**The implications of below replacement fertility for labour supply and international migration, 2000-2050.**[1]

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Fertility rates have been low in almost all advanced countries for the past 25-30 years. In most cases throughout this period, fertility has been below the level that leads to replacement of one generation by the next. In the same period, mortality rates have also fallen sharply. The well-known consequence of this combination is rapid ageing of the population. The rate of ageing will step up a gear in the next 30 years as the baby-boom generation moves into the older ages. A common concern is that a future labour force may not be able to support the rapidly growing aged population. This is a relative concept and its severity is measured by relative indicators, such as the ratio of the number of retired aged persons to the size of the labour force. Considerable attention has been directed to the policy implications of ageing, a recent example being the OECD's (1998) publication, *Maintaining Prosperity in an Ageing Society*. However, much less attention has focused on another important outcome of sustained low fertility. As we show below, most advanced countries are facing either stagnation or a fall in the absolute size of the labour force if current demographic and labour force trends continue.

In this paper, we examine future trends in labour supply in 16 countries. We consider the impact on future labour supply of changes from current levels of fertility, migration and labour force participation. The sixteen countries are chosen to display a range of differing current circumstances. Outcomes were related to the relative rankings of current levels of fertility, migration and labour force participation as shown in Box 1.

## The significance of the absolute size of the labour force

Does the absolute size of the labour force matter or do we need only to be concerned about its size relative to the numbers of dependent people? The question is difficult to answer because it is a new question. There is no prior experience of falling labour supply over a long period of time in an advanced country. In contrast, experience in the past 30 years in advanced countries has been of gradual to rapid increases in labour supply as the baby-boom generation entered the labour force and as women were incorporated in large numbers. Table 1 shows labour force growth in the 16 selected countries in the past 25-30 years. In this period, growth was highest in the Asian 'tiger' economies (Singapore, Thailand, South Korea) where the labour forces more than doubled. They were followed closely by the traditional countries of immigration (Canada, Australia, New Zealand, United States). Growth in the Netherlands was comparable to that of the traditional immigrant countries. The lowest growth was in the large European countries (France, Italy, Germany and United Kingdom) and Japan, but even these countries experienced

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**Box 1. 16 countries grouped by level of fertility, migration and labour force participation**

| Country | Fertility | Migration | Labour force participation |
|---|---|---|---|
| New Zealand<br>United States | High | Moderate | Low or moderate |
| Australia<br>Canada<br>Singapore | Moderate | High | Low |
| United Kingdom<br>France | Moderate | Low | Low |
| Germany<br>Japan<br>Sweden | Low | Low or moderate | High |
| Italy<br>Greece<br>Spain<br>Netherlands | Low | Low or moderate | Low |
| Thailand[a]<br>South Korea[a] | Moderate | Low | High |

a. These two countries also differ from the others in that their present age structure is conducive to substantial growth of labour supply in the next 25 years. This is related to the relative recency of their fertility declines compared to other countries.

expansions of their labour forces ranging from 14 per cent to 28 per cent, constituting several million additional workers in each case.

During this period of expansion of labour forces, the standard emergent policy approach to 'tight' labour markets has been to slow the rate of economic growth using monetary policy. Good economic management has equated to achievement of just the right mix of economic growth, unemployment, inflation and interest rates: lowering the amplitude and shortening the duration of business cycles while economic growth bubbles away. However, if a tight labour market derives not from excess demand arising from 'too' rapid economic growth but from stagnation of or a sustained fall in the supply of labour set to continue over decades, what policy approach is to be used?

One potential pathway is that labour demand will fall to match falls or stagnation in labour supply. Increases in the price of labour could stimulate improvements in productivity so that economies maintain their size or continue to grow. There have been considerable increases in the productivity of labour in the past 30 years and there is little reason to expect that this trend will not continue. Indeed, futurists argue that we are on the cusp of a remarkable period of technological advance that will greatly enhance labour productivity. On the other hand, continued growth in the labour force may be a condition for this technological advance to occur. This is a position taken by the influential Hudson Institute in the United States. It is also the implicit position taken by Microsoft in demanding freer immigration to the United States of persons skilled in information technology.

The Hudson Institute through its *Workforce 2020* project has concluded that the United States will face very tight labour markets in the next decades. As we shall see in the

**Table 1. Relative size of the labour force in c1995 compared to c1970[a], 16 countries**

| Country | Ratio of labour force size in c1995 to labour force size in c1970 | Country | Ratio of labour force size in c1995 to labour force size in c1970 |
|---|---|---|---|
| New Zealand | 1.64 | Japan | 1.28 |
| United States | 1.45 | Sweden | 1.30 |
| Australia | 1.79 | Italy | 1.19 |
| Canada | 1.82 | Greece | 1.41 |
| Singapore | 2.44 | Spain | 1.41 |
| United Kingdom | 1.14 | Netherlands | 1.56 |
| France | 1.25 | Thailand | 2.33 |
| Germany | 1.16 | South Korea | 2.04 |

Sources: Derived from the sources set out in Appendix A

subsequent analysis, the future labour supply situation in the United States is more favourable than it is in almost any other advanced country and much more favourable than most. Thus, depending upon views about future labour demand, the conclusions of the Hudson Institute would apply more powerfully to most other countries than they do to the United States. While long-term projections of labour supply are relatively robust, long-term projections of labour demand are highly conjectural. New technology will continue to displace workers in different occupations, but the authors of *Workforce 2020: Work and Workers in the 21st Century* conclude that

> experience suggests that the development, marketing, and servicing of ever more sophisticated products – and the use of those products in an ever richer ensemble of personal and professional services – will create more jobs than the underlying technology will destroy (Judy and D'Amico 1998).

