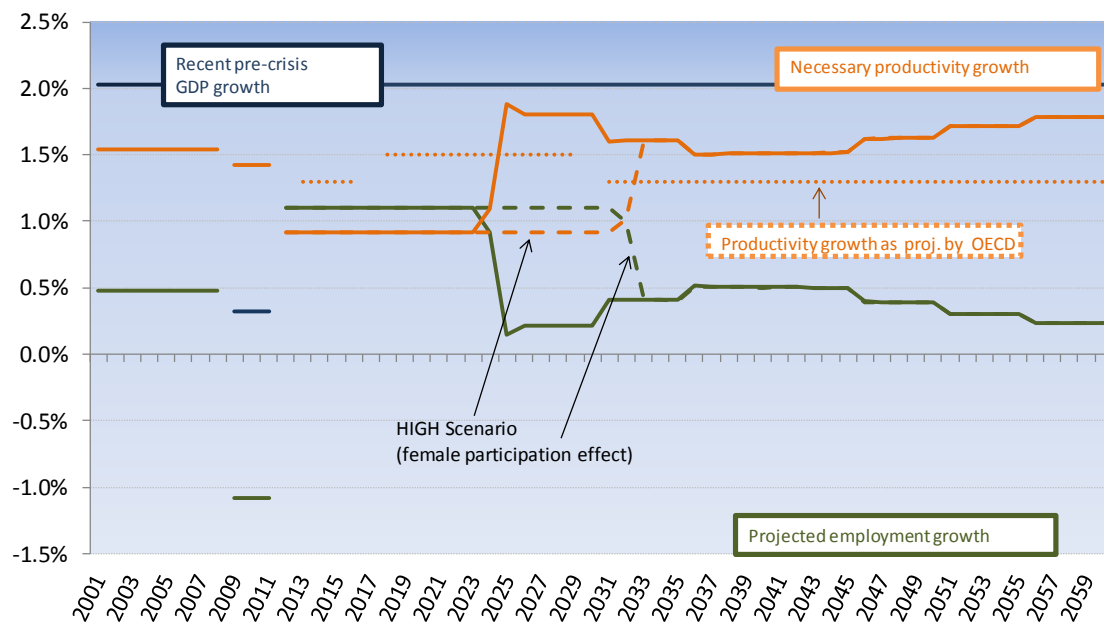
<sup>40</sup> Economic Outlook 2012/1, Chapter 4, p. 200.

<sup>41</sup> Rincon-Aznar *et al* (2014) conclude that even 'after the ICT revolution the EU is not only still lagging behind the US, but the productivity gap has widened, particularly since the financial and economic crisis of 2007-2008'; and the 'more rigid institutional and regulatory framework in Europe compared to the US [be] one of the main culprits for the lower productivity performance' (p. 1).

Significant inequalities, particularly in access to education, are pronounced for specific ethnic groups and result in less favourable labour market outcomes.

**Graph 8: Employment and required productivity growth at 2 % GDP growth (% p.a.), USA**

Future employment growth potential and levels of productivity growth required to sustain 2 % GDP growth



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario);  
World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>)  
Productivity growth projection by OECD, Economic Outlook 2012, p. 200

## 5.2 The case of Japan

In the post-war period, Japan experienced a period of rapid industrial development and high economic growth. Many socio-economic and institutional factors contributed to the so-called 'Japanese economic miracle'. Key factors appear to be the size and quality of investment in capital equipment,<sup>42</sup> and the contribution of the Japanese labour force, not only in terms of its availability and skill standards but also because of its loyalty and its moderate wage demands, taking into account the substantial gains in productivity throughout most of the second half of the 20th century. In addition, coordinating production within large industrial groups, and integrating smaller firms and subcontractors contributed to higher industrial efficiency.<sup>43</sup>

However, WAP started to decline earlier in Japan (1992) and is more pronounced than the average of the industrialised countries. This added to other constraints resulting from the economic crisis caused by the collapse of the bubble economy in the 1990s and the growing cost of raw materials and energy resources. In responding to these challenges, Japanese industry has, since the early 1980s, increasingly opted to expand abroad by offshoring a significant part of its production. According to the Survey of Overseas Business Activities of the Japanese Ministry of Economy, Trade and Industry,

<sup>42</sup> Bradford De Long, J., Summers, L. H. (1991).

<sup>43</sup> Dolan, R. E., Worden, R. L. (Editors, 1994). Online: <http://countrystudies.us/japan/98.htm>.

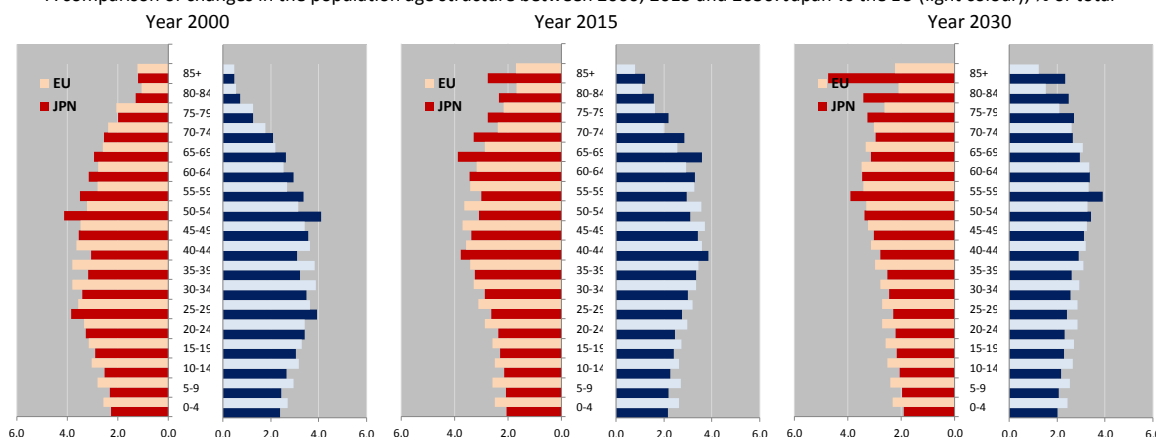
there were 10 425 overseas affiliate companies in the manufacturing industry at the end of fiscal year 2012.<sup>44</sup> It is anticipated that this trend will continue, also taking into account the size of the markets in emerging economies. There are many companies that are planning to expand their business activities to China, Indonesia, India, Thailand, Mexico and elsewhere.

During the period from the onset of economic crisis in the 1990s until 2012, the Japanese economy has grown in real terms at an average annual rate of 1 % at most. However, it is worth noting that GDP per capita is still growing. This might appear encouraging but this growth contributes little to relieving the enormous Japanese public debt, which exceeded 220 % of the country's GDP in 2013.<sup>45</sup> This problem will remain, given the declining population, unless the Japanese economy undergoes a spectacular recovery in the years ahead through increased productivity.

Looking at the demographic trends, the Japanese population is ageing slightly faster than EU's. Graph 9 illustrates the difference in pace between the Japanese and EU populations in the evolution of age pyramids between 2000 and 2030. The differences in the younger age cohorts are mainly due to a relatively higher net flow of migrants to the EU.

**Graph 9: Japan's population pyramid 2000 – 2030**

A comparison of changes in the population age structure between 2000, 2015 and 2030: Japan vs the EU (light colour), % of total



Source: UN Population Projection 2012, medium variant, Eurostat Europop 2013 population projections

The WAP (15-64) is expected to keep on declining until 2060 albeit at a slower rate than in the past. Graph 10 provides a comparison between the Japanese (green) and the EU (blue) cohort balance for the entry and exit cohorts in the WAP. The graph clearly shows the slightly faster decline in this balance in Japan throughout the period. Looking at the labour market, Japan shows clear signs of a human resources bottleneck. Japan's unemployment rate in the second quarter of 2014 was 3.6 %, just below its pre-crisis level of 3.8 % in 2007. Women, although representing only a small reserve, are the only available reserve to slow down future employment decline. According to the OECD, if the current gap in labour force participation between men and women was reduced by 25 % by 2025, this would increase Japan's labour supply by 1.4 % and the GDP by 0.7 %.<sup>46</sup>

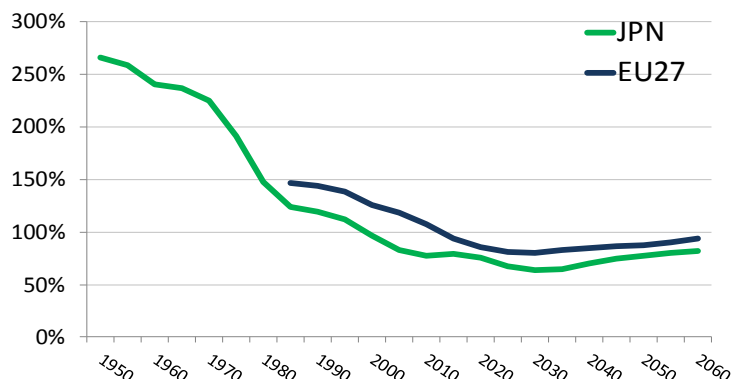
<sup>44</sup> See <http://www.meti.go.jp/english/statistics/tyo/kaigaizi/pdf/h2c406je.pdf>.

<sup>45</sup> See for example <http://www.tradingeconomics.com/japan/government-debt-to-gdp>.

<sup>46</sup> OECD Employment Outlook 2014: How does JAPAN compare? September 2014.

**Graph 10: Cohort balance in Japan**

Entering (age 15-29), relative to  
outgoing (age 50-64) cohorts



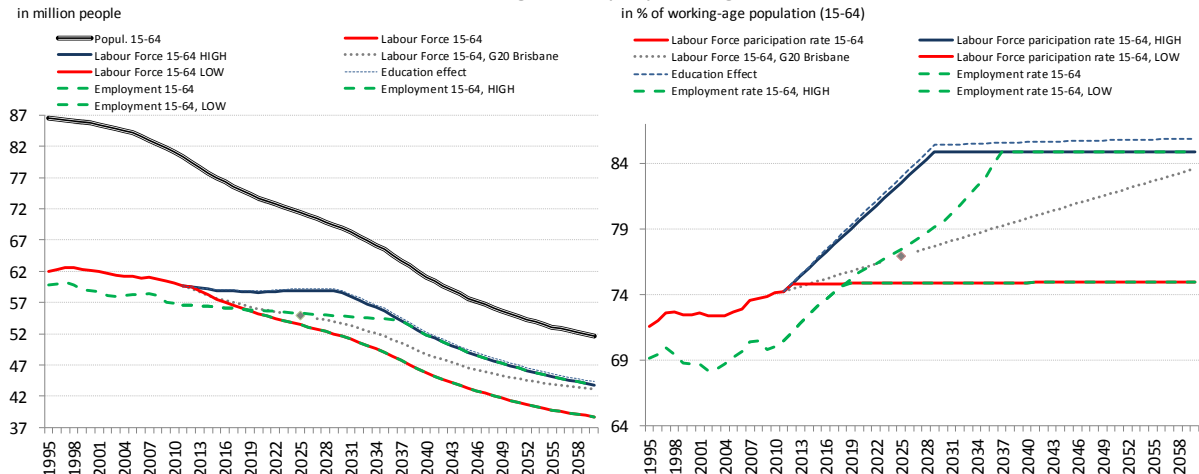
Source: UN Population Projections 2012, medium variant; Eurostat Europop 2013 population projection

### Model findings for Japan

Given the steady decline in the Japanese labour force for more than 30 years, any scenario of sustainable employment growth in the years ahead appears unrealistic. Employment declined by -0.2% per year on average over the pre-crisis period 2000-08. For this reason, the hypothesis tested by the projection model in the case of Japan is equally modest. Graph 11 provides two activity scenarios, showing how long this slow rate of annual employment decline of -0.2% can be maintained from 2013 onwards. Even this modest negative pattern is only sustainable for five years under the low activity scenario. Under the high activity scenario, Japan could sustain this employment growth for a further 20 years or so. This is because the high activity scenario assumes a quantum leap in terms of Japan's female labour market participation rate (currently 63% vs 85% for men aged 15-64). The employment rate could thus climb up to levels around 85% after 2030. However, past evidence suggests that this scenario has little prospect of materialising. Despite a shrinking WAP since 1995, progress in female employment has thus far been very slow.

**Graph 11: Potential employment path assuming different activity scenarios, Japan**

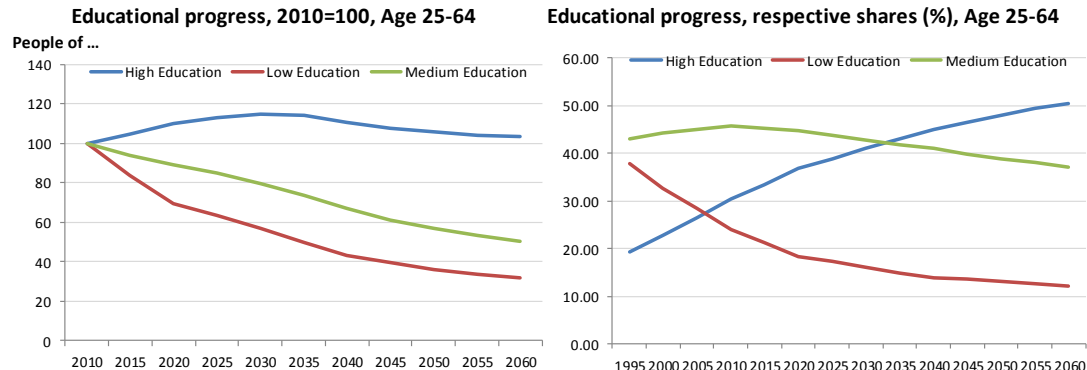
Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: -0.2 %



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario);  
World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

Educational progression in Japan has been remarkable in the past 20 years, and is projected to continue as shown in Graph 12.

**Graph 12: Educational progression in the Japan**



Source: Based on UN population projections, 2012 revision; and World Bank Education Statistics (EdStats)

Rhs: log-linear extrapolation done by the authors of the 1995-2010 trend for the 25-34 year-olds; no progression for older cohorts

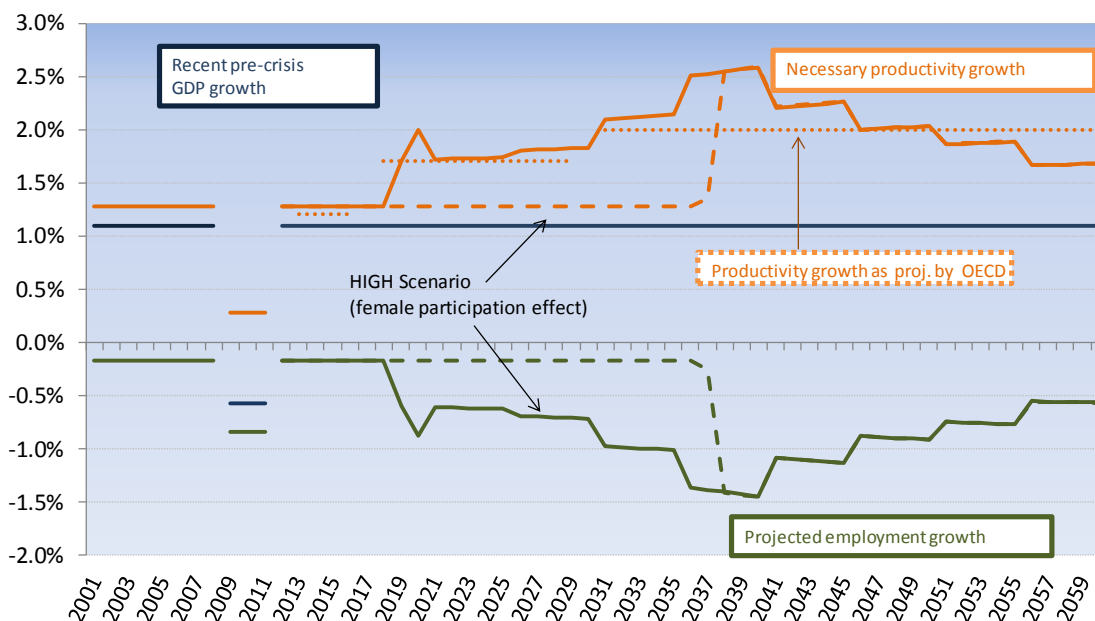
However, its impact on labour market participation is not expected to be significant because the spread of participation rates across education levels is relatively narrow in Japan (see Graph 11).

Even before the crisis, Japan's modest economic growth of around 1 % was exclusively due to productivity gains, as employment growth was already negative. Graph 13 shows that, given the country's strong decline in projected employment, Japan will face major difficulties in sustaining even its modest economic growth of the past decade. Given Japan's projected strong employment decline in both activity scenarios, it would have to double its productivity growth over the next decades, up to the mid-2030s, just to compensate for a declining WAP. The OECD's long-term projection for Japanese productivity gains (+2 %) is in line with the productivity gains required under both scenarios only after 2045. On the basis of this projection the Japanese econ-

omy could still achieve moderately positive rates of growth of less than 1 %. However, the period up to 2040 will be particularly challenging due to the accelerating decline of the Japanese WAP.

**Graph 13: Employment and required productivity growth at 2 % GDP growth (% p.a.), Japan**

Future employment growth potential and levels of productivity growth required to sustain 1.1 % GDP growth



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario); World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>); Productivity growth projection by OECD, Economic Outlook 2012, p. 200

## 6 Future growth perspectives of two emerging economies: China and India

The world's emerging global players are strongly intertwined with the EU, in terms of international trade and international flows of production factors. In the light of the growing importance of emerging economies, particularly China and India, for both global trade and capital and labour flows, there is good reason to take a closer look at the evolving trends in these two distinct cases. Both countries have an enormous workforce which will continue to play a critical role in terms of their own and global growth. Indeed, their strong economic growth performance has been largely attributed to their ability to sustain flows of redundant low-cost workforce from agricultural to industrial and services activities. To assess their future potential to sustain employment and productivity growth, the analysis takes stock of specific population characteristics, namely age, sex, educational attainment and the situation in the domestic labour markets.

Sections 6.1 and 6.2 give a brief overview of the most important socio-demographic trends in China and India. Using the same methodological tools as for the countries examined so far, section 6.3 looks at the employment growth potential of the two

countries in the light of future demographic developments, and draws conclusion for necessary future productivity gains. Section 6.4 focuses on the potential sources of productivity growth. China and India have generated impressive productivity growth over recent decades, due not only to the structural change away from agriculture, but also to fast technological progress and substantial investment in human capital.

## 6.1 The case of China

From an economic point of view, China has maintained its strong momentum of economic growth for more than 30 years. Its opening-up to the global economy in the late 1970s led to its fast transition from a backward, predominantly rural economy to one of the most competitive and powerful economies of the world. China's abundant low-cost labour supply has been a key factor in this spectacular transformation. Its enormous workforce potential was made available through the sustained flow of young workers from backward, rural regions to more developed urban areas close to the Pacific coast. Since the beginning of the 1980s there has been a growing range of higher-productivity industrial and service-related job opportunities, thanks to the growing inflow of foreign direct investment (FDI), as seen in Graph 14b, and the export opportunities offered to China.