While the Internet will change the way that we conduct many transactions and hence reduce the demand for certain types of labour, there is no suggestion that labour demand will fall overall. Indeed, the counter argument is much more likely: that the rapidity of technological advances and greater availability of investment capital will lead to greater demand for people to implement the advances. In addition, Richard Judy of the Hudson Institute has recently concluded that 'both fiscal and monetary policies are likely to be more expansionary over the next 20 years than they have been in the past couple of decades'. He argues that the American voter has come to expect a booming economy and that only a buoyant economy with a strong labour market will prevent protectionism (Judy 1998). If companies are unable to find the workers that they need in the United States, then the company will move offshore, a threat already applied by Microsoft to argue for a freer flow of workers on H1-B visas.

The Hudson Institute considers that, in the new information technology age, there will be a considerable increase in demand for skilled labour and the higher the skill, the greater will be the demand (Judy and D'Amico 1998). As new technology gears in, economies inevitably will continue to experience substantial restructuring. Restructuring produces incongruity between labour supply skills and labour demand skills. Thus, even though workers may be available, they may not have the skills required by the economy. A

growing labour force, particularly a younger, growing labour force is more likely to have the skills required.

The ageing of the population will itself alter the occupational structure of the labour force in the future. Healthy and well-resourced aged people will demand leisure and recreation services while frail aged persons will need a wide array of care services. Some of these services will be highly skilled (for example, sophisticated health services) but others will be low skilled (for example, transport and distribution or household maintenance tasks). Almost all these services will be labour-intensive; that is, the scope for technology to replace labour will be small. Construction is another labour-intensive industry that will be in demand in the future. Construction and service jobs, by their nature, are not easily exported to labour-abundant economies. In addition, the potential for future labour productivity gains is lower in the service and construction industries than it has been in manufacturing, agriculture and mining in the past. Increased affluence among skilled workers in the formal economy will also lead to a demand for unskilled or lowly skilled workers to support affluent lifestyles. In regard to future demand for low-skilled workers, we ask the rhetorical question: why is it that the U. S. Bureau of the Census in its official population projections makes the assumption that illegal migration to the United States will continue at a level of about 220,000 persons for the next 50 years?

If stagnation or falls in labour supply in the future are indeed a problem as can be argued from the above discussion, how can the future supply of labour be increased? Labour supply is the product of future population size in each age and sex category and the age and sex specific labour force participation rates. Thus, labour supply can only increase through having more people in the labour force ages or through increases in labour force participation rates. The remainder of this paper examines the potential for countries to follow either or both of these policy approaches.

**Increasing labour force participation rates**

Growth of the labour force in the past 30 years in advanced countries would have been even more rapid had it not been for two definite trends. First, the extension of education at young ages has taken large numbers of young people out of the full-time labour force. Second, a shift downward in the age of retirement, a trend with considerable variation across countries, has taken many men aged 55 years and over out of the labour force.

The fall in participation rates at young ages is mainly a supply-side phenomenon driven by the need to obtain higher qualifications in a labour market increasingly oriented to skills. However, there is an argument that youth unemployment (low demand for young full-time workers) has led to increases in participation in education from time to time (Hoem forthcoming). Table 2 shows, however, that there is considerable variation between countries in participation rates at young ages. The English-speaking countries stand out as having much higher levels of participation in the 15-19 year-old age group and to a lesser extent, in the 20-24 year-old age group. This is related to combination of study with part-time work that is common for young people in the English-speaking countries. The Netherlands is the only other country displaying this pattern, the high rates

**Table 2. Current labour force participation rates at ages 15-19 and 20-24, 16 countries**

| | Age group 15-19 | | Age group 20-24 | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| Country | Labour force participation rates (%) | | | |
| New Zealand | 57 | 54 | 85 | 72 |
| United States | 43 | 42 | 82 | 73 |
| Australia | 58 | 57 | 87 | 77 |
| Canada | 51 | 50 | 80 | 73 |
| Singapore | 21 | 19 | 76 | 77 |
| United Kingdom | 52 | 49 | 83 | 70 |
| France | 8 | 5 | 58 | 48 |
| Germany | 36 | 29 | 78 | 71 |
| Japan | 18 | 16 | 74 | 74 |
| Sweden | 22 | 24 | 67 | 64 |
| Italy | 22 | 17 | 57 | 48 |
| Greece | 17 | 15 | 71 | 55 |
| Spain | 22 | 18 | 64 | 58 |
| Netherlands | 49 | 46 | 79 | 78 |
| Thailand | 66 | 62 | 87 | 75 |
| South Korea | 9 | 15 | 58 | 66 |

Sources: Derived from the sources set out in Appendix A

in Thailand being due to lower participation in education at these ages. These young people work typically in take-away food stores, supermarkets and other parts of the retail sector, and in the hospitality industry (restaurants, etc). The work is generally lowly paid and lowly skilled, although the workers themselves are mainly destined for high-skilled jobs upon completion of their studies. Nevertheless, if this work was not done by students on a part-time basis, labour markets would be tighter than they are.