The buoyant economic growth of the last 30 years has profoundly transformed the Chinese economy. Rural workers are attracted by fast-growing industries and, despite mobility disincentives imposed by the *hukou* household registration system (see Box 2), Xin Meng finds that the number of internal rural to urban migrants increased from 39 to 160 million during the period 1997-11.<sup>47</sup>

### **Box 2: China's *hukou* system of household registration**

Labour mobility was restricted in China until the mid-1980s. In 1985, a system of temporary residency outside the place of *hukou* regional registration was introduced, resulting in a rapid increase in mobility from rural regions to urban areas. Since then, other policy initiatives by the Chinese government have further reduced institutional restrictions on labour mobility. Despite a less restrictive approach to mobility, significant disincentives persist, since only people with local *hukou* registration have access to most of the welfare services provided by the state. This may prevent many people from moving to the cities. According to The Economist, more than half of the Chinese population lives in cities, but only 36 % have an urban *hukou*. The Chinese government plans to relax *hukou* restrictions in order to facilitate mobility, at least to cities below 5 m inhabitants (The Economist, March 22nd, 2014).

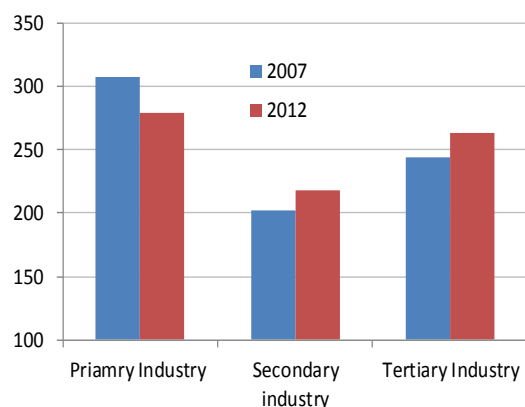
These massive flows stemmed from better employment prospects in the cities and considerable geographic wage differentials. The workforce shifts from low to higher productivity jobs have been a driving factor in the enormous annual labour productivity growth of around 9-10 % over the same period in China. Productivity growth made a much more important contribution to China's economic growth than employment growth, which did not exceed 2 % p.a.

<sup>47</sup> See X. Meng: Has China run out of surplus labor?

Structural changes continue to be substantial in the Chinese economy, particularly in the labour market. According to official data from the China National Bureau of Statistics, 20 million people have left the primary sector in just five years since 2007, whereas the employment gains in industry and services have amounted to at least 17 and 19 million people, respectively (see Graph 14a).

**Graph 14: Active population and foreign direct investment in China**

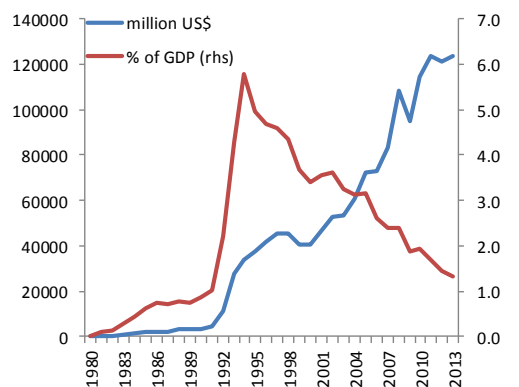
Economically active persons by main sector



Source: China National Bureau of Statistics

<http://219.235.129.58/reportYearQuery.do?id=0200&r=0.374501544259527>

Foreign FDI flows in % of GDP



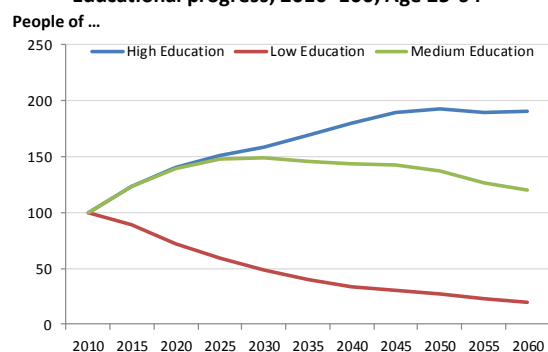
Data source: UNCTD Statistics

<http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx>

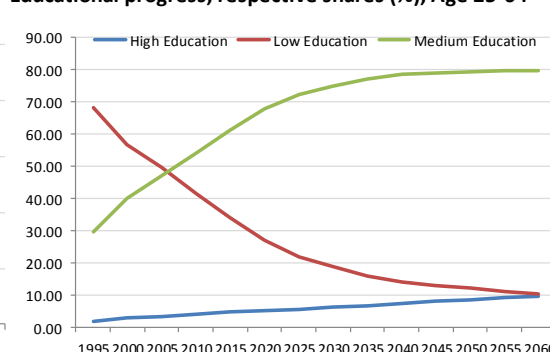
It is worth mentioning too that over the last two decades this rapid structural shift from low-productivity agricultural activities to manufacturing and services was also accompanied by equally fast educational progression. If this continues, it will result in the rapid erosion of China's abundant low-skilled workforce, mainly in favour of a medium-skilled secondary educated supply of labour, as seen in Graph 15. These projections suggest that the trend towards an increasing the proportion of medium and highly educated people will continue.

**Graph 15: Educational progress in China, age group 25-64 years<sup>48</sup>**

Educational progress, 2010=100, Age 25-64



Educational progress, respective shares (%), Age 25-64



Source: Based on UN population projections, 2012 revision; and World Bank Education Statistics (EdStats)

Rhs: log-linear extrapolation done by the authors of the 1995-2010 trend for the 25-34 year-olds; no progression for older cohorts

<sup>48</sup> In the World Bank's EdStats database, low educated people are those who have completed primary education or have no education. Medium educated people are those who have completed secondary education, and highly educated people are those who completed tertiary education. Non-completed tertiary and secondary educated people fall into the medium and low educated categories, respectively.

Indeed, over the last two decades, evidence suggests that China is taking important steps towards a more knowledge-based society. Educational progress in recent decades has been impressive:<sup>49</sup> Today, the literacy rate of adults (aged 15+) is approaching 100 % whereas 30 years ago one third of the adult population was illiterate. Likewise, enrolment in secondary education has increased from 20 million people in 1970 to around 100 million people recently. In addition, many Chinese people see globalisation as a chance to improve their living conditions, and no longer shy away from meeting the high cost of education for their offspring. More than 10 million Chinese are enrolled in private secondary education, up by almost 40 % in only the last six years, and the number of students in tertiary education has literally exploded from 14 per 100.000 inhabitants in 1970 to more than 2 400 today. The Chinese economy's almost obligatory drive towards innovation and excellence<sup>50</sup> may further intensify competition in those markets where the EU and the other developed economies still maintain a competitive advantage.

Despite this progress, there are now growing doubts whether China can sustain the extraordinary pace of its economic growth in the future, given the anticipated rapid contraction in the Chinese WAP. A number of studies claim that China is currently at a turning point in its economic development.<sup>51</sup>

Firstly, most of the industrialised urban areas have recorded significant wage increases in recent years, even for the unskilled workers coming from rural areas. There is also evidence of labour shortages (Du and Wang, 2010). Secondly, China is entering a period of WAP decline, which means that its pools of redundant human resources may dry up soon. In turn, this implies that any future growth in employment could be generated by the more effective utilisation of its declining human resources. Thirdly, improvements in rural education have considerably reduced the supply of unskilled workers (Cai, 2010; Du and Wang, 2010).

Other authors have expressed doubts about these findings, claiming that the flow of rural workers to the industrial centres could continue through appropriate policy reforms. Knight *et al* (2010) argue that institutional factors, particularly those preventing rural mobile workers from accessing state welfare services, discourage labour flows, and consequently there is still a considerable potential labour reserve in the backward, rural regions. Using alternative sets of assumptions, both Knight *et al* (2010) and Golley and Meng (2011) suggest that an increase of the migrant stock by some 150 million by 2020 is still possible.

However, it is questionable whether these flows, even if confirmed, could compensate for the anticipated rapid contraction in employment beyond 2020. This is because the Chinese WAP, which is currently peaking at about one billion, is expected to start shrinking after 2015. By 2050, China will have lost as much as 16 % of its current WAP, according to the 2012 revision of UN World Population Prospects. This is the result of a sharp drop in fertility following the introduction of the one-child policy back in 1979. Today's total fertility rate (1.7) is slightly higher than its 2000 low level (1.5), but less than a third of what it used to be in the 1960s. However, it is worth noting that although the Chinese fertility rate is practically on a par with the average total

<sup>49</sup> World Bank EdStats database.

<sup>50</sup> China's 12th Five-Year Plan (2011-2015), which describes economic and social development targets, continues to put strong emphasis on qualitative growth as it outlines the implementation of 'the strategy of reinvigorating the country through science and education and the strategy of strengthening the country through human resource development'; see the full translation done by the Delegation of the European Union in China and available on the website of the British Chamber of Commerce in China: <http://www.britishchamber.cn/content/chinas-twelfth-five-year-plan-2011-2015-full-english-version>).

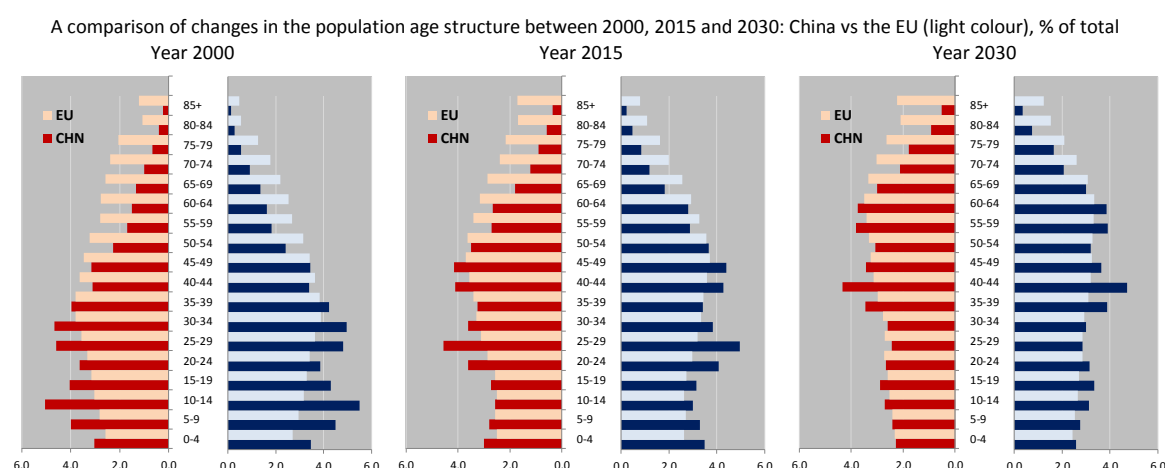
<sup>51</sup> Many of these findings can be found in the special issue of the China Economic Journal vol. 3(2) 2010, published by the China Centre for Economic Research at Peking University.

fertility rate in the EU, the birth rate (as a percentage of the population) in China is expected to be considerably lower than the EU's. This is because, since the introduction of one child policy, there has been a predominance of male births in China — around 1.16 male per 1 female birth compared to 1.05 in the EU. This in turn results in a lower number of births due to the declining proportion of women of reproductive age in the total population.

It is questionable whether the recent relaxation of the one-child policy could significantly affect future demographic trends on the labour market, given the rate of the projected WAP decline in China and the relatively unfavourable environment for fertility growth, due to the progressive urbanisation of the Chinese population and the significant changes in education and lifestyle of younger generations. Annex 3 shows the findings of a simulation that assumes the full and immediate abolition of the one-child policy. Although the resulting effect is a strong catch-up in fertility rates, this is too late to have any noticeable effect on the WAP and potential employment growth in the next two decades.

Graph 16 compares the evolution of age pyramids of the Chinese and EU population between 2000 and 2030, China still has a relatively younger population but the rate of ageing is much faster.

**Graph 16: Age pyramid in China, 2000 – 2030**

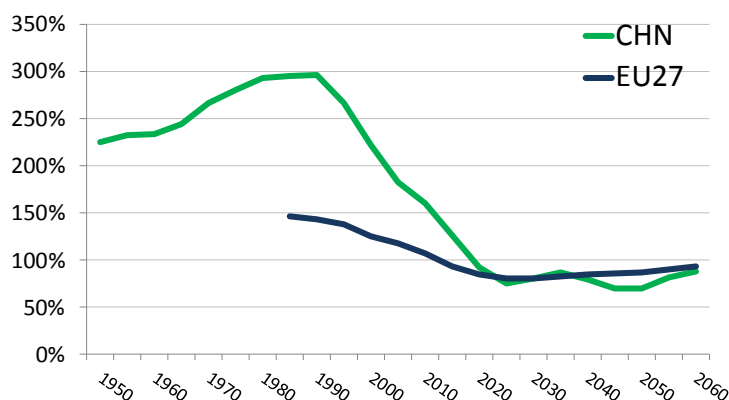


Source: UN Population Projection 2012, medium variant, Eurostat Europop 2013 population projections

By 2030 the two age pyramids will be very similar except for the 70+ age cohorts. Given the rate at which the Chinese population is ageing, the effect on the WAP cohorts will manifest itself much faster than in the case of the EU. This is best illustrated in Graph 17 which shows how the ratio of entries into the WAP (15-29) evolves relative to exits (50-64), in China (green) and the EU (blue). The graph clearly shows a rapid reversal of the Chinese WAP from the young and expanding workforce of the 1980s to one that is ageing and contracting in a matter of decades. In China, the exit cohorts will outnumber the young peers by 2020, when the ratio of entries to exits will be equal to or even lower than in the EU.

**Graph 17: Cohort balance in China**

Entering (age 15-29), relative to  
outgoing (age 50-64) cohorts



Source: UN Population Projections 2012, medium variant; Eurostat Europop 2013 population projection

Given the relatively limited human resources reserves, employment in China will not be able to grow more than 1 % after 2017, even on the basis of the optimistic high activity scenario. Moreover, by 2030 at the latest, employment growth will become negative, which will make China's economic growth even more reliant on productivity growth.

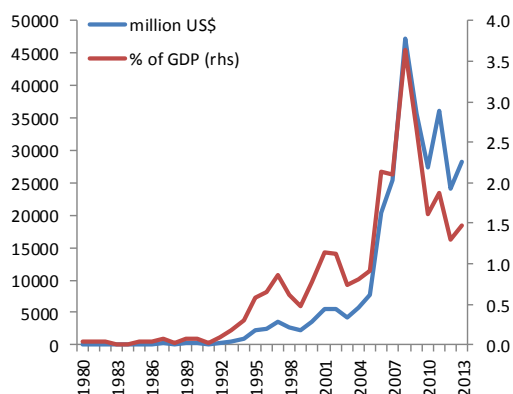
## 6.2 The case of India

India differs from China from the economic point of view. It has had a slower average rate of annual economic growth — around 5 % over the last 30 years. Throughout this period, inflation was often above 10 %.<sup>52</sup> Unlike China, India has had a significant trade deficit, which amounted to \$10.84 bn in August 2014, and relatively high public debt of 67.72 % of GDP.<sup>53</sup> It is also worth noting that, until the early 1990s, India's policies did not allow overseas corporate bodies to invest in the country. Since then, the Indian government has taken steps to boost FDI inflows. Nevertheless, India still imposes restrictions on equity holdings by foreign investors in various sectors. Graph 18 illustrates the evolution of FDI in India. The level of FDI until 2004 was extremely low and even today it accounts for less than a quarter of FDI into China.

<sup>52</sup> A number of persistent structural problems have contributed to India's notoriously high inflation. Among these are regular price hikes in core sectors such as food and energy —the result of India's strong exposure to external shocks, such as oil price increases. See Financial Times Editorial, 26 January, 2014.

<sup>53</sup> For balance of trade and public debt data, see the Ministry of Commerce and Industry of India <http://www.tradingeconomics.com/india/balance-of-trade> and <http://www.tradingeconomics.com/india/government-debt-to-gdp>.

**Graph 18: Foreign FDI flows in India**



Data source: UNCTD Statistics

<http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx>

The Indian labour market is characterised by low participation and a high rate of informal employment. According to the OECD,<sup>54</sup> informal employment in India makes up 85 % of total employment, the highest rate among emerging economies, despite positive trends in job creation. The shadow economy leads to strong segmentation and poor functioning of the labour market. It also hinders investment in human resources.

Compared to China, labour productivity growth remains relatively low. This is particularly true in the backward agricultural sector which accounted for 17 % of India's GDP in 2013. The services sector, which accounts for 55 % of India's GDP, has undergone the most dynamic development since the 1970s and may continue to play a leading role in the process of India's integration into the world economy. Over the past three decades, exports of services have grown twice as fast as those of goods. This rapid growth of the Indian services sector suggests that India has circumvented some intermediate steps typically associated with the transition of a developing country to a post-industrialised economy.<sup>55</sup>

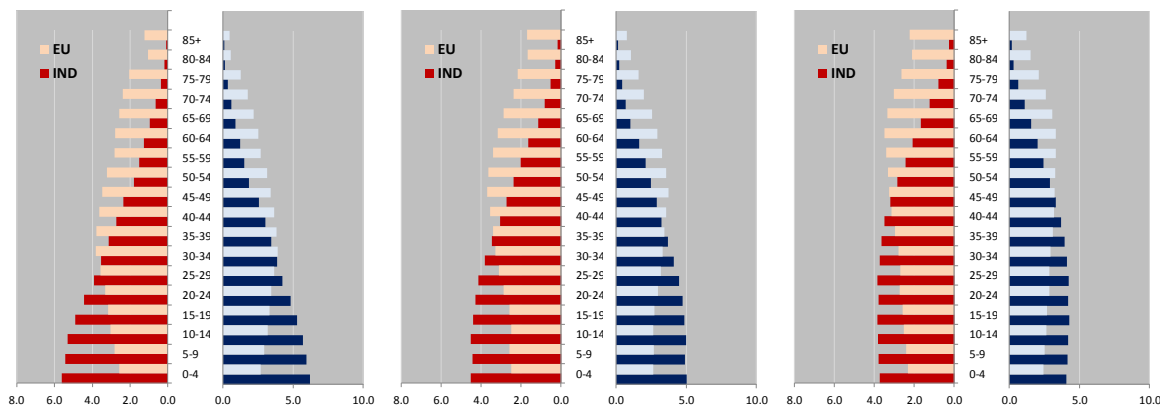
From a demographic point of view, India's ageing process has been much slower than China's. Graph 19 illustrates this relatively slower transition from 2000 to 2030 against the background of the EU age pyramid.

<sup>54</sup> OECD Better Policies series: India, sustaining high and inclusive growth. OECD, October 2012, p. 28.

<sup>55</sup> Ibidem, p. 12.

**Graph 19: Projected demographic development in India until 2030 in % of gender-specific total**

A comparison of changes in the population age structure between 2000, 2015 and 2030: India vs the EU (light colour), % of total

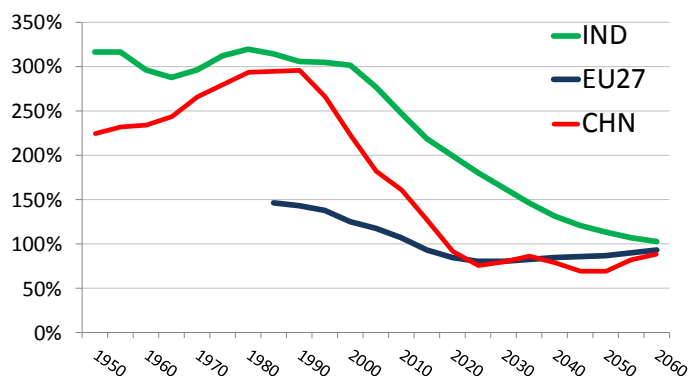


Source: UN Population Projection 2012, medium variant, Eurostat Europop 2013 population projections

Given a relatively young population and low rate of population ageing, the process of WAP ageing will evolve much more slowly in India than China or the EU. According to the 2012 revision of UN World Population Prospects, while the Chinese WAP will start to decline rapidly by 2015, India's WAP will continue to grow until 2053. This is illustrated in Graph 20 which compares the evolution the ratio of entries (15-29) to exits (50-64) of the WAP of China, India and the EU.

**Graph 20: Balance of cohorts: entries (cohort 15-29) relative to exit (50-64) cohorts**

Entering (age 15-29), relative to  
outgoing (age 50-64) cohorts



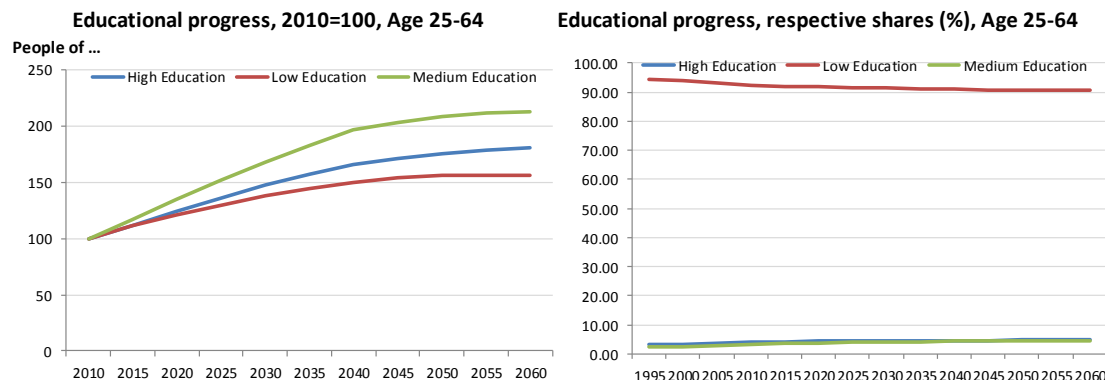
Source: UN Population Projections 2012, medium variant; Eurostat Europop 2013 population projection

The strong positive balances in India indicate that there will be abundant labour reserves for several decades. India's potential for further employment growth appears even greater in light of the currently low participation rates of women and young people at levels below 40 %.

In addition to its employment growth potential, India also possesses significant productivity growth potential, given its very large agricultural sector which today is characterised by very low productivity. A shift of redundant rural workforce to more productive jobs in manufacturing and services could boost productivity growth even in the absence of significant up-skilling. This process is under way but to reap the full

benefit of its human resources, India will have to make substantial progress in tackling the range of challenging macro-economic and labour market issues highlighted earlier.

**Graph 21: Educational progress in India, age group 25-64 years**



Source: Based on UN population projections, 2012 revision; and World Bank Education Statistics (EdStats)

Rhs: log-linear extrapolation done by the authors of the 1995-2010 trend for the 25-34 year-olds; no progression for older cohorts

Progress is being made in educating the enormous Indian WAP, but this is still inadequate given that over 90 % of India's current WAP (25 to 64 years) has a low education level. India lags behind China — enrolment in tertiary education increased from 9 % in 2000 to 18 % in 2010 compared to a shift from 8 % to 26 % in China.<sup>56</sup> This progress has yet to impact on the workforce's educational composition (Graph 21). Currently, the supply of highly educated people is still very low, meaning that there is an enormous, unmet demand. Given an average annual GDP growth of close to 8 % over the last decade, the demand for higher education is estimated to exceed 500 million people in the next ten years.<sup>57</sup> India could accelerate its structural transition towards higher-productivity industrial and service activities by investing more in educational progress. By 2020, the Indian government aims to achieve 30 % gross enrolment, which will mean providing 40 million university places, an increase of 14 million in six years. Therefore, overall, India's potential for economic growth appears to be very strong.

<sup>56</sup> Source: World Bank. Total enrolment in tertiary education (ISCED 5 and 6), regardless of age, expressed as a percentage of the total population of the five-year age group following on from secondary school leaving.

<sup>57</sup> Understanding India. The future of higher education and opportunities for international cooperation. British Council, February 2014.

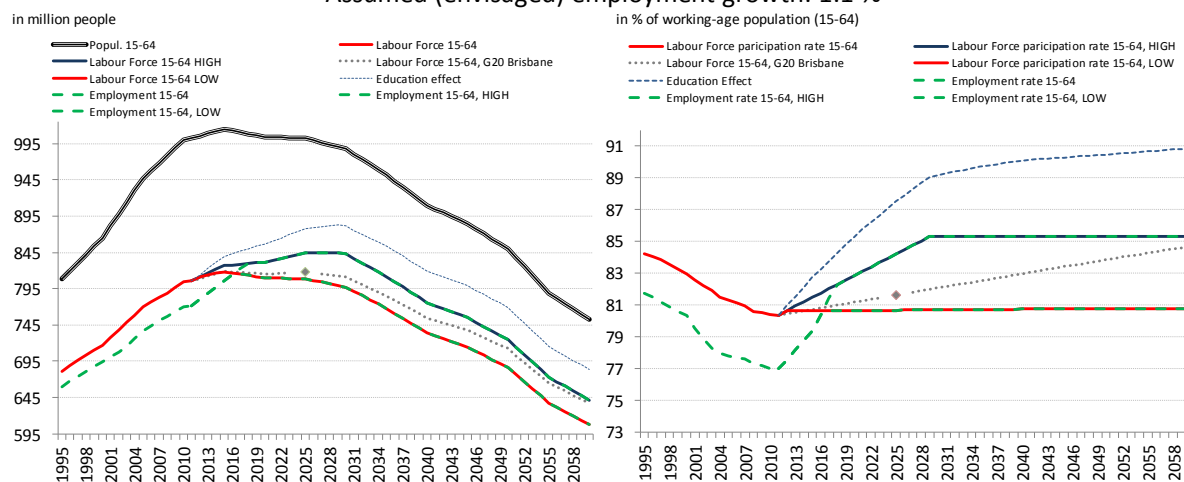
### 6.3 Future working-age population trends and their impact on employment and economic growth: the model findings

The focus here is on assessing the human resources potential for employment and economic growth in China and India in the years ahead by setting a high and a low activity scenario. These two scenarios represent the expected upper and lower limits of employment in the years ahead.

According to UN projections, WAP (defined as people aged 15 to 64 years) in China is expected to start shrinking in 2015. The decline will be relatively modest until 2030 but will then accelerate strongly. By 2060 China will have lost as many as 250 million people of working age. Graph 22 illustrates the low and high activity scenarios. The low scenario assumes no further increase in the overall activity rate while the high scenario assumes that the gender gap in activity will close by 2030. This requires the female activity rate in the 15 to 64 age range to climb by 10 percentage points to 85 % by 2030. Both scenarios need to be seen as theoretically optimal as they implicitly exclude any further limitations on employment growth, e.g. labour mobility restrictions (due to the *hukou* regional registration system).

**Graph 22: Potential employment path assuming different activity scenarios, China**

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: 1.1 %



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario);  
World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

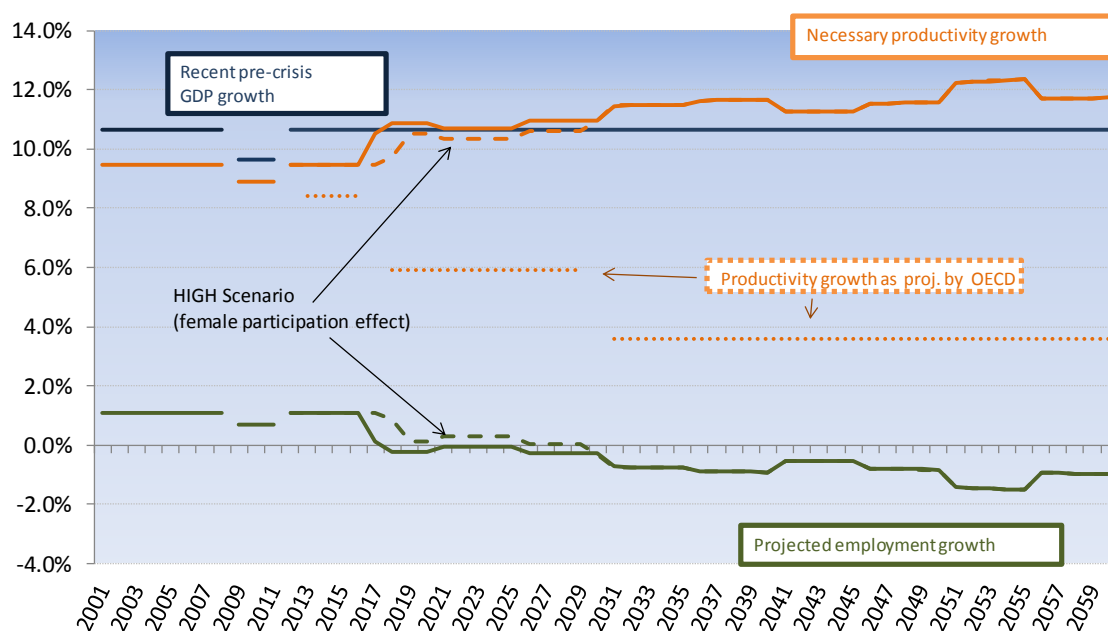
China's long-term employment growth has been averaging 1.1 % per year since the mid-1990s, which is surprisingly low in the light of two-digit economic growth rates. In other words, economic expansion has mainly been the result of productivity gains of almost 10 % per year. Employment gains were mainly fuelled by strong inter-regional mobility flows and, to a lesser extent, the increase in overall WAP. However, given the fast decline in Chinese WAP it is foreseeable that, even in the high activity scenario, employment will not be able to continue growing even at its modest long-term average rate of 1.1 % after 2017. By 2030 employment growth will become negative.

The dotted blue line indicates the high activity scenario's potential if educational progression is taken into account. In fact, China can expect substantial employment gains from further educational progression if OECD average labour force participation rates

are applied to the low, medium and high educational attainment levels of the WAP, as projected in Graph 15 above. Even this enormous further shift away from no / primary education towards secondary education, though strongly affecting participation rates, would fail to reverse the trend towards negative activity and employment growth.

**Graph 23: Employment and required productivity growth in China, different activity scenarios**

Future employment growth potential and levels of productivity growth required to sustain 10.6 % GDP growth



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario); World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>); Productivity growth projection by OECD, Economic Outlook 2012, p. 200

Productivity growth will need to be accelerated over coming decades in light of the inevitable employment decline. Buoyant productivity gains above 11% would be required in order to maintain the spectacular two-digit rates of economic growth of the past decades. Graph 23 shows that annual average productivity increases would have to be kept above 11% for at least five decades. Indeed, persistent pressure on productivity growth will remain a constant in the coming decades. Annex 3 shows that even abolishing the one-child policy will not modify this situation. Experience from the Japanese case<sup>58</sup> show how ambitious it is to assume two-digit productivity growth rates for decades: between 1960 and 1980 average labour productivity growth in Japan was 4.3 % per year as Japan caught up to western-style economic standards, but this declined to 1.3 % between 1980 and 2000 as saturation set in.<sup>59</sup>

OECD projections are therefore much more modest as they assume a marked slow-down in productivity growth over the coming decades: If long-term productivity growth in China did not exceed 3.6 % as shown in Graph 23, this would imply a fall of at least 8 percentage points below the theoretical 'necessary productivity growth'

<sup>58</sup> In Japan, the population is at a more advanced stage of ageing and the working age population has been declining since the middle of the 1990s.

<sup>59</sup> Source: European Commission, DG ECFIN, AMECO database (variable ZVGDF), see [http://ec.europa.eu/economy\\_finance/ameco/user/serie/SelectSerie.cfm](http://ec.europa.eu/economy_finance/ameco/user/serie/SelectSerie.cfm).

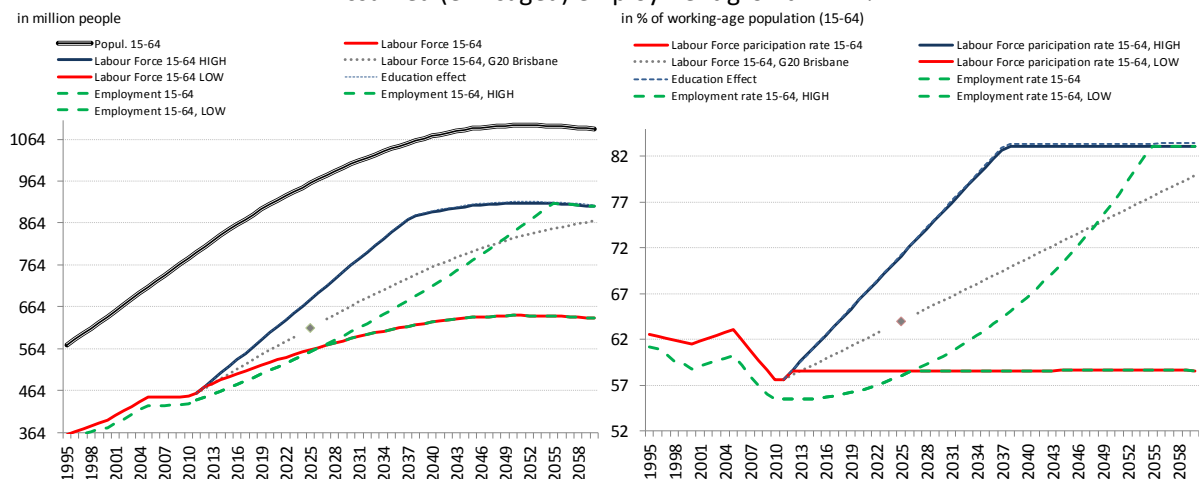
(both scenarios). As a result, potential GDP would fall well below the 10.6 % that China has experienced in the past. According to the OECD's modest productivity outlook, potential GDP growth after 2030 would be a mere 2.8 %. Such an outlook would imply a massive slowdown in China's impressive past growth performance.

The findings for **India** are quite different. Graph 24 illustrates the low and high activity scenarios. As before, the low scenario anticipates no change in activity rates while the high scenario makes the assumption that the gender gap in activity will eventually close (after 2050). As mentioned earlier, the Indian WAP is expected to keep growing until 2053, providing plenty of room for sustainable employment growth of 1.7 %<sup>60</sup> until at least 2027 under the low activity scenario and beyond 2050 under the high activity scenario.

Given the size of India's WAP and the marked current gender gap in labour force participation, it is interesting to note the enormous impact of higher labour market participation implied by the Brisbane scenario which assumes gradual progress in female labour market participation. If Brisbane becomes a reality for India, by 2025, the country will have shifted female participation by around 52 million people compared to the low scenario. This would mean that around half of the envisaged total participation gains for the G20 countries would be due to strong progress in India. Compared to India, the potential gains of the EU and the US (+4, +2 million, respectively), and even China (10 million),<sup>61</sup> appear modest.

**Graph 24 Potential employment path assuming different activity scenarios, India**

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: 1.7 %



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario);  
World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

Compared to China, India could sustain its long-term average rate of economic growth of 7.1 % for much longer without demographic constraints. In the very long run too, the required contribution of productivity growth in India appears modest compared to China, even in the absence of educational progression, which is projected to have a negligible impact compared to the Chinese case. However, based on the OECD's long-term assumption of productivity growth of less than 4 % per year, the country's long-

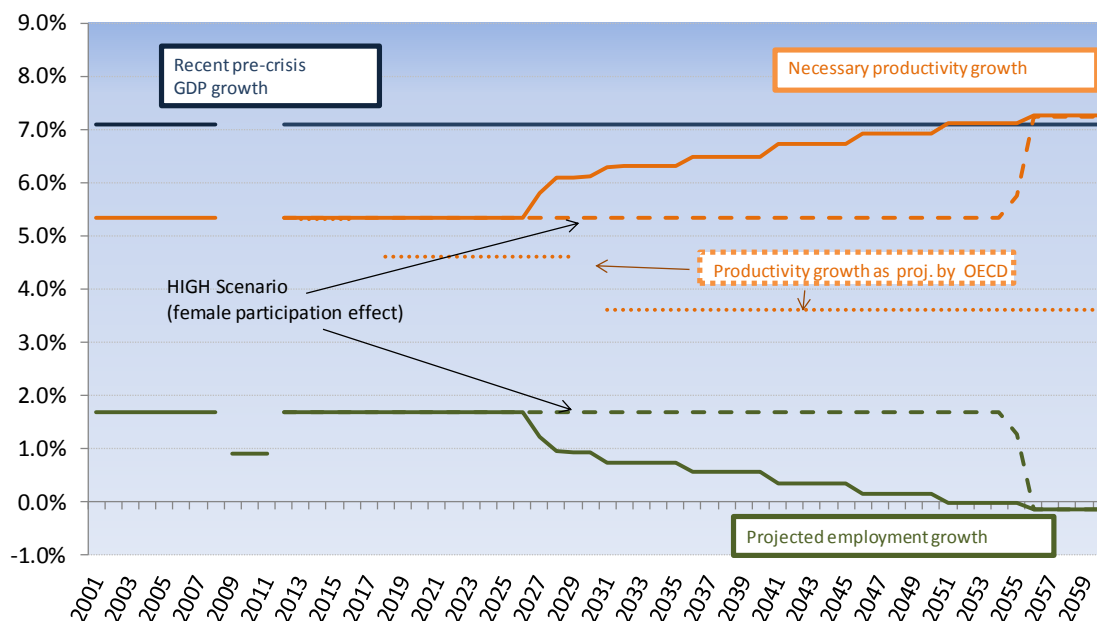
<sup>60</sup> India's average employment growth 2000-08.

<sup>61</sup> This is because the current Chinese labour market participation gap for women is much smaller compared to India's (10 ppts and 53 ppts. difference in the activity rate, respectively).

term growth potential would only be half the 7.1 % seen on average between 2000 and 2008.