It is difficult to assess the extent of future changes in labour force participation rates at ages less than 25 years. In all of the future labour supply scenarios used in this paper, we assume that participation rates at these ages will remain at their current levels in each country. This will not necessarily be the case. For example, Hoem (forthcoming) has reported that there has recently been a substantial increase in education participation in Sweden for those aged 20-24. This has coincided with declining labour force participation in this age group in Sweden. As technology advances, and as those with high skills continue to receive high rewards from the labour market, it is likely that young adults will spend more time in education. Thus, to assume no change may be considered an optimistic assumption as far as increasing the labour supply is concerned.

The OECD (1998) has argued that, in an ageing society, attention should be focused on increasing the labour force participation of men at older ages. Modelling work for Australia has shown that this approach can theoretically have a very substantial impact upon the supply of labour and upon the ratio of the labour force to the non-labour force (McDonald and Kippen 1999). Thus, in this paper, we examine the impact on labour supply of increased levels of participation among men at older ages. The change in participation that occurred between 1971 and 1995 for men aged 55-64 years is shown in

**Table 3. Labour force participation rates for men aged 55-64 years c1970 and c1995**

| Year | c1970 | c1995 |
|---|---|---|
| Country | Labour force participation rates (%) | |
| New Zealand | 79 | 66 |
| United States | 81 | 68 |
| Australia | 83 | 60 |
| Canada | 80 | 61 |
| Singapore | 66 | 61 |
| United Kingdom | 91 | 64 |
| France | 71 | 43 |
| Germany | 78 | 56 |
| Japan | 90 | 85 |
| Sweden | 82 | 71 |
| Italy | 59 | 45 |
| Greece | 75 | 61 |
| Spain | 81 | 56 |
| Netherlands | 81 | 42 |

Sources: Derived from the sources set out in Appendix A

Table 3. Substantial falls are evident for most countries, the principal exception being Japan.

We can conjecture that the early retirement policies of the 1960s and 1970s were implemented in the knowledge that this would open up opportunities for the large, baby-boom generation (Gruber and Wise 1997). To the extent that this is true, there is some irony in the fact that early retirement policies may now create labour shortages when taken up by the boomer generation themselves. By making cross-national comparisons, Gruber and Wise (1997) have shown that early retirement of men has been very closely related to the incentives built into the retirement policies in each country. More specifically, 'unused capacity' of men aged 55-64 years in each country is closely related to the implicit tax rates upon income from work. They show that the incentive to retire increases:

- the earlier is the minimum age at which people can retire
- the higher is the replacement rate (value of pension relative to value of wage)
- the lower are the accrued pension benefits from additional years of work
- if there is access to disability pensions or state-funded aged pensions below the normal retirement age.

In simple terms, if you make very little extra money by continuing to work compared to retiring, then there is a very strong incentive to retire. Gruber and Wise (1997) also show that the provision of early retirement benefits led to withdrawal of men from the labour force and not the reverse. In their calculations, they assume long and continuous work histories. This will not be a valid assumption for women. However there seems to be a tendency for employed women to retire if their husbands retire. Thus, early retirement of men can induce early retirement of women. As the number of women without husbands increases, and as more people have disrupted working careers or shorter working careers

because of extended years in education, there will be a tendency to work longer in order to accrue adequate retirement benefits. For example, Liefbroer and Henkens (1999) have shown that retirement ages of men in the Netherlands increase as their level of education increases.

The conclusion is that to increase participation rates for men at older ages will require changes in the incentive systems presently in place. That is, the incentives to withdraw will need to be replaced by incentives to remain in the labour force. This requires considerable political expertise as it may involve reversal of expected entitlements. While it is acknowledged that reversal of the trend to lower levels of participation for men at older ages is fraught with difficulty, in this paper we model the impact of a return to the labour force participation rates of the early 1970s for men aged 35 years and over. We assume that achievement of these higher rates of participation extends over a 30 year period from c1995 to c2025 (exact assumptions are provided in Appendix B). A return to the rates of the early 1970s also means that labour force participation rates for men at ages 65 and over would increase. Labour force participation beyond age 65 will require a shift in both values and incentives and is a more doubtful assumption than increases in participation at ages 55-64 years.

Labour supply has expanded in the past 30 years through the increased involvement of women. This process has not come to an end and there is potential in most countries for further increases in labour force participation rates for women. As each new generation of women moves through the labour force ages, rates of participation tend to increase. Sweden has now achieved very high rates of participation for women. Swedish women now have participation rates at all ages that are only slightly less than those for Swedish men[2]. It does not seem unreasonable to suggest that women in other countries will have similar levels of participation in the future to those of Swedish women now. Thus, in two of the scenarios below, we use the assumption that participation rates of women aged 25 years and over will increase over the next 30 years to equal the current rates for Sweden.