#### Graph 25 Employment and required productivity growth in India

Future employment growth potential and levels of productivity growth required to sustain 7.1 % GDP growth



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario); World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>); Productivity growth projection by OECD, Economic Outlook 2012, p. 200

### 6.4 A productivity dividend in the future?

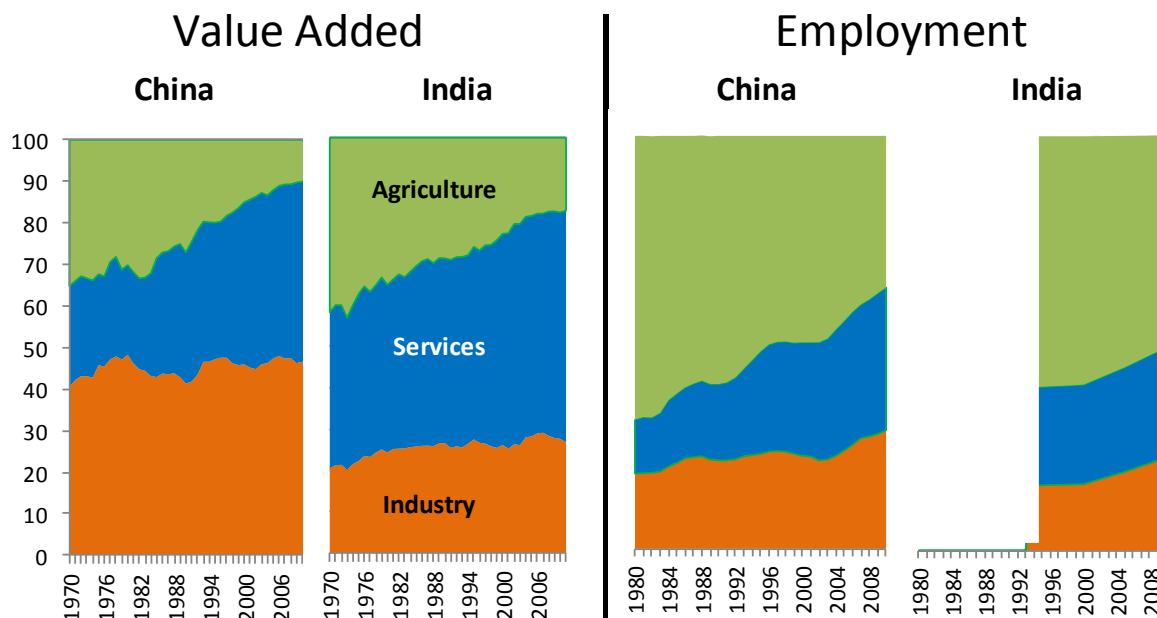
In order to better understand the productivity growth pattern of the two emerging economies, one can distinguish between two types of productivity gains:

- A **technological productivity gain** per worker within a given sector which comes from better capital endowment, better education/skills and faster innovation.
- A **structural productivity gain** resulting from improvements in factors allocation, i.e., from structural changes in the economy. This can happen, for example, when redundant low-cost human resources shift away from low-productivity sectors (mainly agriculture) to higher-productivity industrial production or services. The structural productivity gain could be seen as a 'productivity dividend' which would be produced even in the absence of any particular investment in skills, due to the more efficient allocation of productive resources.<sup>62</sup>

<sup>62</sup> Nobel prize-winner Arthur Lewis first dealt with the allocation-related productivity growth component. Lewis argued that most developing economies have a growth potential from which they can benefit by transferring surplus workforce from extremely low productivity rural activities to more productive jobs in the industrial sector. A significant proportion of this mostly unskilled workforce represents a 'surplus' in the sense that its marginal productivity is assumed to be below the subsistence wage, which in turn sets a competitive wage floor for FDI's and technology transfers, leading to more productive jobs in manufacturing, construction and other more value-added activities in the industrial sector. This benefit could last until the

As seen in Graph 26, substantial reallocation of production and productive resources took place in both countries.

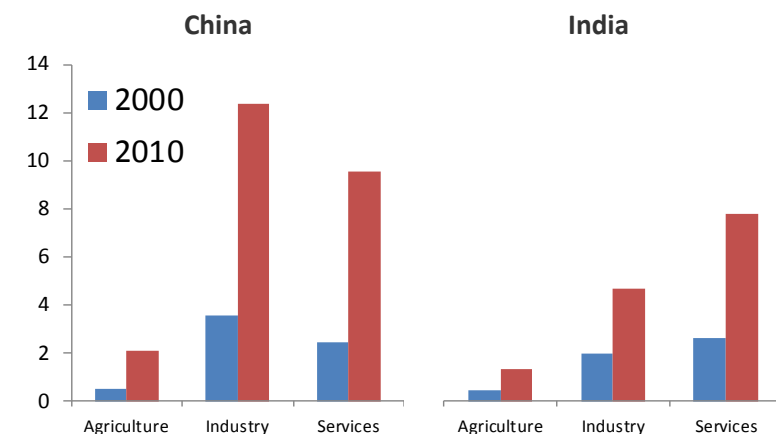
**Graph 26:** Share of agriculture, industrial production and services in total value added and employment, China and India



Source: World Bank labour market data

Given the enormous cross-sector differences in productivity (Graph 27), this reallocation triggered strong structural productivity gains in both countries.

**Graph 27:** Nominal GDP (1000 US-\$) per employed, 2000 and 2010



Source: World Bank labour market data

Today, the developed world's share of employment in agriculture is much smaller than in the developing countries: 5 % in the EU and below 2 % in the US, compared to 51 %

existing workforce surplus is fully transferred. Then, wages will start growing steadily across economic sectors while wage differentials will narrow substantially. (W. A. Lewis, 1954).

in India and 37% in China (2010). With respect to the future growth perspectives of world regions, there are two major implications:

- It can be assumed that the trend away from agricultural production in China and (especially) India will continue. Reallocation is thus likely to remain a driver of structural productivity growth over the coming decades, even if the rate continues to slow down as agricultural share approaches the standards of the industrialised world (a situation that China will experience before India).
- Today's structural differences between fast-developing China and India and the EU represent a strong competitive disadvantage for the EU in terms of growth, because there is comparably little potential for a significant productivity dividend in the EU from re-allocating resources away from backward, low-productivity activities.

In order to take greater advantage of its structural productivity dividend, China's challenge is to facilitate further labour movements from rural areas to cities which currently are restricted by the *hukou* system. The Chinese government has recently announced a relaxation of the *hukou* restrictions, thereby facilitating movement to small and medium-sized cities at least. This is deemed insufficient by many sources as 'most new jobs are being created in the 16 big cities with populations of more than 5 m'.<sup>63</sup> Apart from that, Purdy *et al* (2014) see 'a shrinking pool' of labour due to a declining number of people 'available to leave their farming communities to work in factories'.<sup>64</sup> In India, Singh (2006) sees the 'social structure' of the population (castes, communities) as potential impediments to further productivity growth in both cities and rural areas as these may hinder mobility of many rural workers to the cities.<sup>65</sup>

Such potential restrictions on the availability of labour bring about other challenges. China in particular will need to take stock of the fact that the structural productivity dividend will rapidly decline over the next decade. As outlined above, both China and India are in the process of emphasising quality growth and making an effort to increase investment in innovation with a view to reaping technological productivity gains.<sup>66</sup> However, there is evidence that productivity gains through technological (or educational) progress will also slow down. Apart from the impact of ageing on productivity, the OECD sees a slowing-down of the technological productivity gain as the main reason for a deceleration in overall productivity growth in developing countries. Their 'economies catch up with the technology frontier and gaps in human capital, represented by years of schooling, begin to close'.<sup>67</sup> Hence, the OECD assumes that total factor productivity of the developed and developing world will converge in the long run — the degree of convergence 'depending on the country's own structural conditions and policies'.<sup>68</sup>

In the case of the EU, the lower structural productivity dividend adds to the negative demographic dividend as outlined above. As a result, in contrast to China or India, pressure to generate strong technological productivity gains already represents an urgent priority. In this context, Commission analysis has shown strong evidence that investment in human capital is a very efficient tool to strengthen productivity growth

<sup>63</sup> The Economist (2014).

<sup>64</sup> Purdy *et al* (2014), p. 4.

<sup>65</sup> Singh (2006), p. 255.

<sup>66</sup> For example, over the last decade China has expanded the volume of R&D investment almost 7 times, see Purdy *et al* (2014), p. 8.

<sup>67</sup> OECD Economic Outlook 2012/1, p. 199. It is assumed that total factor productivity of the developed and developing world will converge in the long run.

<sup>68</sup> Ibidem, p. 195.

in the long run.<sup>69</sup> However, investment by the EU Member States in education, research and innovation remains a big challenge.<sup>70</sup> One of the main intentions of the new European Commission is to establish a new Fund for Strategic Investment to 'support strategic investments of European significance in infrastructure' including 'education, research and innovation'.<sup>71</sup>

## 7 Conclusion

Demographic change and declining WAP are global phenomena which will constrain the future trends of global economic growth in the EU, Japan, China and several other countries around the world. During the next 20 years, the developed world will experience the massive exit of the 'baby-boom' generation which is already under way. Although the incoming generations are better educated, which is a positive development in terms of employment perspectives, they are considerably smaller in size. This negative balance between incoming and outgoing generations represents a serious drawback to both future employment growth and economic growth.

Employment and labour productivity growth are the two components of economic growth. The analysis shows that a declining WAP and the ongoing economic transformation, particularly in the emerging economies, may affect both of them either directly or indirectly. Employment growth is very important not only for economic growth but also for social welfare and income distribution within an ageing society, since a decline in employment may also reduce social welfare resources.

Japan, the country with the most advanced demographic shift, represents a useful case study as it provides insight into the long-term effects of a shrinking WAP, a decline that started in the middle of the 1990s and has already led to a relatively steady long-term decline in employment. This trend is so strong that, even under the optimistic activity assumptions, Japan will hardly be able to maintain the currently slow rate of employment decline for more than a decade. Besides, past efforts to increase female participation or to promote more open migration policies have not yielded the expected results. The prospect of a Japanese economic growth rate lower than 1 % can only be avoided if the rate of productivity growth doubles in the next two decades.

Europe's WAP started shrinking about 30 years after the Japanese turning point. This has mainly been due to the slowdown effects of the relatively more significant migratory inflows. In addition, several enlargements over the past 30 years have significantly accelerated the process in the EU.<sup>72</sup> Evidence presented in this paper shows that EU employment will start declining within 10 to 20 years due to the intensity of the decline in the WAP, even under very optimistic assumptions on workforce activation.

Europe is currently emerging from a six-year economic crisis with high unemployment. Ahead lies a period of rapid structural change in the economy (and labour demand in

<sup>69</sup> See, for example, the authors' 2013 paper (section 4.2), or Chapter 2 (Investing in Human Capital) of the 2014 Employment and Social Developments in Europe Review (esp. section 4 — Simulations with the Labour Market Model).

<sup>70</sup> Nineteen Member States actually reduced their expenditure on education in 2012, see the Commission's Education and Skills Monitor (2014:1), p. 7.

<sup>71</sup> European Commission (2014:2), p. 9.

<sup>72</sup> The relative projected decline in the WAP from 2013 to 2060 is almost twice as fast for today's EU compared to the EU of 15 Member States before the 2004 enlargement (-12 % vs -7 % according to Eurostat Europop 2013, main scenario).

particular), with possible further risks of skills or geographical mismatches. The role of employment and economic policies will be critical for making the most of these idle human resources. Economic migration represents another underutilised potential for Europe. It requires a common policy approach at EU level aimed both at making best use of the potential of migrants already living legally in the EU while opening clear and stable pathways for new migrant workers on the basis of specific labour vacancies as well as much broader human capital criteria. The policy practices of Australia and Canada provide valuable good practices in this context.

However, the analysis shows that in the long term, Europe will have to rely increasingly on productivity growth. Unlike the developing world, Europe has relatively few productivity gains to be made from shifting low-skilled workers from agriculture to manufacturing or services since these gains were reaped long ago. Today agriculture accounts for a mere 5 % of Europe's total employment. Europe and the rest of the developed world will have to invest in high value-added economic activities that generate genuine productivity growth based on innovation, capital deepening investment and better organisation.

Human resources will continue to play an important role in this context. Historically, one of Europe's key economic assets has been the quality of its workers. In tomorrow's highly competitive globalised economy, it is of utmost importance that Europe retains its competitive edge by investing in the development of skills and education. Earlier analysis by Peschner and Fotakis (2013), employing the European Commission's (DG EMPL) Labour Market Model, showed that these policies can help to make up for the productivity gains needed in the coming decades. Securing a continuous supply of highly skilled workers in the years ahead is a strategic priority for Europe.

The demographic trends in the US have been different. Unlike the EU and Japan, the US WAP will continue to grow over the next 50 years, albeit more slowly. However, the US has seen a declining activity rate since 2002. The US Bureau of Labor Statistics, in its projections up to 2022, expects this decline to persist for demographic and economic reasons, including the ageing of the baby boom generation and an increase in the number of discouraged workers. One of the key reasons for this lower labour market participation relates to the observed gaps in terms of labour market outcomes, particularly between groups of different ethnic origin. Those gaps are considerably larger in the younger, in-coming (15-35) age cohorts. This finding points to existing, important inequalities within the US society, particularly in the area of education.

In the case of the emerging economies, China and India represent two very different cases. China is characterised by quickly changing demographics with a rapid decline in the WAP starting around now. This is both due to the one-child policy and to rapid societal changes over the past 30 years. The Chinese WAP stopped growing already in 2013. Given the relatively limited human resources reserves, even on the basis of the optimistic high activity scenario, Chinese employment will not be able to grow by more than 1 % after 2017. By 2030 at the latest, employment growth will become negative. Unavoidably this will make China's economic growth even more reliant on productivity growth. China could try to shift a sizable part of the remaining human resources in low-productivity agricultural activities, currently 36 %, to manufacturing and industrial production. It can also try to increase productivity through capital deepening and more investment in science, technology and innovation, as in the developed economies. India's situation is quite different. It will enjoy sustained growth in its WAP over the next 50 years, surpassing China's before 2040. In addition, as agriculture still accounts for more than 50 % of employment, India has enormous potential for productivity growth by reallocating a considerable number of these workers to more productive economic activities. However, India has several important structural problems. Its

economy has a significant trade deficit and a relatively high public debt. In addition, its policies still impose restrictions on equity-holding by foreign investors in various sectors. Most importantly, the Indian labour market is characterised by low participation and a high rate of informal employment. The shadow economy leads to strong segmentation and poor functioning of the labour market, which in turn hinders investments in human resources.

In spite of these serious problems, Indian services exports have been growing fast. The rapid growth of the Indian services sector suggests that India will follow a different growth path to China. India may be able to sustain its long-term average rate of economic growth of 7.1% much longer, without the need to rely more heavily on higher productivity gains. Even in the very long run the necessary contribution of productivity growth remains modest compared to China — but it will still exceed 7%.

In conclusion, demographic trends appear to be a serious global issue which will constrain future trends of economic growth in the EU, the US, China and other global players. In most of these regions the inescapable decline of working-age population will impose restrictions on future employment and economic growth. Higher productivity growth will eventually become the only way to sustain a positive rate of economic growth in the EU and many other parts of the world including some of the emerging economies.

Whereas the developed, industrialised world will have to generate higher productivity growth through continuous innovation and strong investment in skills and education, emerging economies will still be able to reap a higher 'productivity' by reallocating productive resources, mainly human resources, from low value-added economic activities in agriculture to more productive industrial and service activities. However, evidence suggests that emerging economies such as China and India are not solely reliant on those structural productivity gains. They are also increasingly investing in human capital formation. Hence, it can be expected that the EU will face more acute global competition in the decades to come, not only in markets related to cheap labour and products of low value-added, but also on premium products and high quality services.

This paper concentrates on the EU and the most powerful global players while the analysis in the annexes looks further afield. It reveals a growing inequality in terms of a north-south share of labour reserves. WAP growth will remain strong only in some of the poorer regions of the planet, mainly in south Asia and the Sub-Saharan Africa. This adds to the existing north-south divide in terms of capital investment, increasing the risk of a global economy slowdown in the future. It may also seriously affect both the size and the direction of migratory flows in the years ahead. Therefore, the global dimension of product and factor markets needs to be given more serious consideration when drawing up the industrialised world's policy agenda for the years ahead.

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## Annex 1: The rest of the world and the challenges ahead

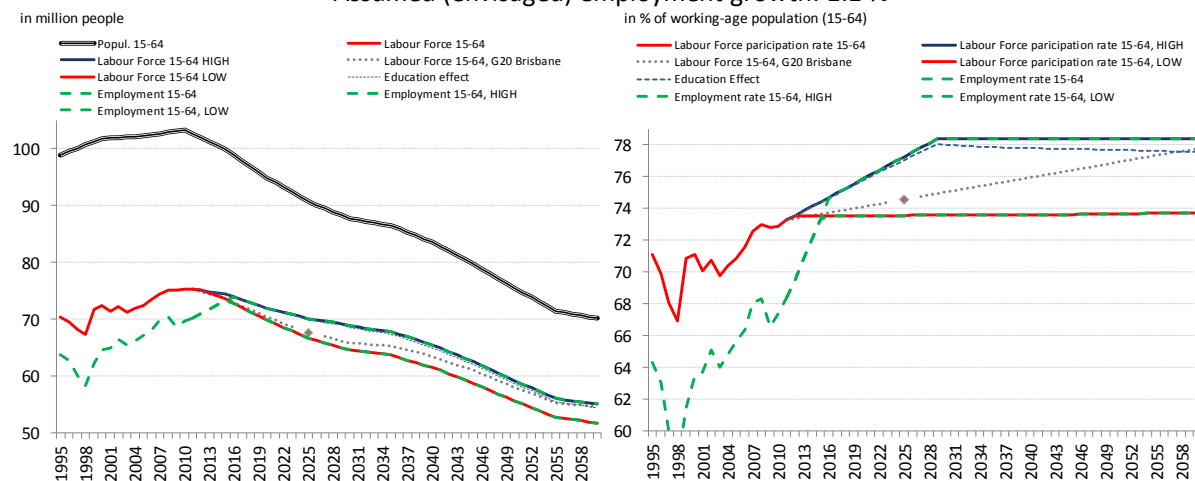
The analysis of the world's most powerful regions presented so far has revealed increasing risks of growth bottlenecks due to demographic change. However, in some regions, the major challenge is in fact workforce behaviour, specifically low labour market participation. Recent analysis of the G20 countries has shown that 'demography will exercise a constraining influence on labour markets in the coming decades through a marked decline in the expected rate of growth of the economically active population between 2020 and 2030 in all G20 countries except Australia'.<sup>73</sup> This section provides a brief overview of growth prospects in an additional set of countries. Trends across the world's regions are grouped in clusters, based on the nature of the expected challenge, particularly with regard to labour market participation and the fall in WAP.

### A1.1 Countries facing a strong working-age population decline in the short term

In addition to Japan and the EU, Russia most notably is also facing the harsh prospect of a severe WAP shrinkage. WAP contraction, which started around 2010, will cause Russia's WAP to fall from over 100 million people to around 70 million by 2060.

#### Graph 29 Potential employment path assuming different activity scenarios, Russia

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: 1.1 %



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario);  
World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

As the current gap between the labour force participation rate for women and men is already relatively narrow (69 % for women compared with 78 % for men), the high activity scenario would not change WAP significantly. If employment were to continue growing at an annual rate of 1.1 %, as was the case in the 2000-08 pre-crisis period, Russia would already face employment growth restrictions by 2016. This would mean that from 2016 onwards, Russian employment growth would be negative. Therefore, for Russia to maintain its strong pre-crisis GDP growth rates of around 7 %, it would

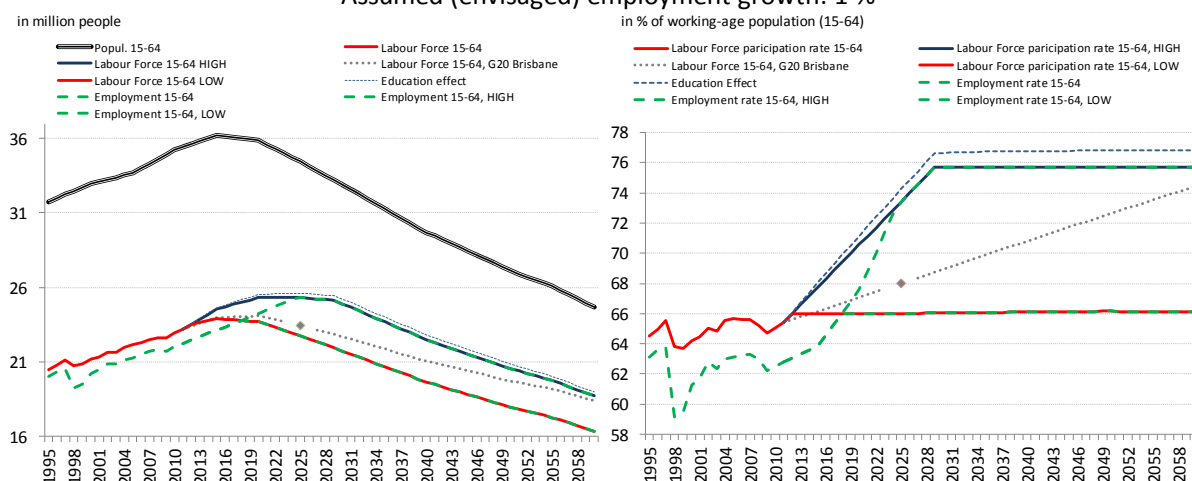
<sup>73</sup> OECD/ILO/World Bank, G20 labour markets: outlook, key challenges and policy responses, 2014, p. 4.

have to accelerate productivity to around 8 % in the long term, compared with the average of 5.4 % observed before the crisis. The education effect on labour market participation is negative because of a strong projected decline in the proportion of people with medium education level, coupled with a higher proportion of those with low levels of education. This is because, according to the World Bank database, the proportion of young people with low levels of education has increased among Russians in the recent years.

The Republic of Korea faces important demographic challenges similar to those faced by Japan, albeit with a considerable time lag of 25 years.

**Graph 30 Potential employment path assuming different activity scenarios, Republic of Korea**

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: 1 %



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario);  
World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

South Korea's WAP will peak in 2015, before dropping quickly from 36 million people to 25 million by 2060. Pre-crisis employment growth rates of 1 % per year would be possible until 2018 under the low activity scenario. The situation under the high activity scenario, where the labour market participation rate of women catches up with that of men, would only delay the peak in working-age population until 2024, even though the gender gap in labour market participation is considerable (76% for men compared with 55% for women). This is due to the intensity of the demographic decline in South Korea. Although the education effect in South Korea is positive and noticeable in terms of higher activity rates, its effect on activity would not significantly offset employment restrictions, which would inevitably result in negative employment growth in the medium term. To compensate for this in the long term, South Korea's pre-crisis 3.4 % annual productivity gain would have to double in both scenarios in order to keep GDP growth at its strong pre-crisis levels of around 4.4 % per year.

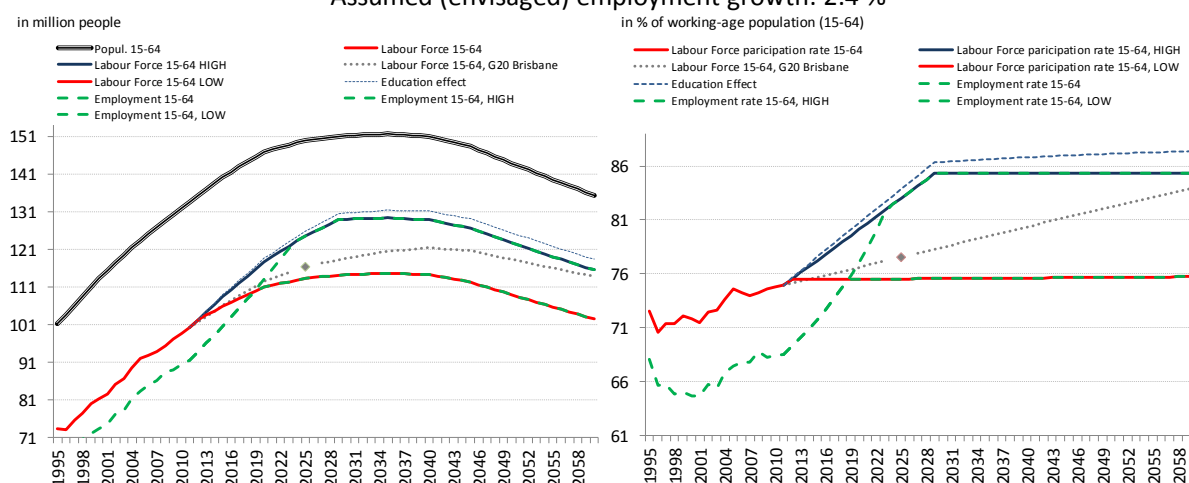
## A1.2 Latin-American Cluster: medium-term growth restrictions

The region is facing urgent socio-economic challenges although recent economic performance has varied greatly across Latin American countries<sup>74</sup>. In the 2000-08 pre-crisis period, economic growth in Latin America's three biggest economies ranged from just above 2 % per year in Mexico and Argentina to 3.6 % in Brazil. As Argentina and Mexico are categorised as developing countries, with \$-denominated per-capita GDP for 2012 still one third of the figure for the EU28<sup>75</sup> and around one fifth of the US reference figure, annual economic growth of 2 % appears modest. The relatively slow catch-up on the part of these countries points to the existence of severe economic and societal obstacles to growth. However, these go beyond the scope of this paper. In the case of Brazil, a large part of its relatively strong GDP growth was due to employment gains (+2.4 % per year).<sup>76</sup>

In terms of their demographic trends, all three countries are facing a situation where WAP could keep increasing until at least the 2030s. Graph 31 presents the situation in Brazil.

**Graph 31 Potential employment path assuming different activity scenarios, Brazil**

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: 2.4 %



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario);  
World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

Brazilian employment grew strongly before the last economic crisis, rising by 2.4 % on average per year between 2000 and 2008. If Brazil makes no further progress on workforce activation, its strong employment growth will grind to a halt by 2018. If full activation of women in the workforce were to be achieved, (high activity scenario), this strong employment growth could continue for a further six years. However, as Brazil's already declining birth rates are already having a knock-on effect on WAP, its employment growth would come to a halt in the mid-2030s before then becoming negative.

For Brazil to maintain its strong GDP growth, it will have to compensate for WAP shrinkage with accelerated annual productivity growth. As shown in Graph 32, annual

<sup>74</sup> Argentina and Venezuela in particular are facing severe economic difficulties

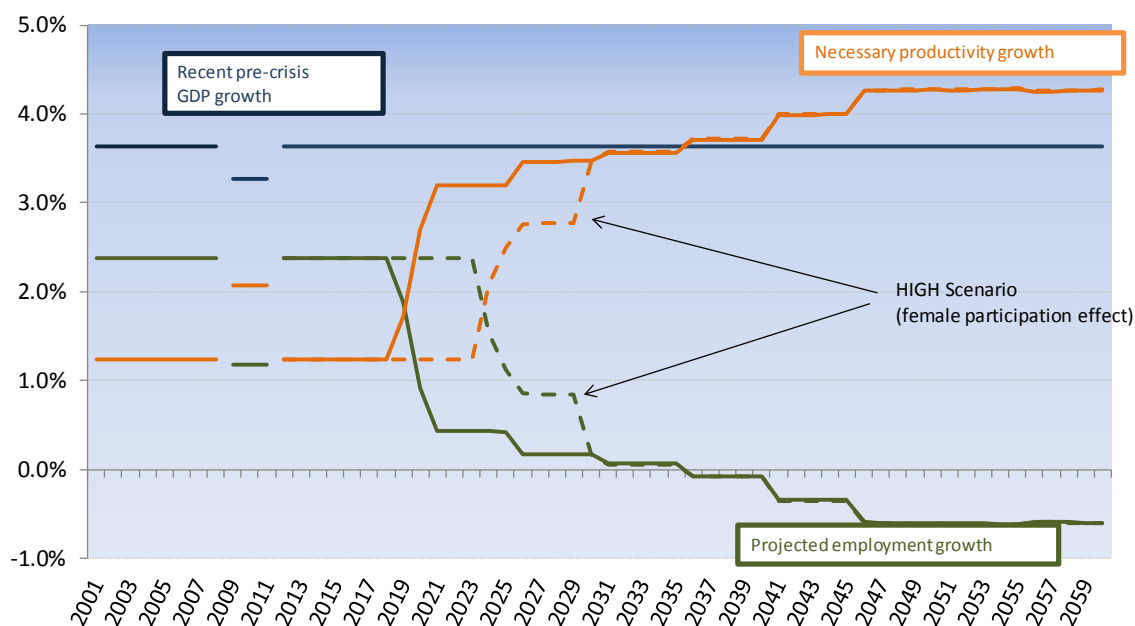
<sup>75</sup> Eurostat National Accounts for 2012, converted into US dollars.

<sup>76</sup> World Bank database for Argentina, Mexico, USA, Brazil.

productivity growth would have to exceed 4 % per year in the long term, starting from a pre-crisis level of around 1 %.

### Graph 32 Employment and required productivity growth in Brazil

Future employment growth potential and levels of productivity growth required to sustain 3.6 % GDP growth



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario); World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>)

The situation in Mexico and Argentina is similar in terms of the demographic outlook, but different in terms of its implications for growth. In both countries, pre-crisis GDP growth was much lower than in Brazil and was also exclusively the result of employment gains. We set out below the situation for Mexico.

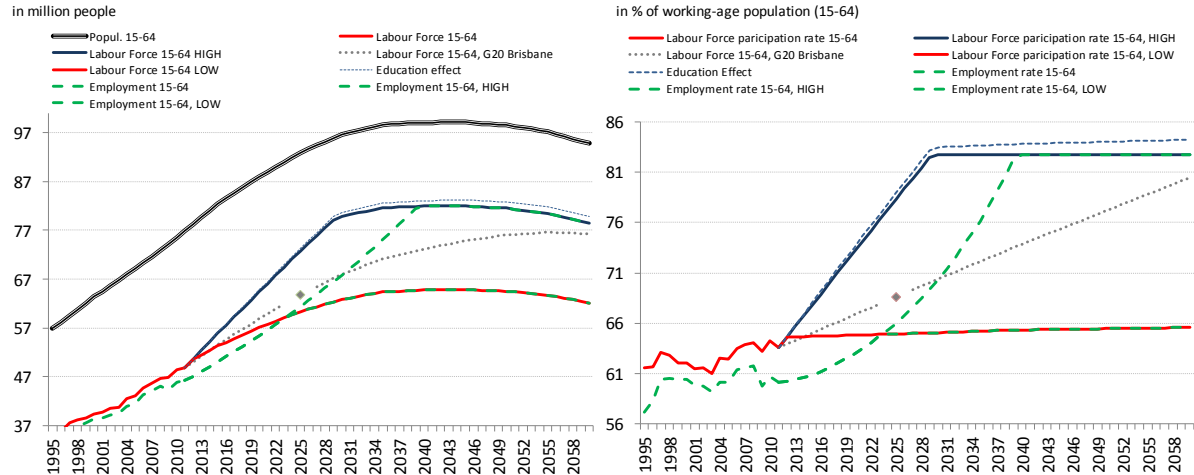
Mexico's strong pre-crisis employment growth of around 2 % per year would cease by 2023 (low activity scenario). Under the high activity scenario, assuming major progress on the labour market participation of women, the risk of a halt in employment growth would be postponed until the late 2030s, given Mexico's currently very high gender gap in labour market participation.<sup>77</sup> In conclusion, the main factor inhibiting further employment growth in the medium term appears to be labour market behaviour rather than demographics.

However, owing to the projected decline in WAP that is due to start around 2040, employment growth would inevitably come to end by around 2040 at the latest and eventually become negative. The consequences of this will be serious unless Mexico shifts its growth pattern away from low-skilled labour towards human capital investment, thus paving the way for much stronger productivity gains.

<sup>77</sup> The rate of participation by men is twice as high as that of women (83 % compared with 46 % in 2011).

### Graph 33 Potential employment path assuming different activity scenarios, Mexico

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: 2 %

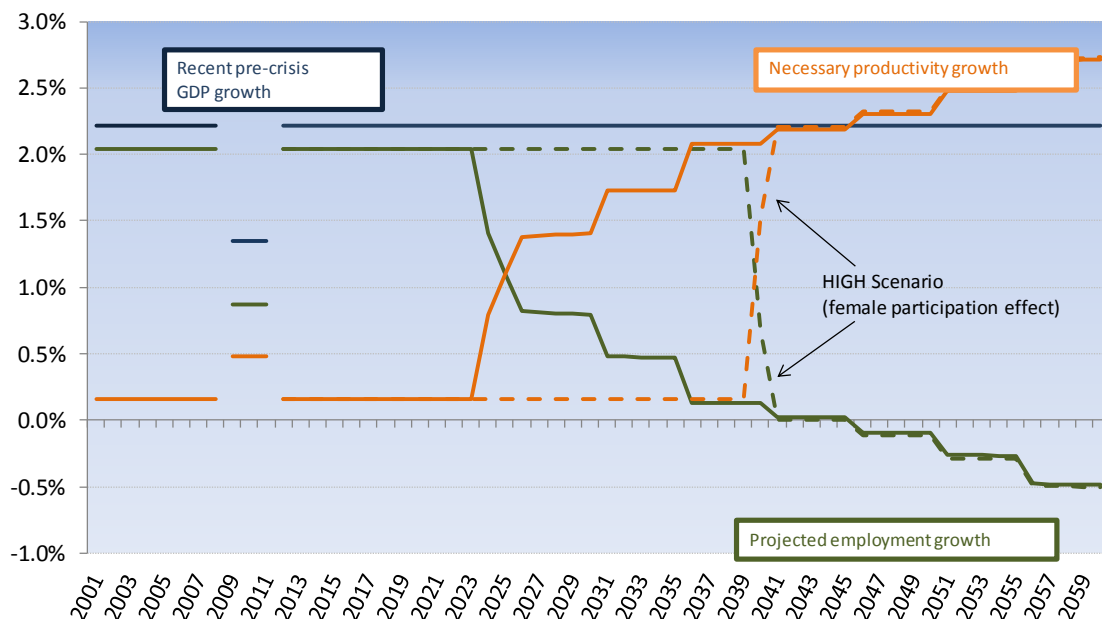


Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario); World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

Graph 34 shows that pre-crisis productivity growth in Mexico was very low. Mexico has ten more years, until mid-2020's, to put in place reforms before the inevitable slow-down in employment growth makes substantially higher productivity gains necessary in order for the country to maintain its (modest) pre-crisis GDP growth of 2.2 %.

### Graph 34 Employment and required productivity growth in Mexico

Future employment growth potential and levels of productivity growth required to sustain 2.2 % GDP growth



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario); World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>)

In the medium term, the pressure on employment growth could be cushioned by higher labour market participation by women. However, in the long term, the productivity gains that Mexico will need to achieve would have to be higher than 2.5 % every year. Argentina will be in a very similar situation.

In conclusion, in the long term, higher productivity will also become necessary for those countries where the fall in WAP is still far off. Moreover, long-term productivity gains would have to be substantial, as the countries concerned have been relying on low-productivity employment growth for decades. In order for these countries to change the driving force behind their economic growth, they will need to make important institutional reforms allowing for attracting strong investments in both human and physical capital.

### **A1.3 Turkey: a case study of particular interest for Europe**

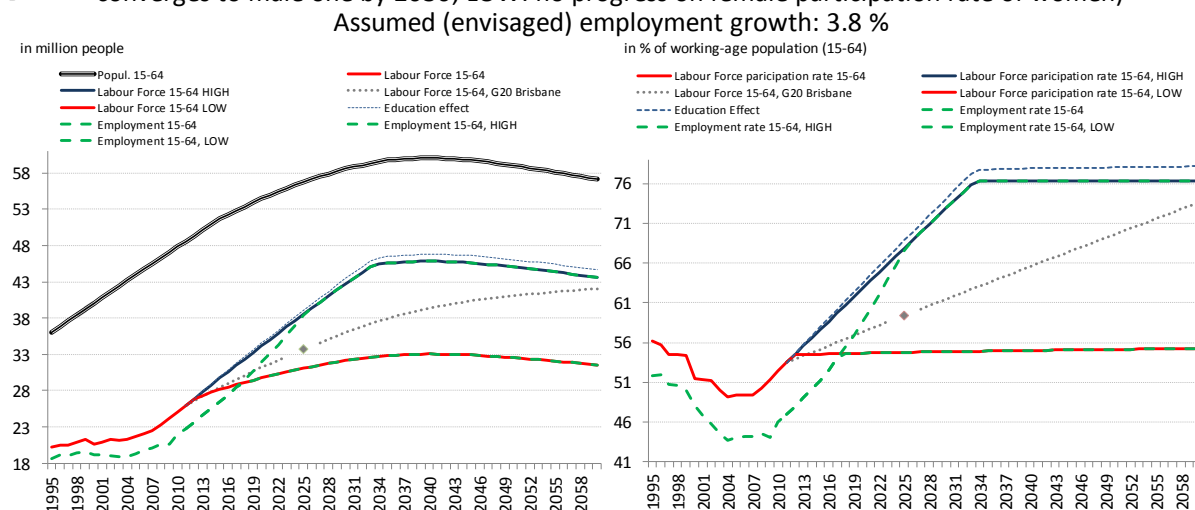
Turkey is undergoing impressive labour market and economic transformation. Its pre-crisis rate of economic growth averaged 4.4 % each year. According to World Bank data, contrary to the usual pattern in developing countries, a substantial part of this growth (3.5 %) came from productivity shifts, while only 0.9 % came from employment gains. Following the economic crisis in Turkey at the beginning of this century, there has been a reverse in the relative intensities of employment growth and productivity growth: the observed drop in productivity growth has been offset by an increase in employment growth, allowing Turkey to maintain economic growth at around 4 %.