**Increasing the size of the population**

The potential for stagnation or fall in labour supply in the next 30 years is due primarily to low birth rates in the past 30 years. Hence a shift to a higher fertility rate today would not have any direct impact on labour supply until 20-25 years from now[3]. After that, however, an increase in the birth rate from today will have an important impact on labour supply. In this paper, we are examining 50 year projection scenarios. To examine the effect of an increasing birth rate on labour supply, we assume that all countries move to a Total Fertility Rate of 1.8 births per woman over the next 10-15 years. For two of the countries considered, the United States and New Zealand, this assumption implies a fall in their future fertility. The assumption of 1.8 is somewhat arbitrary. Its main justification

[2] Current age specific labour force participation rates for the sixteen countries are shown in Appendix Table C. It should be noted that Sweden has generous family leave policies such that the labour force participation rate does not necessarily reflect the proportion of Swedish women who are actually at work on any given day.

[3] There may be an indirect effect if the higher birth rate dampens the labour force participation of women.

is that it is only a little higher than the level applying in several countries at present, including some in which the fertility rate has been relatively stable in recent years (for example, France and the United Kingdom). This is suggestive of feasibility over a longer period of time[4]. For some countries with very low fertility, a rise in fertility from around 1.2 to 1.8 over a 10-15 year period must be regarded as optimistic. For other countries such as Australia, the present trend in fertility is distinctly downwards so that a reversal of this trend does not fit present expectations.

Given current population age structures, the only population component that can have any real impact on changes in labour supply over the next 30 years is migration. The 16 countries examined here include countries that traditionally have had high levels of immigration, such as Australia, Canada, the United States, New Zealand and Singapore and countries that, until recently, have had a long history of emigration, such as the United Kingdom, Germany, the Netherlands, Italy, Spain and Greece. Countries with a long history of immigration, because of that history, are more likely to be able to sustain future large-scale immigration intakes than other countries. While the origins of the people of most countries are much more mixed than is often acknowledged, immigrant countries are more likely to embrace a relatively high level of multiculturalism while non-immigrant countries are more likely to wish to maintain the solidity of their own culture. Issues of social cohesion relating to immigration are high on the current political agenda in many countries that are facing stagnation or falls in their labour supply. Thus, while immigration may be a good economic approach to the labour supply issue, the large scale of immigration required may not be socially sustainable for some countries.

The skill level of immigrants is also an issue. The Hudson Institute is critical of current United States immigration policy that is seen to favour low skills over high skills. The suggestion is made that the orientation towards skills in the Canadian and Australian immigration policies should be adopted by the United States (Reynolds 1998). However, if the United States and other advanced countries were to adopt this approach, there would be considerable international competition for skilled immigrants. Australia, with its highly selective points system (based on age, English capacity and skill level) has had difficulty in meeting its relatively small annual target for skilled immigrants[5]. Competition for highly skilled immigrants will be based upon economic grounds such as wages, working conditions and taxes. However, social grounds such as the provision of human and citizen rights, multiculturalism, racism, social harmony, safety and lifestyle

[4] A Total Fertility Rate of 1.8 births per woman implies a distribution of women by the number of children that they have during their lifetime that is something like the following distribution:

| Number of children | % |
|---|---|
| 0 | 22 |
| 1 | 15 |
| 2 | 36 |
| 3 | 19 |
| 4 | 6 |
| 5+ | 2 |

[5] However, as we write, the Australian Government is suggesting that a queue of eligible people is developing.

are also likely to be important. Skilled immigrants may also use environmental criteria in selecting the place to which they will move.

The other side of intense competition between advanced countries for skilled immigrants is an increase in the brain drain from developing countries. The return from investment in higher education by developing countries could flow substantially to advanced countries if advanced countries address their labour shortages through immigration. This is a long-standing issue of equity that is likely to become much more inequitable. Given the portability of information technology, there is the possibility that new high technology industries will locate in the now developing countries. On the other hand, even in the advanced countries, these industries tend to be highly concentrated in particular localities, localities with high amenity. Thus, climate, culture, environment, lifestyle, freedom, safety and political stability will be characteristics of the places in which these industries locate. Developing countries may lose out in this form of competition even though they have the required labour skills.

Future demand for labour, however, will not be entirely for skilled labour. There is evidence of the development in many advanced countries of multi-tiered labour markets. The top tier is the skilled, formal labour market. This is the formal economy where state regulation applies and, where, for most part, returns to labour are high. This is the labour market that the Hudson Institute has in mind when its makes its projections. Many countries have developed a second tier consisting mainly of temporary, foreign workers who, while their presence in the country is documented, have lower entitlements and lower wages. Those working as domestic servants are a classic case, but others work in the construction industry and in leisure and recreation. Entry for these workers takes many forms. There are guest worker schemes and contract workers employed through recruitment agencies. Australia now has an annual intake of 78,000 young people on working holiday visas. These young people constitute a significant fraction of the leisure and recreation work force. The third tier is the informal labour market that operates largely outside of government regulation. The workers in this tier are often undocumented immigrants who enter with a degree of publicly unacknowledged acquiescence on the part of governments. A classic example here is migration from Mexico to the United States, but undocumented migration has become common in many advanced countries.