Graph 35 shows that Turkey's working-age population will continue to increase until the 2040s. Turkey's decent pre-crisis employment growth rates of 0.9 % per year could continue beyond 2050. However, taking into account the country's recent employment boom, more ambitious employment growth scenarios would change the situation radically. According to Eurostat's EU Labour Force Survey, Turkey's employment growth in the 15-64 age group has strongly accelerated since 2010, pushing the annual average employment growth rate up to 3.8 % between 2008 and 2013.

If this pace of employment growth were to continue in the future, under the low activity scenario, which assumes no further progress in labour force activation, it would reach its upper limit already by 2017. Under the high activity scenario, if Turkey gradually closes the enormous 44 ppt-gender gap in the labour market participation rate (76 % for men compared with 32 % for women), this would allow for sustained employment growth until 2034, or even a little later if educational progress is also taken into account. In other words, in the case of Turkey, low labour market participation rate of women appears to be the main limiting factor for future employment growth. This situation is quite similar to the Mexican case presented above.

**Graph 35 Potential employment path assuming different activity scenarios, high 'desired Employment growth', Turkey**

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)

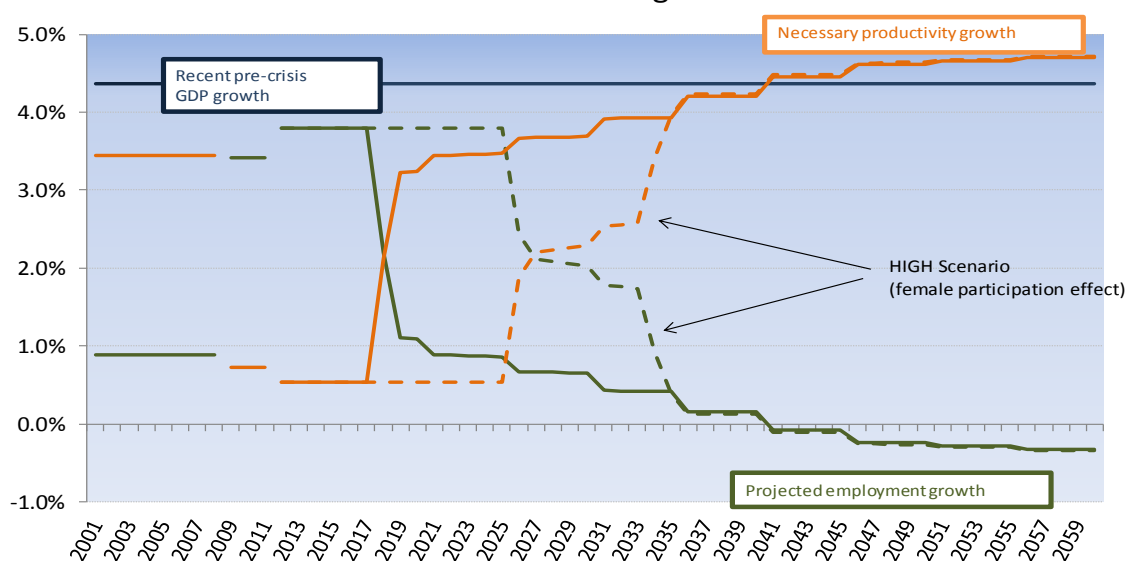


Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario); World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

Graph 36 below shows how getting women onto the labour market has enormous potential to help maintain Turkey's growth potential in the medium term. However, in the long term, productivity growth levels will have to rise beyond 4.5 % per year to keep the economy growing at 4.4 %. This will require strong investment in innovation and human capital.

**Graph 36 Employment and required productivity growth in Turkey (high 'desired employment growth')**

Future employment growth potential and levels of productivity growth required to sustain 4.4 % GDP growth



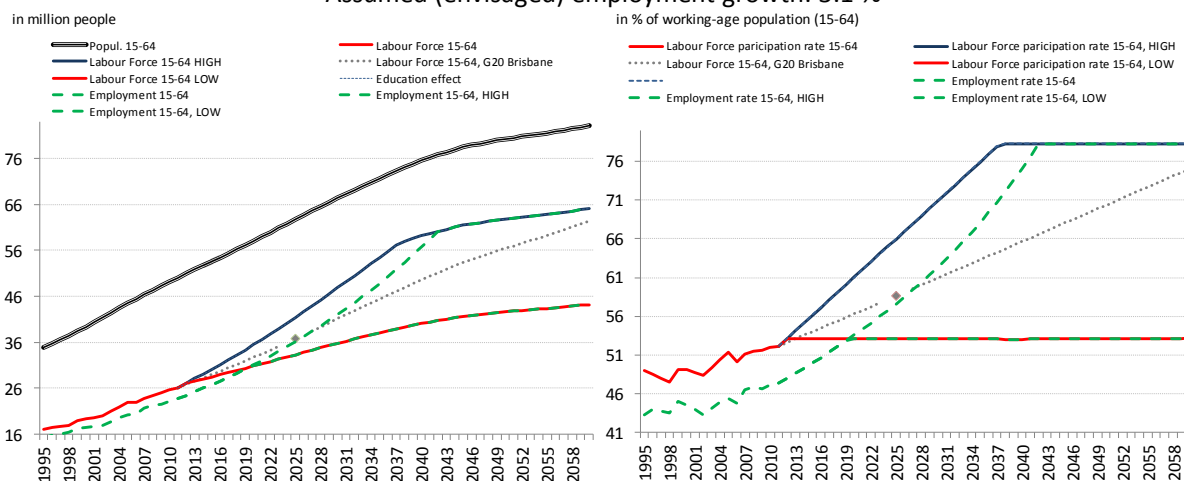
Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario); World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>)

## A1.4 The Arab World: strong potential for higher labour market participation by women

Current political instability in the North African and Middle-Eastern Arab world makes it very difficult to make long-term socio-economic projections. However, given the region's geographical proximity to Europe, it is important to take account of the evolving trends. With 85 million inhabitants, Egypt is the region's biggest country. It combines a young and fast-growing population with a labour-intensive economy that was also growing fast before the crisis. Labour market participation is characterised by an enormous gender gap in employment: Egypt's 2011 labour market participation rate for women was a mere 26 %, compared with 78 % for men.

### Graph 37 Potential employment path assuming different activity scenarios, Egypt

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: 3.1 %



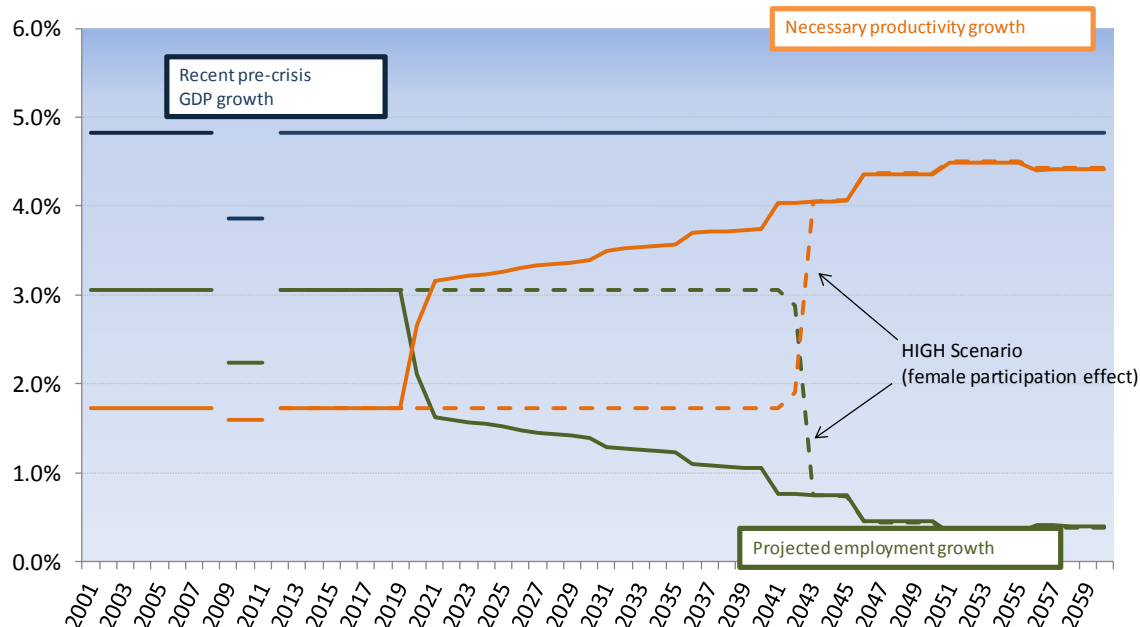
Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario);  
World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

Graph 37 shows that Egypt's relatively strong pre-crisis employment growth of 3.1 % per year could not be maintained for long unless progress was made in the labour market participation of women. Under the high activity scenario, if full progress (i.e. a zero gender gap) were to be achieved by 2037, unlimited employment growth could continue until 2042. Although employment could continue growing relative to WAP in both scenarios, Egypt and the other Arab countries in the region are characterised by their very low female activity rates which represents a huge untapped potential for future employment and economic growth.

In the light of the employment development scenario described above, for Egypt to maintain its pre-crisis growth of close to 5 %, it would need to double the speed of its productivity growth in the long term. However, under the high activity scenario, greater labour market participation by women would cushion the pressure. This would provide Egypt and other countries in the region the time needed to reap gains in productivity growth through investments in better education and skills.

**Graph 38 Employment and required productivity growth in Egypt**

Future employment growth potential and levels of productivity growth required to sustain 4.8 % GDP growth



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario); World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>)

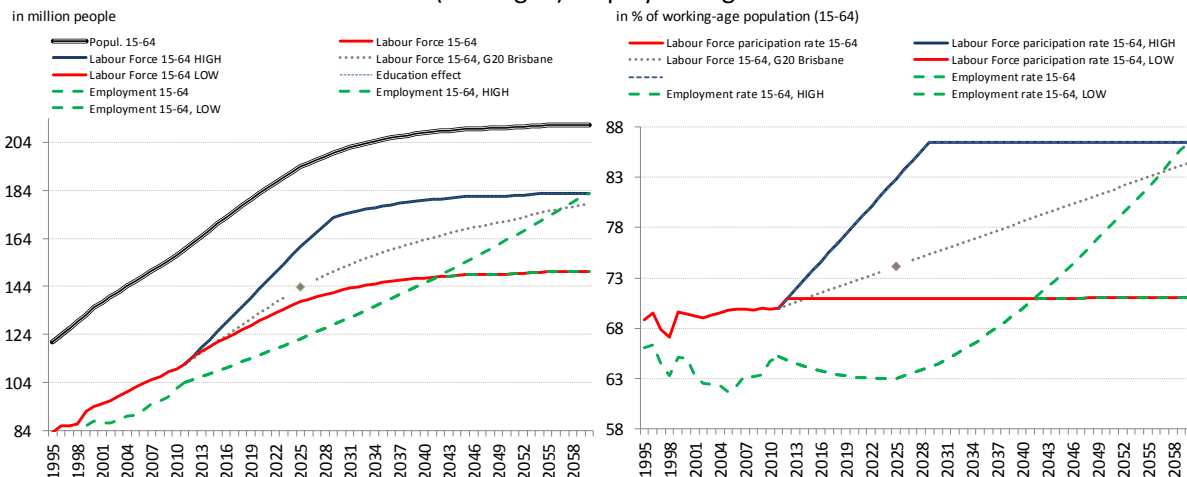
### A1.5 South Asia-Indonesia: strong working-age population growth coming to a halt

The above analysis on India shows that while the growth in its WAP is set to remain strong for the time being, its WAP will reach its peak around 2050. The potential for higher labour market participation by women in India is enormous and would enable the country to continue its strong employment growth path for quite some time before stronger productivity requirements take hold. Other major players in the region share a similar pattern.

Indonesia, another major G20 country, would be able to continue its employment growth trend until 2042 under the low activity scenario even without stronger labour market participation by women. This would be possible mainly due to continuing strong growth in its WAP, which is expected to rise from 170 million people today to around 200 million in 2030. However, after 2030 the growth in the WAP will slow down significantly, before coming to a halt by the mid-2040s. After that, Indonesia will increasingly have to rely on higher labour market participation by women. Its current gap in the participation rate amounts to more than 30 ppts. (87 % for men compared with 53 % for women in 2011 according to World Bank data).

**Graph 39 Potential employment path assuming different activity scenarios, Indonesia**

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: 1.2 %

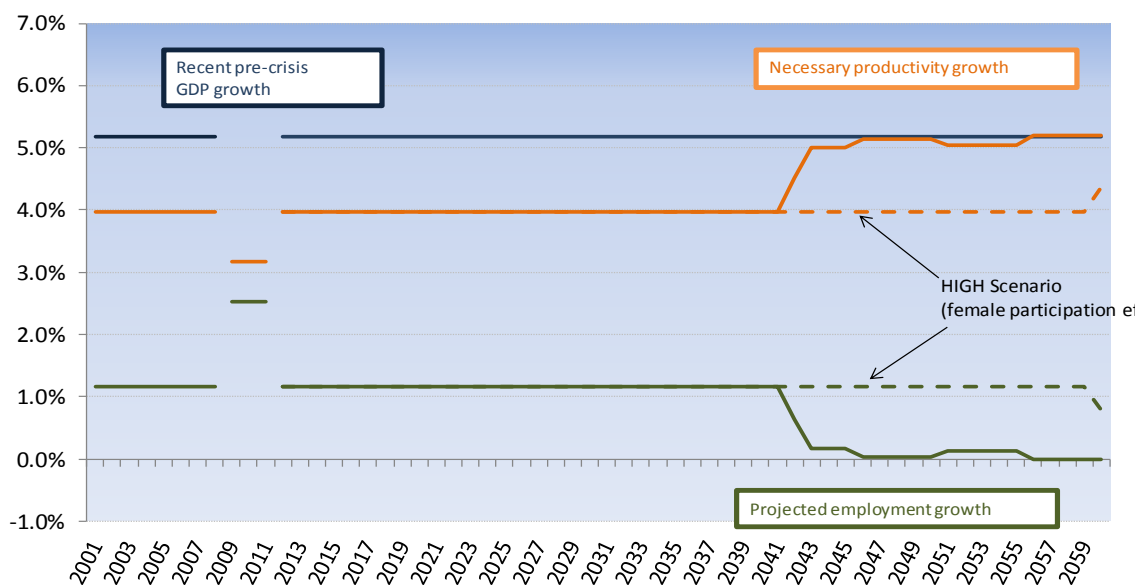


Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario); World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

Closing the gap would postpone the employment growth bottleneck until 2060. This would make Indonesia's 'unconstrained' pre-crisis employment growth of 1.2 % per year possible for another 18 years. However, after that time, its recent 5 % economic growth would — in the absence of further long-term employment growth — require productivity growth to accelerate to around 5 % per year, up from the pre-crisis figure of 4 %.

**Graph 40 Employment and required productivity growth in Indonesia**

Future employment growth potential and levels of productivity growth required to sustain 5.2 % GDP growth



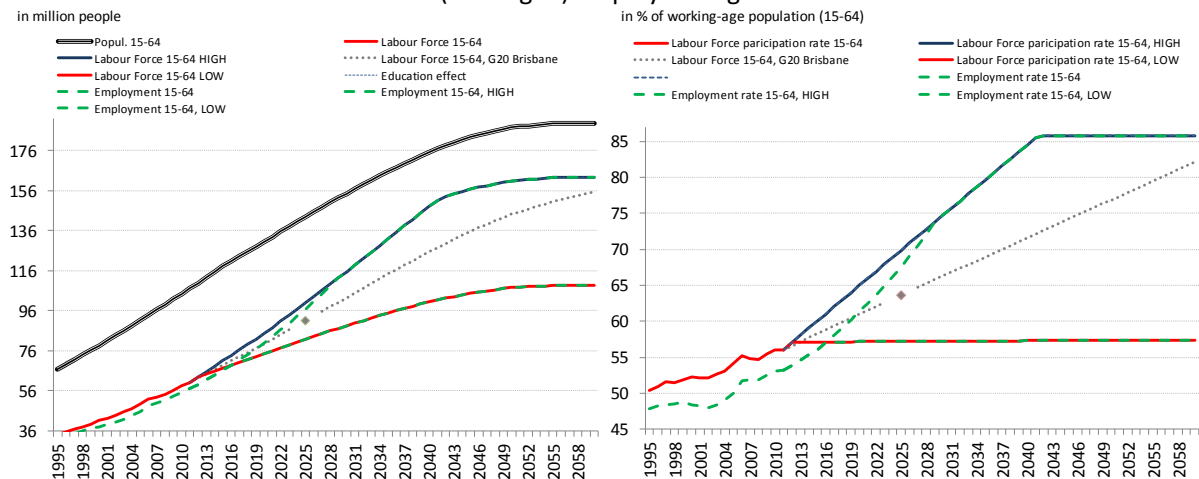
Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario); World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>)

Other major countries in the region, such as Pakistan and Bangladesh, share a similar, but not identical pattern.

#### Graph 41 Potential employment path assuming different activity scenarios, Pakistan

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)

Assumed (envisaged) employment growth: 3.9 %

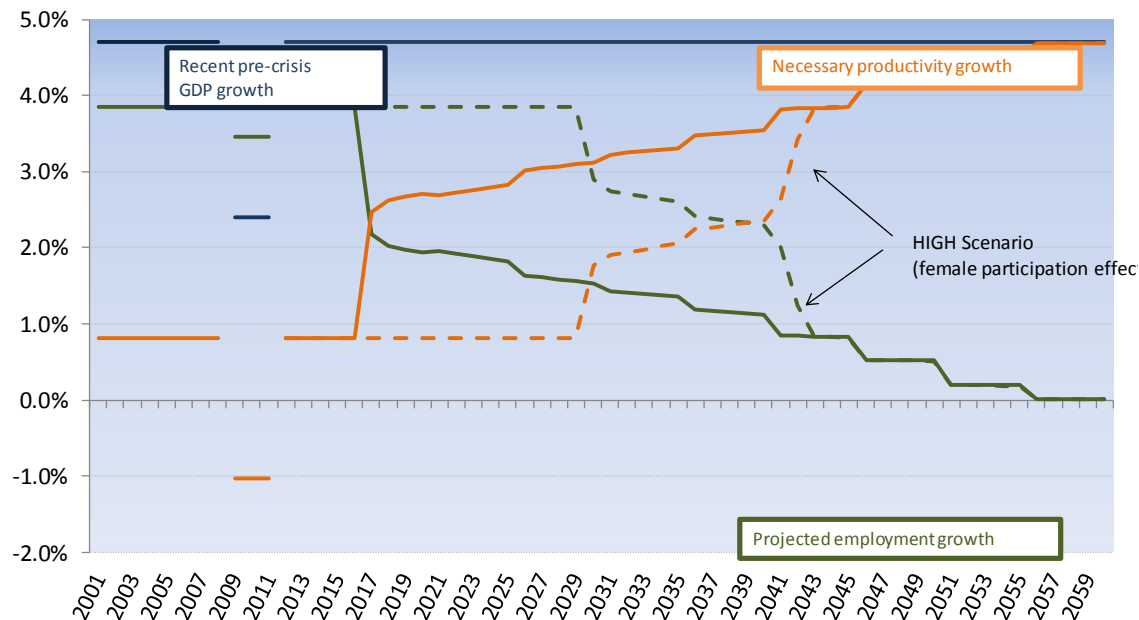


Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario); World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

Pakistan's working-age population is expected to continue growing over the following decades before peaking in the mid-2050s. Its enormous pre-crisis employment growth of just below 4 % will have to slow down soon if labour market participation rates stay at their current low levels of below 60 % as assumed in the low activity scenario. Pakistan could maintain strong employment growth until 2040 if by then it closed its enormous labour market participation gap (86 % for men compared with 25 % for women). However, in the long term, given the low activity rates for woman, Pakistan will be confronted with the challenges common to all countries in the region. Its current productivity growth profile of below 1 % will not be sufficient to sustain its long term trend of economic growth at close to 5 % per year. Progress on labour market participation by women would help to offset the need for higher productivity growth for several decades. Alternatively, Pakistan would need to achieve a gradual increase in productivity growth from 1 to 5 % per year in order to maintain economic growth. This is because employment growth would come to a halt.

**Graph 42** Employment and required productivity growth in Pakistan

Future employment growth potential and levels of productivity growth required to sustain 4.7 % GDP growth



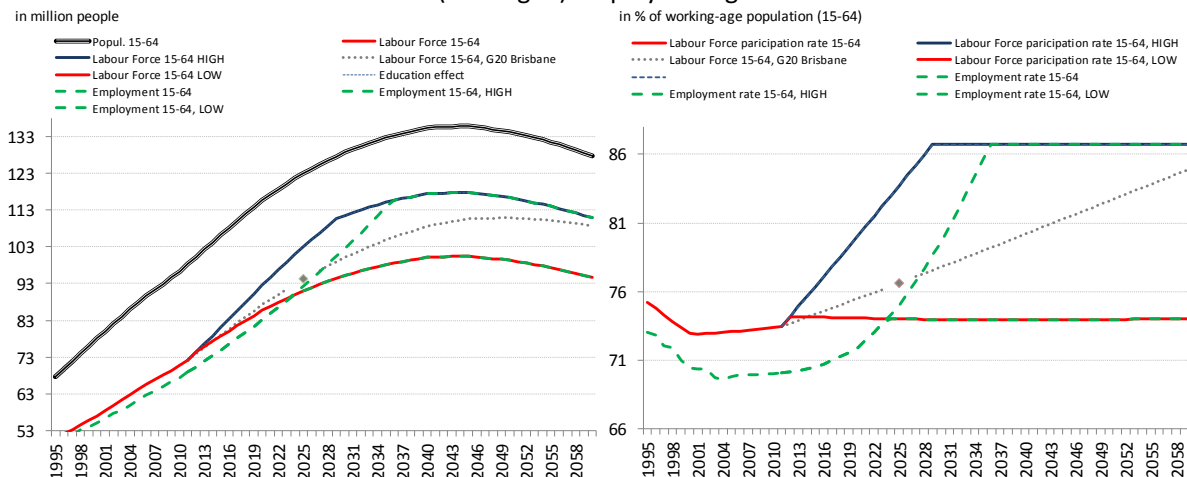
Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario); World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>)

Bangladesh is another example of a fast-growing developing country where economic growth has been supported by strong demographic growth which, however, will come to a halt around 2045 and then turn negative. Its WAP (currently around 100 million) will peak in 2045 at some 136 million. Strong economic expansion contributed to GDP growth rates close to 6 % p.a. in 2000-08. However, many people in Bangladesh live in severe deprivation and its 2012 GDP per capita is only 1.5 % of the United States' or 2.3 % of the EU's; this hints at massive quality-of-growth problems, as growth largely depends on low-wage, low-productivity activities. The country's recent (2000-08) growth performance has to be seen in that context.

In the low activity scenario, Bangladesh's pre-crisis employment growth could continue until 2024. If the current (27 pts.) gender participation gap were to be closed, this period could be extended by 11 years (high activity scenario), giving Bangladesh more time to move towards a greater emphasis on productivity growth.

**Graph 43 Potential employment path assuming different activity scenarios, Bangladesh**

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: 2.1 %

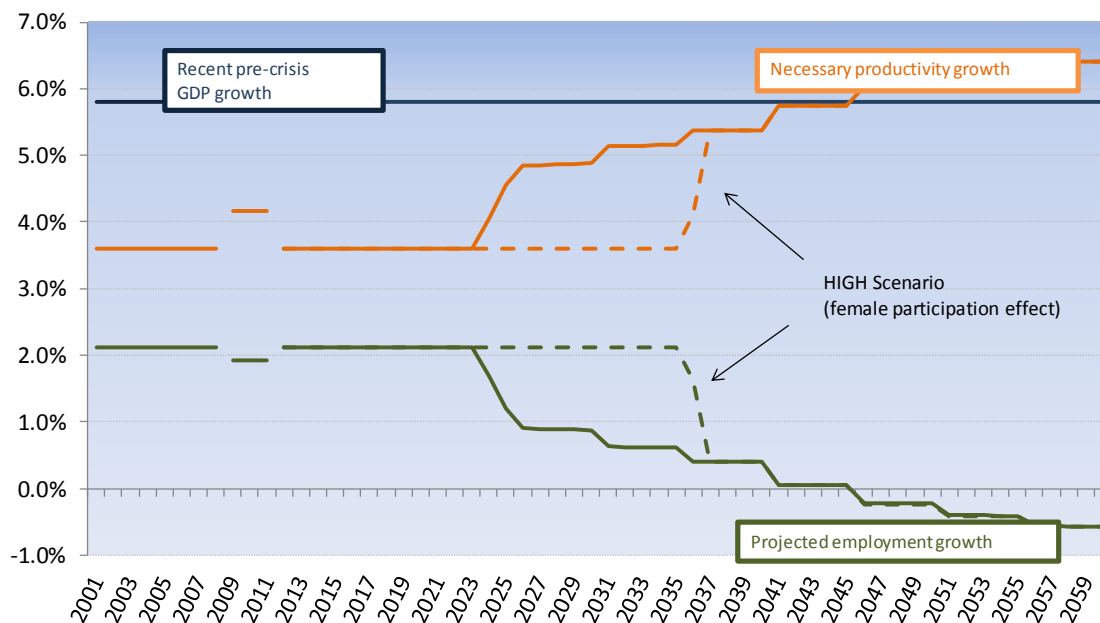


Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario);  
World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

In the long run, however, in order to sustain current GDP growth levels, the country will theoretically have to almost double its annual rate of productivity growth.

**Graph 42 Employment and required productivity growth in Bangladesh**

Future employment growth potential and levels of productivity growth required to sustain 5.8 % GDP growth



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario);  
World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>)

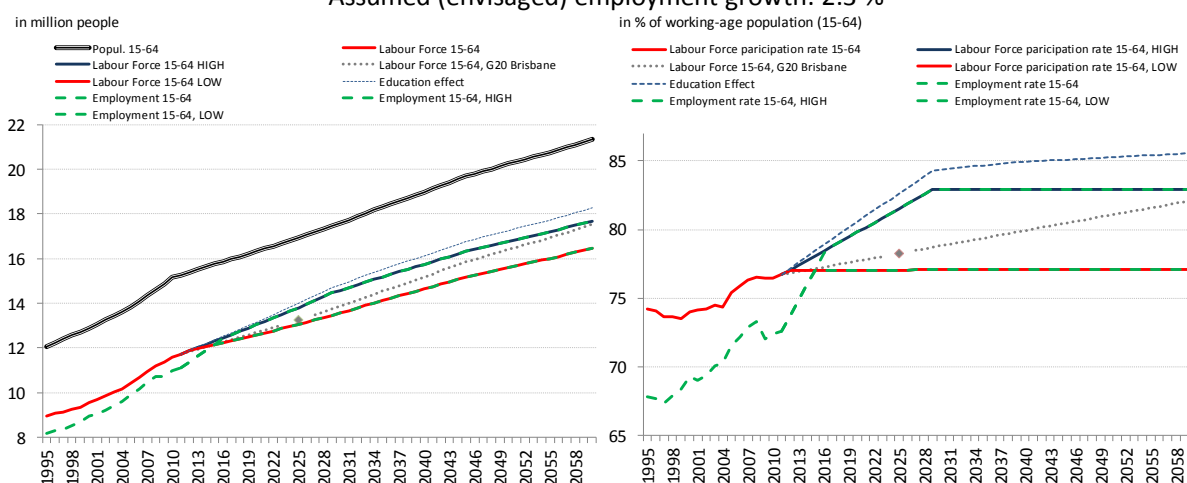
## A1.6 Sustained WAP growth in some parts of the industrialised world

In the highly developed industrialised world apart from the United States, Canada and Australia represent countries which manage to maintain growing WAP throughout the projection period. One major factor is their very high net migration rate of 8 and 11 per 1 000 inhabitants respectively between 2005 and 2010 — far above Western European (2 per 1 000) and even US levels (3 per 1 000).<sup>78</sup> Without going into detail in this sub-chapter, well-skilled migrants have undoubtedly contributed to both countries' growth performance throughout the post-war period.

The UN projections indicate that Australia's WAP will climb steadily from its present level of 16 million to 21 million by 2060 (Graph 43). Unlike many other industrialised countries, Australia will be able to safeguard positive employment growth throughout the projection period, maintaining a positive demographic dividend to potential growth from its growing WAP. However, the strong pre-crisis employment growth (2.3 % a year) cannot be maintained for long in either of the participation scenarios; this also holds true in the case of Canada.

### Graph 43 Potential employment path assuming different activity scenarios, Australia

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: 2.3 %



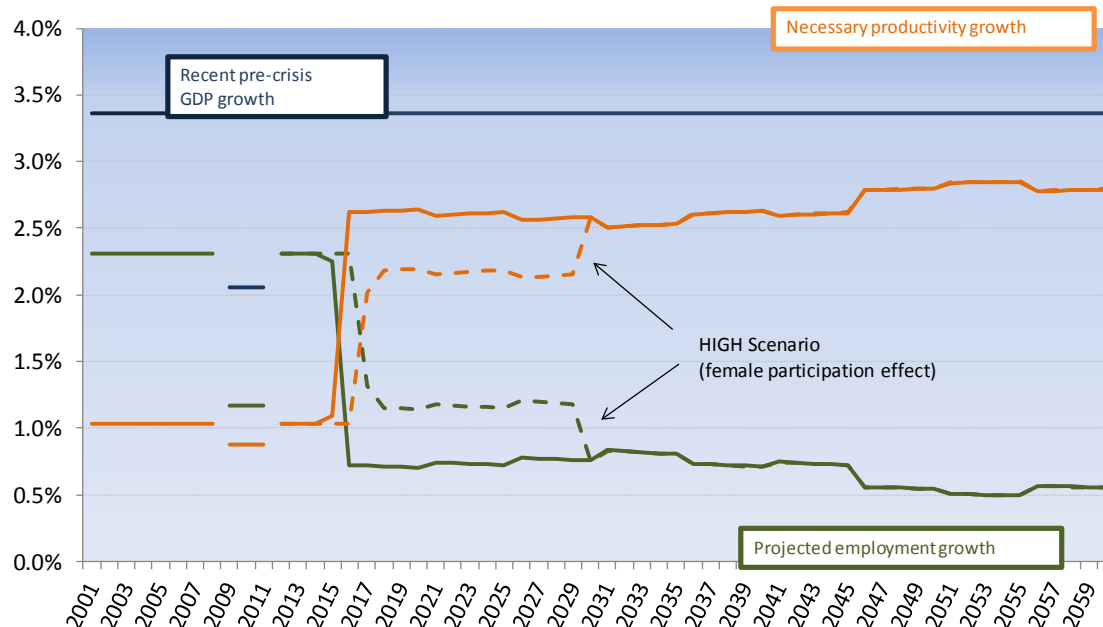
Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario);  
World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

This becomes clear if one looks at growth rates. Before the crisis, Australia's 2.3 % employment growth was necessary to maintain impressive GDP growth of close to 3.5 %.

<sup>78</sup> World population prospects: 2012 revision, UN, Department of Economic and Social Affairs, Population Division (2013).

**Graph 44 Employment and required productivity growth in Australia**

Future employment growth potential and levels of productivity growth required to sustain 3.4 % GDP growth



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario); World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>)

If this growth level is to be sustained in the future, productivity gains will have to increase from today's levels of around 1 % per year to over 2.5 % in the long run. The situation in Canada is very similar: today's productivity growth of less than 1 % would have to rise to over 2 % in any scenario. Given the relatively narrow gender participation gap in both countries, reducing it, as assumed in the high activity scenario, makes little difference. However, both countries have advanced considerably in terms of educational progression and in both cases this has had a significant effect on participation. Graph 44 shows that Australia will be able to add 3 ppts. to its long-term activity rate (Canada: 4 ppts.), which offers additional potential to shift both employment and productivity growth.

As a result, despite strong WAP growth (on the back of the migration factored into the UN projections), the pre-crisis economic growth pattern may not be sustainable in the long run without further substantial gains in productivity growth in the two countries in question.

### A1.7 Sub-Saharan Africa: yet to catch up

Africa has seen strong economic growth in the past decade (5 % average annual growth in GDP), but it is afflicted by political instability and a large proportion of its fast-growing population is still caught in severe poverty.<sup>79</sup> For example, Nigeria's GDP grew by an impressive 9 % per year on average between 2000 and 2008. Yet the EU's

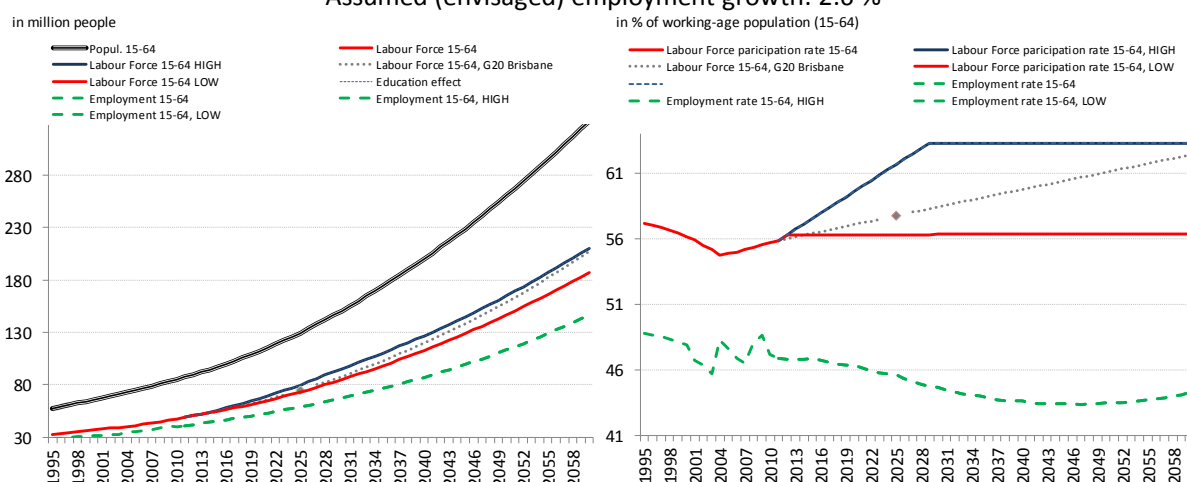
<sup>79</sup> UN Economic Commission for Africa, *Economic report on Africa 2014* (executive summary), p. 2.

2012 per-capita GDP is more than 20 times higher than Nigeria's.<sup>80</sup> This section cannot deal with the range of challenges to development in this region. It will only focus on long-term growth potential from the angle of WAP demographics.

Nigeria is a representative example for many countries in the region where population keeps growing at a fast pace. Nigeria's population has quintupled over the past 60 years and now stands at around 180 million. The demographic trend is set to continue.

#### Graph 45 Potential employment path assuming different activity scenarios, Nigeria

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: 2.6 %



Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario);  
World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

WAP is projected to increase further from today's (approx.) 90 million people to more than 300 million by 2060. Given Nigeria's annual average employment growth of 2.6% in 2000-08, there is no sign of employment growth limitation in either of the scenarios. However, this enormous human resources potential remains largely untapped given the current functioning of the economy and labour market.<sup>81</sup> As for many other African countries, future growth will largely depend on the region's ability first to safeguard political and societal stability and then to reform the economy so as to improve competitiveness through better education. This challenge is also a matter of global concern given that these regions, together with South Asia, will represent the main human resources reserves at global scale after 2030. Development policy could play a critical role in this context. In developing its policy agenda for the future, the industrialised world needs to take more serious account of the challenge of economic development in Sub-Saharan Africa and South Asia which currently face galloping demographics and extreme poverty.

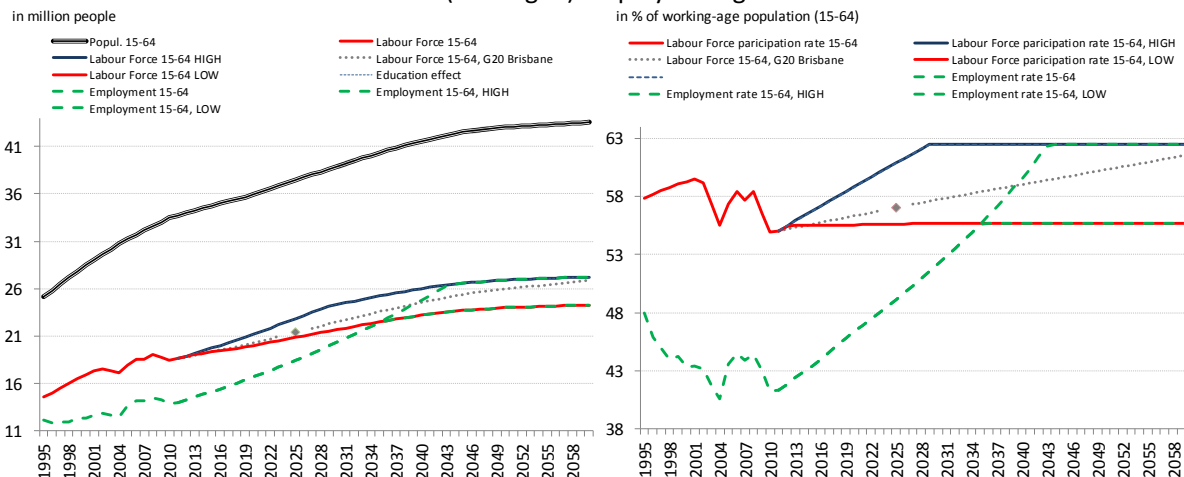
However, it is worth pointing that Africa is quite diverse in terms of individual countries' economic and societal transformation. As a member of the G20, South Africa is often cited as an emerging economy, further up the ladder of industrial development, with a per-capita GDP five times that of Nigeria.