The low wages of workers in the second and third tiers have two implications. First, they enable the advanced country to compete in areas of production that would be uncompetitive if the wages of the formal sector were to be paid. Tomato producers in the southern United States with low-wage labour are able to compete more than effectively with tomato producers in Mexico (Martin 1999). In this sense, the third tier is a disguised form of protectionism. Second, where the low-wage jobs are held by undocumented immigrants, the same jobs are not available to domestic low-skilled workers. Accordingly, domestic low-skilled workers can be left out of the formal market because of their low skills and out of the informal market because of the higher wages that employers would be required to pay them (Borjas 1998). Thus, even where there is a labour shortage in an advanced country, high unemployment rates may persist in

particular localities and among low-skilled non-immigrant workers. This can be a formula for social unrest.

The history of migration to the traditional immigrant receiving countries is a history of settlement migration where the migrants have the full rights of permanent residence and, later, citizenship. Exploitation can characterise new forms of immigration where the immigration is not formalised and acknowledged by government or if the immigrants have substantially lower entitlements than permanent residents (Castles 1999). Again, this can be a formula for social unrest.

**Countries with abundant labour**

The prospect of stagnation or decline of labour supply in advanced countries over the next 30 years sits in stark contrast to the massive increases in labour supply that will take place in some developing countries in the same period. Labour forces are set to explode in size in those developing countries that have fertility rates that are still high, or have been high in the recent past. The population in the labour force ages (20-64 years) in Pakistan will grow from 50 million in 1995 to 150 million in 2035. In India, the same increase will be from 470 million to 850 million and in the Philippines, from 32 million to 70 million. Thus, in absolute terms, there will be no global shortage of labour. The increase in India's labour supply alone would easily cover potential labour supply falls in all the advanced countries put together. In this circumstance, capital can be exported to the countries with abundant labour supply. This has been an approach used particularly in manufacturing in recent decades and all the indications are that this trend will continue.

On the other hand, a sharp increase in the scale of emigration of skilled people from the developing countries to the advanced countries will slow the speed of economic development in the developing countries that supply the migrants. Because skilled workers create employment opportunities for low-skilled workers, emigration of high-skilled workers disadvantages low skilled workers. The vulnerability of low-skilled workers in developing countries has led them to offer their services in advanced countries subject to very unfavourable terms by the standards of the advanced countries. Poverty forces women in poor countries to leave their own children to look after the children of rich people in advanced countries, or to provide other services. Middle men profit from the trade. This is exploitation in one of its grossest forms.

**Future labour supply scenarios by country**

In the following discussion, we consider six projection scenarios[6]:

[6] All of the scenarios for a given country have the same assumption regarding future mortality improvement. Expectation of life is assumed to increase by one year every ten years from present levels. The age distribution of net migration is the age distribution of net migration to Australia in the years, 1994-95 to 1996-97.

1. The base projection: net migration is set to zero and fertility and labour force participation rates are kept at their present level.
2. Impact of migration: this is the base projection with the addition that present levels of migration continue.
3. Impact of high migration: this is the base projection combined with annual net migration equivalent to 0.5 per cent of the country's population at the commencement of the projection. This level, 0.5 per cent, is the approximate current rate of net migration for Canada and Australia.
4. Fertility to 1.8: current levels of migration and labour force participation are maintained but fertility moves to 1.8 births per woman over a 10-15 year period.
5. Increased labour force participation: current levels of fertility and migration are maintained, but labour force participation rates are increased over a 30-year period as described above (detail in Appendix B).
6. The most optimistic possibility: fertility moves to 1.8 births per woman, net migration increases to varying levels by country (the levels are shown in Appendix B) and labour force participation increases as in Scenario 5 (with some minor modifications as indicated in Appendix B).

The results of these projection scenarios are shown for each country in the charts at the end of the paper. For most countries, the projections serve to display the limits of future labour supply and the relative importance of different policy approaches (immigration, fertility, labour force participation) for different countries. For any one country, more realistic projections could be made using detailed knowledge of trends and prospects in that country.

As mentioned at the beginning, countries have been grouped according to their outcomes that, in turn, are the product of particular combinations of current circumstances.

*1. New Zealand and the United States (high fertility, moderate migration, low or moderate labour force participation)*

If the aim is to sustain at least the present size of the labour force, these countries have the least difficulty in doing this. Even with zero migration, constant participation rates and constant fertility (Scenario 1) lead to a rise in the size of the labour force in both countries to about 2015 after which labour supply would remain roughly constant. With zero migration and a fertility rate very close to replacement level, both countries would reach a stationary labour supply situation from about 2015. This is the result of past relatively high fertility. When their current levels of migration are added to the projection (Scenario 2), both experience growth in their labour supply throughout the 50 years of the projection. The United States labour force would rise from 140 million to 176 million over 50 years; New Zealand's supply would rise from 1.8 to 2.4 million.

If immigration were to shift to the present rates for Australia and Canada (Scenario 3), while other factors remained constant, the United States and New Zealand labour forces would rise at a rate of about 0.8-0.9 per cent per annum. An increase in the labour force participation rates as assumed in Scenario 4 would have about the same impact on the

growth of labour supplies in these countries as the higher migration assumption of Scenario 3. Both would experience considerable labour force growth.