<sup>80</sup> World Bank database for Nigeria.

<sup>81</sup> UN Economic Commission for Africa, *Economic report on Africa 2014* (executive summary), p. 2.

**Graph 46 Potential employment path assuming different activity scenarios, South Africa**

Working-age population, active population, and employment (HIGH scenario: female participation rate converges to male one by 2030; LOW: no progress on female participation rate of women)  
Assumed (envisaged) employment growth: 2 %

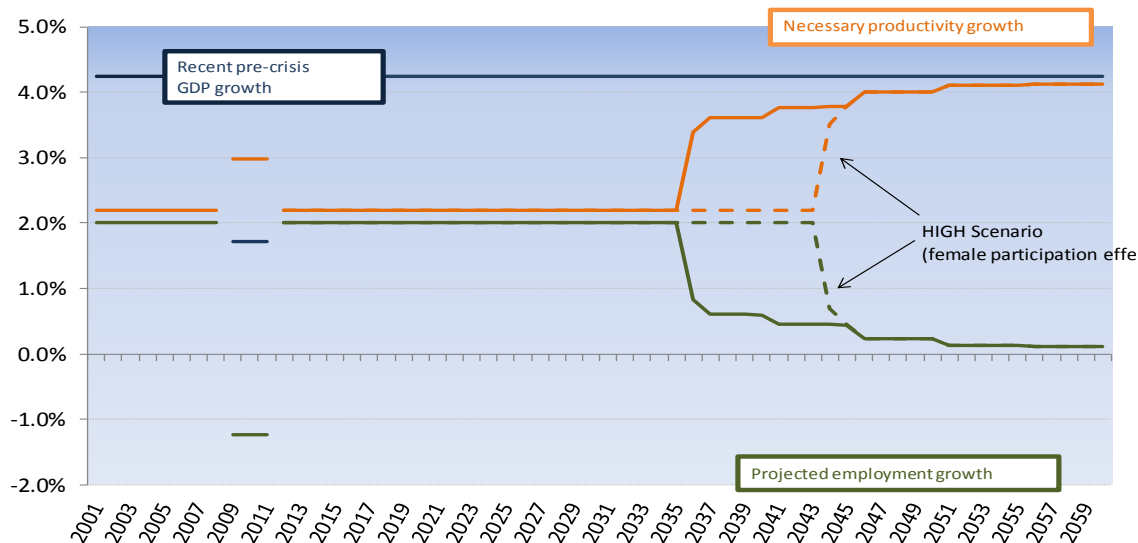


Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2013, main scenario);  
World Bank labour market data (employment and participation rates, <http://data.worldbank.org/country>)

WAP growth in South Africa is set to slow down significantly. Today's WAP of 34 million people will climb to 44 million by 2060, which means that the 2 % p.a. pre-crisis employment growth pattern will not continue beyond 2035 in the low or 2043 in the high activity scenario. In the long run, the country's growth pattern has to change so that productivity increases accelerate significantly: for South Africa to continue its pre-crisis GDP growth path of over 4 % p.a., productivity gains of around 4 % would be required after 2040, as WAP growth will almost come to a halt. In that respect, the country represents a quite distinct case as compared to other parts of the continent.

**Graph 47 Employment and required productivity growth in South Africa**

Future employment growth potential and levels of productivity growth required to sustain 4.2 % GDP growth



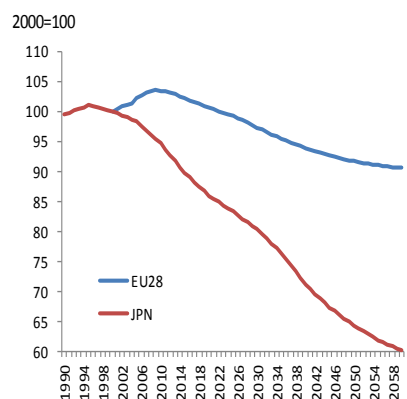
Own projections based on UN population prospects, 2012 revision, medium variant (except EU: Eurostat Europop2010, convergence scenario);  
World Bank labour market data (employment and participation rates, GDP-growth rates, <http://data.worldbank.org/country>)

## Annex 2: Lessons to learn from Japan?

Japan's demographic profile in the past 20 years and the impact it has had on total employment and activity suggest that productivity in the EU might come under pressure very soon if Europe fails to make immediate progress towards the EU2020 employment goal. Indeed, in terms of labour-force demographics, the EU is currently in a very similar situation to that of Japan in the mid-1990s. Graph A2 1a shows that the EU's WAP peaked around 2010, 15 years after Japan's. Given the advance of the WAP ageing process in Japan, are there any useful lessons for Europe to learn from the Japanese experience?

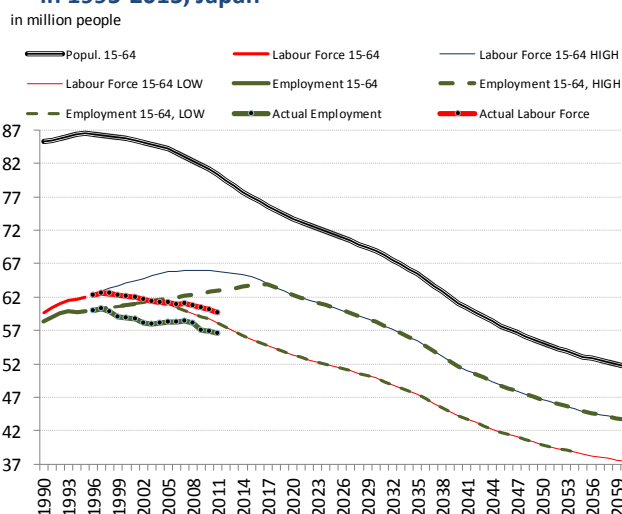
To help providing an answer to that question we run an ex-post simulation of the Japanese case with the fiction of being back in 1995, using our projection method. That is, we assume a low (no progress) and a high activity scenario. We then plot the resulting model trends in activity and employment against the ones that have actually occurred since 1995. The high activity scenario assumes that the gender participation gap closes by 2015 — a bold assumption for Japan, as there was a 26 ppt gap in 1995 (85 % male vs 59 % female participation).<sup>82</sup> Graph A2 1b shows that, under these circumstances, the (very moderate) employment growth rates of 0.3 % per year in 1990-95 could have continued until 2004 in the low activity scenario, and until 2016 in the high activity scenario, before turning negative due to the strong WAP decline.

**Graph A2 1a: Working-age population (15-64 years) in the EU and Japan**



Sources: UN population projection, 2012 rev., medium var., Eurostat Europop2013 popul. projection, main scenario

**Graph A2 1b: Employment/activity projection based on 1990-95 data, theoretical catch-up of female participation in 1995-2015, Japan**



Own projections based on UN population prospects, 2012 revision, medium variant  
World Bank labour market data (employment and participation rates)

However, in reality the situation did not evolve within these high and low activity limits. In fact, WAP decline almost coincided with nearly commensurate declines in both activity and employment. After WAP had begun to shrink, there were no considerable shifts in employment or activity rates. In other words, contrary to the assumption made for the EU above, unused labour reserves in Japan remained largely untapped which consequently dragged down rapidly both participation and employment.

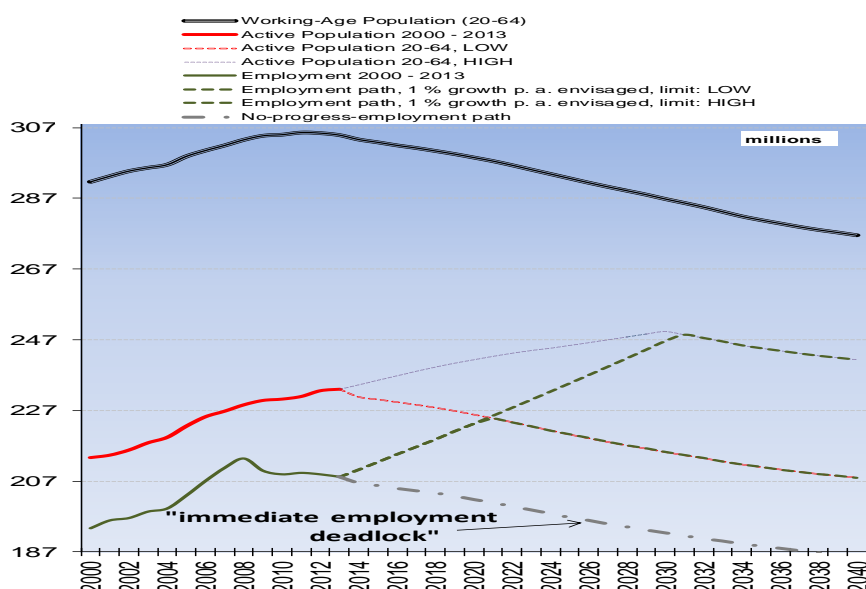
<sup>82</sup> So we refrain from adding an older-workers and an educational effect on activity.

In turn, pressure on productivity to generate economic growth emerged just as WAP started to decline. The Japanese case shows that the low activity scenario may not always reflect the worst case scenario. This was neither the intention behind defining this scenario.<sup>83</sup> Instead, this scenario should be seen as a purely theoretical construct aiming to show the extent of possible activity gains (difference between high and low scenario) which could be expected through activation policies (and needed to safeguard further employment growth).

The findings on the Japanese case – though not directly comparable to the EU – provide some useful insight. To better illustrate, we supplement the depiction of the situation for the EU presented in section 4 with an additional ‘*employment deadlock scenario*’, see Graph A2 2a and 2b. In this scenario, instead of assuming an EU2020-compatible employment progress of 1.1% per year (as seen in Graph 2) leading to the envisaged 75% employment rate by 2020, we assume no future change in the EU employment and activity rates from now on. In other words, the scenario assumes that the EU employment rate would keep stagnant as in the case of Japan at the time and that the unused EU’s human resources reserves will remain untapped in the years ahead<sup>84</sup>.

In this scenario the employment growth bottleneck becomes an *immediate* problem: Employment starts shrinking from now on. As a consequence, the pressure on productivity would be an immediate challenge rather than an issue in the long term. In that case there was no window of opportunity which would allow to implement time-consuming productivity-enhancing reforms. Productivity growth would have to double *from now on* (and not only after 2020) as compared with the pre-crisis decade just to sustain a positive GDP growth.

Graph A2 2a: Potential employment path, EU28

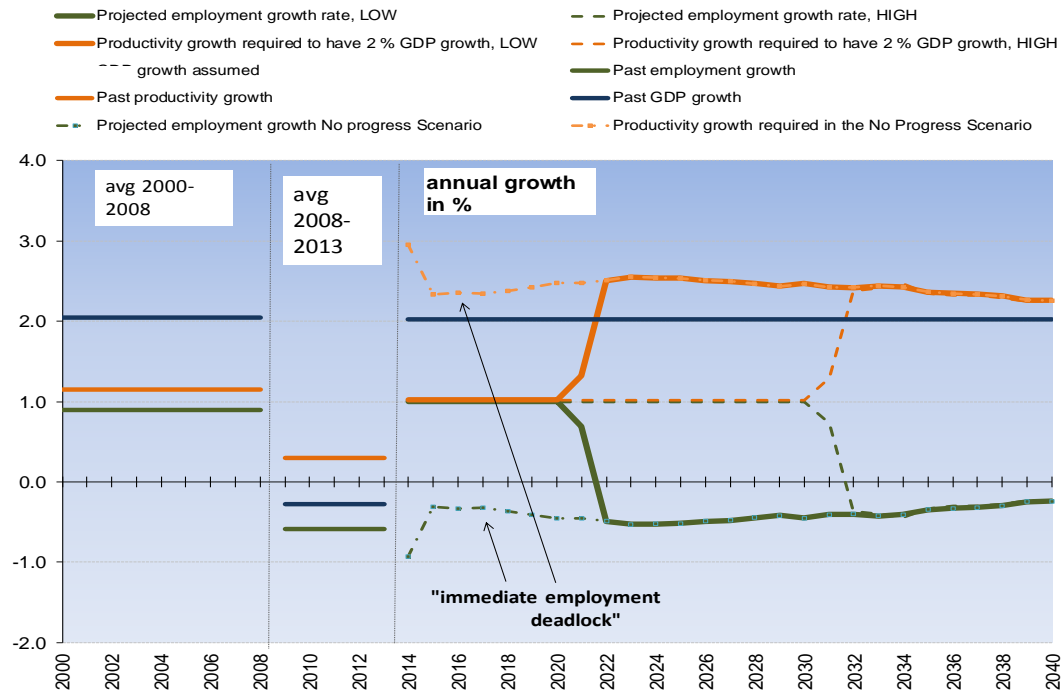


Source: Own calculations based on Eurostat EU LFS and Eurostat Europop 2013 population projection

<sup>83</sup> Most often in times of WAP decline, it is observed that the more employment grows, the more it recruits from the (harder-to-recruit) inactive part of the WAP and not only from the reduced stock of the unemployed.

<sup>84</sup> It should be noted here that since the beginning of the economic crisis the EU employment rate remain practically stagnant at levels below 70%, that is, significantly lower than the Europe 2020 objective of 75%.

Graph A2 2b: Necessary productivity growth

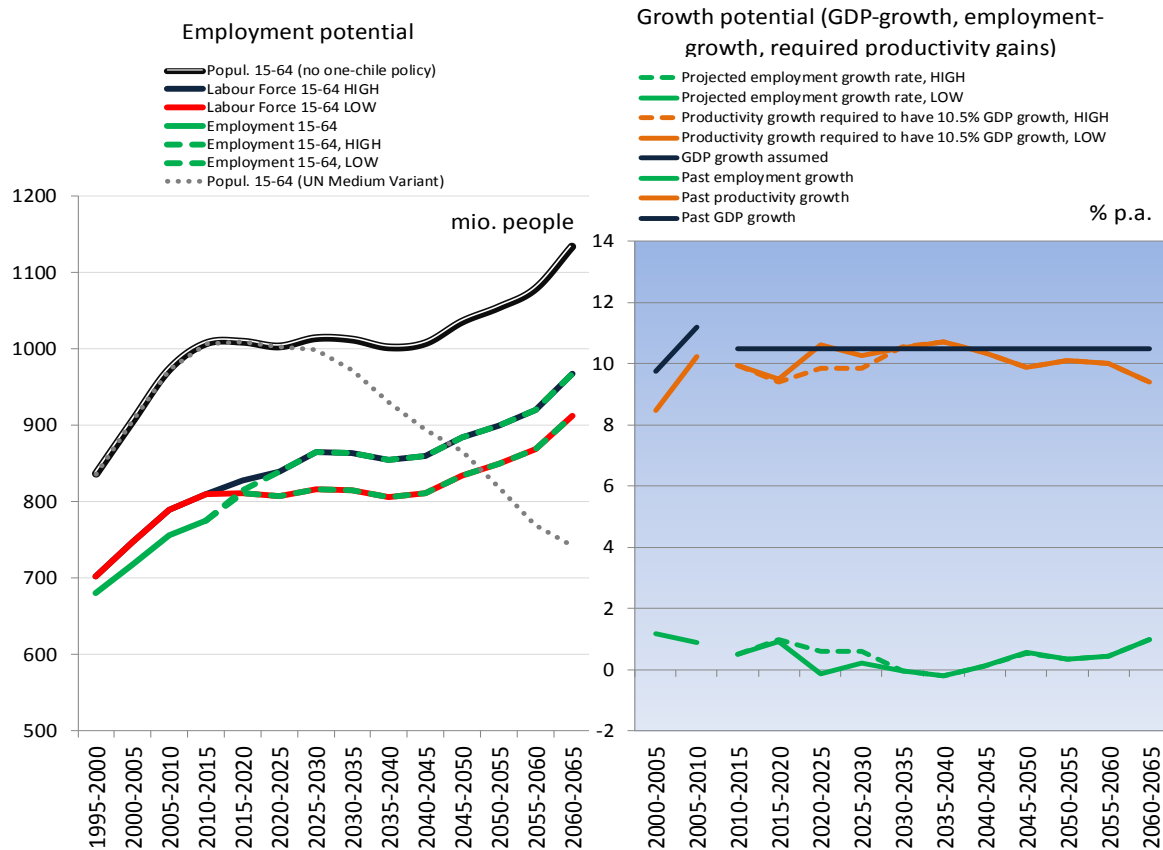


Source: Own calculations based on Eurostat EU LFS and Eurostat Europop 2013 population projection

## Annex 3: China's demographic and growth prospects and the 'one child' policy

Will a less restrictive family policy alleviate the pressure on productivity in China? Since the start of the 1970s, when China first implemented a series of family planning policies to influence mainly rural-area fertility,<sup>85</sup> total fertility has been declining rapidly. These culminated in the introduction of the one-child-per-couple restriction in the late 1970s. By then, the total fertility rate (TFR) had already declined to around three children per woman aged between 15 and 45 — down from over six in the 1950s. Today, the total fertility rate is a mere 1.7, well below replacement level.<sup>86</sup> We assume that China abolishes the one-child policy now and that by around 2030 the TFR will climb steeply back to its level when the restriction was introduced (gradual shift from 1.7 today to 3 in 2030-35). The following picture would emerge instead of that depicted in Graphs 22 and 23 above:

**Graph A3: Potential employment and productivity path assuming different activity scenarios, high fertility scenario, China**



Chosen scenario: Own scenario: TFR=3, linear phasing-in by 2030-2035

The dotted grey line depicts WAP in the medium variant of the UN population projection, which had been taken on board in Chart 22 above. It assumes TFR to stagnate around 1.7 to 1.8 in the long run. Noticeable differences begin to materialise after 2030, i.e. the fertility shock comes too late to change the point in time when employment growth will be limited due to human resource scarcities (between 2015 and 2025, depending on the activity scenario). However, in contrast to the situation where

<sup>85</sup> Gui-Ying and Lutz, 2004, p. 272.

<sup>86</sup> UN world population prospects: 2012 revision (<http://esa.un.org/wpp/Documentation/publications.htm>).

the one-child restriction is still in place, employment growth could be kept stable until just after 2040 in both activity scenarios. After 2040, employment could start growing again in parallel with WAP — in sharp contrast to the situation without the strong positive fertility shock.

However, in contrast to more advanced economies in Europe, the USA or Japan, China's growth pattern is driven far more by productivity gains than by employment. Hence, the need for productivity growth to sustain pre-crisis GDP growth levels will not change much, even after such strong positive demographic impetus to the future WAP. Productivity gains of around 10 % per year would still be needed until at least 2050. Only after 2050 could employment growth resume its pre-crisis sustainable growth rate of around 1 % a year; this would alleviate the pressure on productivity only slightly, with annual productivity gains of 9 % still necessary.

In other words, no labour-market participation scenario, or any realistically ambitious assumption on fertility, will prevent labour shortages already over the next decade. The high reliance of the Chinese economy on productivity growth rates will further increase in the years ahead.



European Commission

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