If current migration and participation levels remained constant and fertility fell to 1.8 births per woman (Scenario 5), the United States and New Zealand labour forces would follow the path of Scenario 3 for the first 25 years after which the lower fertility would lead to a constant labour supply. That is, the moderate level of migration would balance the lower fertility in the long term to produce a stationary population and a stationary labour force. Finally, the 'optimistic' projection (Scenario 6) produces the highest growth in both countries over the first 35 years of the projection.

The United States can maintain reasonable growth in its labour supply throughout the next 50 years without any change in the current levels of fertility, migration and labour force participation. The scope for additional growth probably lies in increases in the participation rates. This is contingent upon United States fertility remaining at around replacement level. However, even with a fall in fertility to 1.8, the United States labour force would continue to grow, although at a considerably slower rate after 2020. If this relatively favourable future is a cause for concern, as the Hudson Institute suggests, then other countries discussed below are in a serious situation. Global trends in economic behaviour and economic policy are likely to be set in the United States. Thus, the economic culture will remain a growth culture. In this situation, countries that are not part of the growth culture are likely to feel the strain.

New Zealand has both high out- and in-migration rates. In most recent years, this has pushed net migration into the negative range. The out-migration is very heavily concentrated among 20-24 year-olds and there is a potential that New Zealand is losing its best and its brightest (mainly to Australia). If this trend were to continue, the labour supply in New Zealand could fall after 2010. Increase in labour force participation rates could offset this trend. For New Zealand, the key issue, as recently identified by its Prime Minister, is to have a sufficiently strong economy to enable it to maintain its young people.

*2. Australia, Canada and Singapore (moderate fertility, high migration, low labour force participation)*

The labour supply futures of all three of these countries are migration-dependent. With zero net migration, their current fertility and labour force participation rates would lead to a falling labour supply from about 2010 onwards (Scenario 1). However, when their current migration levels are added to the projection (Scenario 2), all experience rises in their labour supply to about 2020 after which Australia's supply continues to rise very slowly while the labour supplies in Canada and Singapore would fall very slowly. In all cases, the labour supply in 2050 would be above the present level. Changing the level of net migration to 0.5 per cent of the current population size (Scenario 3) has only a small

impact on the outcomes because migration is already close to this level in these countries[7].

The potential large impact on labour supply for all three countries is increases in labour force participation rates (Scenario 4). Singapore and Australia, in particular, can increase their labour supplies dramatically over the next 30 years by increasing the participation rates of older men and of women aged 25 years and over. In contrast, a shift in fertility to 1.8 (Scenario 5) has little impact on labour supply in Australia and Singapore as their current levels are close to 1.8. The impact of fertility increase would be significant in Canada after 2025. Finally, the 'optimistic' projection (Scenario 6) leads to high growth in labour supply in all three countries.

Continuation of immigration at least at present levels is the key to the avoidance of falls in labour supply in these countries. Continued growth of the labour supply, however, is dependent upon increases in labour force participation rates. All three countries have declining fertility at present. Further falls in fertility will not affect labour supply for about 20-25 years, but after that, very low fertility (TFR under 1.5) would have a considerable impact on their labour supplies. Thus, if the long term labour supply is an issue of concern, current fertility needs to be at least maintained.

*3. The United Kingdom and France (moderate fertility, low migration and low labour force participation)*

As both countries have low levels of migration at present, Scenarios 1 and 2 produce similar results. That is, the present levels of fertility, migration and labour force participation lead to very small rises in labour supply over the next decade followed by substantial and sustained falls that continue unabated until the end of the projection period. A rise in fertility to 1.8 (Scenario 5) makes little difference to this outcome because fertility in both countries is close to 1.8 now. A fall in fertility from the current levels would have a devastating impact on the size of the labour force from 2025 onwards.

Hence future growth of the labour force is contingent upon either much higher levels of migration (Scenario 3) or higher levels of participation (Scenario 4). The 'optimistic' assumption that combines moderate net migration for these countries (100,000 per annum) with large increases in labour force participation for older men and for women aged 25 years and over produces a very favourable result for both countries. Thus, the policy direction for these two countries if they wish to maintain their labour supplies at least at the present levels would involve maintaining present fertility levels, attempting to increase labour force participation and embarking upon a larger-scale immigration program.

[7] As we write, in Australia, a shift in the migration intake that would raise Australia's net migration to 0.5 per cent of its current level is the subject of debate. Those who favour the increase and those who oppose it do not consider the impact to be small. There are big and small canvases and here we are painting on a very large canvas.

*4. Germany, Sweden and Japan (low fertility, low or moderate migration, high labour force participation).*

With zero migration and present fertility and labour force participation (Scenario 1), these three countries face immediate, sustained and substantial falls in the sizes of their labour forces. Over the next 50 years, Japan's labour supply would fall from 68 million to 45 million, Germany's from 41 million to 21 million, and Sweden's from 4.4 million to 3.2 million. Current moderate levels of net migration for Sweden (15,000 per year) and Germany (200,000 per year), offset these falls to a significant extent. However, in Germany, migration at current levels would not prevent immediate fall in the labour supply and, in Sweden, it does not prevent a fall after 2020 (Scenario 2). In Japan, the current low level of migration makes almost no difference to the result.

A rise in fertility to 1.8 (Scenario 5) in combination with the present levels of net migration would produce a reasonable long-term result for both Germany and Sweden, reasonable in the sense that labour supply would fall by only a smaller amount (41 million to 34 million in Germany and 4.4 million to 4.2 million in Sweden) and its level would become stationary. This rise in fertility would have only a relatively small impact on the fall in labour supply in Japan in the next 50 years (the fall would be from 68 million to 51 million rather than 46 million without an increase in fertility).

For Japan, the most effective way to deal with the fall in labour supply in the short-term is to increase the labour force participation rates of Japanese women. Increased participation rates for both women and older men would make a significant difference in Germany, at least over the next 25 years. In Sweden, where labour force participation is already very high, further large increases in participation are not feasible.

The 'optimistic' Scenario 6 in these countries leads to small increases in labour supply in these countries for at least the next 25 years. This optimism involves for Japan an increase in fertility to 1.8 over the next 15 years, higher labour force participation rates for women over the next 30 years and immediate implementation of a net migration of 200,000 persons per annum. For countries with relatively homogeneous cultures, migration on this scale presents a cultural challenge. The combination of increased fertility and increased labour force participation of women implies a major shift in the organisation of the Japanese family system and in work and family support policies.

*5. Italy, Spain, Greece and the Netherlands (low fertility, low or moderate migration, low labour force participation).*

Like the previous group, zero net migration and constant fertility and labour force participation result in all these countries facing immediate, sustained and substantial falls in their labour supplies over the next 50 years. For example, under Scenario 1, Italy's labour supply would fall from 23.2 million in 1995 to 11.3 million in 2050. Adding the current level of net migration for Italy (100,000 per annum) improves this situation only by a small amount (a labour supply of 14 million in 2050). Compared to Italy, the impact of the addition of current net migration is greater for Greece and the Netherlands but less

for Spain (Scenario 2). High migration (0.5 per cent of current population) would produce a relatively constant labour supply for the next 20 years (Scenario 3), but the annual levels of net migration required (Italy, 287,000; Spain, 197,000; Greece, 52,000 and the Netherlands, 78,000) are a long way beyond the historical experience of these countries.

Unlike the previous group of countries, these countries have very low participation rates at present. All could substantially change their labour supply futures by increasing labour force participation rates as assumed in Scenarios 4 or 6. In the longer term, however, labour supply can only be maintained through increases in fertility that begin immediately. The 'optimistic' projections for these countries involve an increase in fertility to 1.8 over the next 15 years, increases in net migration (100,000 to 150,000 for Italy, for example) and substantial increases in participation over the next 30 years. Again, the combination of higher fertility and higher labour force participation of women will require substantial cultural change. The acceptance of much larger numbers of immigrants will also require cultural adjustment.

7. *Thailand and South Korea (moderate fertility, low migration and high labour force participation).*

Compared to all the other countries considered here, the fall in fertility in these countries is relatively recent. This means that they have a much younger age structure than the other countries and considerable potential for labour force growth in the next 25 years despite their current moderate fertility levels. Thailand's labour force will grow from 32 million to 42 million in the next 25 years without any change in fertility, migration or participation. South Korea is in a similar situation. However higher levels of participation of young people in education in Thailand in the future will reduce the labour supply compared to the projected scenarios.

**Guest workers or settlement migration**

In all of the above projections, the fertility of immigrants from the time of arrival has been assumed to be the same as that of the country of destination. Fertility levels will be higher if the immigrants have higher fertility than the non-immigrants. The higher Hispanic fertility in the United States adds about 0.2 births to the United States Total Fertility Rate[8] On the other hand, because of the heavy focus on skilled migration, immigrants to Australia, on average, have about the same fertility rate as the non-immigrant population.

More importantly, the fertility of immigrants is affected by the form of immigration. The assumptions we have used here are consistent with settlement migration where immigrants have their families with them. With other forms of migration (guest worker, undocumented migration), families may be left behind in the country of origin. At the extreme, the fertility rate of temporary workers who are expected to leave is zero.

[8] In New Zealand, the higher fertility rate is related to the higher fertility of the Maori indigenous population. Non-Maori fertility is around 1.8.

**Table 4. A comparison of international flows of people in and out of Japan under a settlement migration and a guest worker migration approach to keeping the labour supply at a constant level[a]**

| | Annual movement (millions) | | | |
|---|---|---|---|---|
| | Settlement projection | Guest worker projection | | |
| Year | Immigrants | Immigrants | Emigrants | Net migration |
| 2004 - 2008 | 0.53 | 2.0 | 0.0 | 2.0 |
| 2014 - 2018 | 0.62 | 4.1 | 2.0 | 2.1 |
| 2024 - 2028 | 0.58 | 6.2 | 4.1 | 2.1 |
| 2034 - 2038 | 0.89 | 9.4 | 6.2 | 3.1 |
| 2044 - 2048 | 0.79 | 12.2 | 9.4 | 2.8 |
| 2054 - 2058 | 0.61 | 14.3 | 12.2 | 2.1 |
| 2064 - 2068 | 0.72 | 16.5 | 14.3 | 2.2 |
| 2074 - 2078 | 0.74 | 18.5 | 16.5 | 2.0 |
| 2084 - 2088 | 0.67 | 20.0 | 18.5 | 1.6 |
| 2094 - 2098 | 0.69 | 21.6 | 20.0 | 1.6 |

a. The projections are explained in detail in the text.

Countries faced with the prospect of large falls in their labour supply may opt for a system of guest workers or undocumented migration. In doing so, they can suggest to their own peoples that the immigrants are not there, that their entry cannot be controlled or that their entry is temporary and cultural absorption is not an issue of major concern. However, beyond the formidable social risks of such a strategy, there is the demographic liability of the very low fertility of immigrants that is a result of this approach.

To illustrate the demographic difference between settlement migration and guest worker migration, we have conducted two 100-year projections for Japan, both of which produce a constant labour force throughout the 100-year period. The first projection assumes a settlement form of immigration where the migrants may bring children with them or have children after they arrive at the current rate of fertility in Japan.[9] The immigrants and their children also remain in Japan. The second projection assumes a guest worker approach where the immigrants are all workers aged 20-29 years who leave after 10 years in Japan and do not have any children in Japan. Fertility rates and labour force participation rates for non-immigrants remain constant at current levels.

The present population of Japan and their descendants make up the same proportion of the future labour force in both projections. They would represent 100 per cent of the labour force in 1999, 67 per cent in 2049 and 39 per cent in 2099. With the settlement projection, immigrants would make up 28 per cent of the labour force in 2049 and 33 per cent in 2099 while the descendants of the immigrants would make up 5 per cent in 2049 and 28 per cent in 2099. In the guest worker projection, there are no descendants of immigrants so the guest workers would make up 33 per cent of the 2049 labour force and 61 per cent of the 2099 labour force.

[9] The age distribution of immigrants is the age distribution of net migration to Australia in the years, 1994-95 to 1996-97.

The most startling aspect of this experiment, however, is the implications for flows of immigrants (Table 4). The settlement migration projection would require annual immigration to rise to a peak of about 900,000 per annum in the period 2034-2038 after which it would fall back to a stable long-term figure of about 700,000 per annum. These are startling large figures for a country that does not have a history of large-scale immigration, but they are insignificant compared to the flows required in the guest worker projection. As early as 2024-2028, the guest worker approach would require an annual flow of 6.2 million immigrants and 4.1 million emigrants. By the end of the century, the numbers become ludicrous: 21.6 million annual immigrants and 20.0 annual emigrants from a workforce consisting of only 67.6 million workers. The lesson from this experiment is that settlement migration is a considerably more efficient way of increasing labour supply than guest worker migration.

## Conclusion

We have argued that stagnation or falls in labour supply deriving from past low fertility will present difficulties for economies in most advanced countries over the next 30 to 50 years. The principal force in the world economic engine, the United States, sees itself as facing a tight labour market in the next 30 years despite the fact that the future labour supply situation is more favourable in the United States than in almost any other country considered here. These circumstances point to a continuation of the culture of growth in economic thought and policy. While we may praise the virtues of a slow-down in economic activity, the more likely outcome is that countries with falling labour supplies will not fare well while the United States engine roars on. Capital will follow growth.

The study has shown that low fertility has implications for the labour supplies of all advanced countries, but that the implications vary considerably. For the countries of immigration (the United States, New Zealand, Australia, Canada and Singapore), falls in labour supply can be avoided through continuation of their present fertility, migration and labour force participation rates. Incentives for increased labour force participation of women and older men would lead to substantial growth in labour supply in all these countries.

Substantial increases in labour force participation combined with relatively modest increases in levels of immigration would reverse future falls in labour supply in France, the United Kingdom, Germany and the Netherlands, but significant growth could only be achieved through levels of immigration that are well outside the experience of these countries.

For Sweden, a doubling of net migration from 15,000 per annum to 30,000 would be sufficient to offset a decline in the labour force in the next 25 years. The potential to gain additional workers through increases in labour force participation rates is low in Sweden unless participation above age 65 years increased substantially.

In Italy, Spain and Greece, considerably increased labour force participation rates for women and for older men could sustain the present level of labour supply if combined with modest increases in immigration. Both of these changes would require considerable cultural adjustment.

Japan faces the least favourable situation of all of the advanced countries examined here. Its labour force participation rates for men are already high, offering little scope for increase. It has a very low historical level of immigration so that the absorption of very large numbers of immigrants would be difficult. Finally, its family system is not well geared to the entry of married women with children into the labour force. Nevertheless, the 'optimistic' projection for Japan produces a rise in its labour supply for all of the next 50 years. The optimistic projection involves a considerable increase in the labour force participation of women over the next 30 years, net settlement migration of 200,000 persons per annum and an increase in fertility to 1.8 births per woman over the next 15 years.

In coming decades, capital will continue to flow from the advanced economies to the economies that have an abundant labour supply. In the advanced economies, substitution by imports or rises in productivity levels will offset falls in the numbers of available workers in some sectors. This process is already well advanced in agriculture, mining and manufacturing. In the past 20 years, the transfer of labour from these sectors, the concentration of the post-war baby-boom in the working ages and the movement of women into paid employment have enabled the service sectors of these economies to grow rapidly. In contradistinction, the next 40 years will be marked by substantial labour shortages in advanced economies. Maintenance of the service sector in these economies, even at contemporary levels, will almost certainly stimulate a demand for immigrant labour on a scale never seen in all but the traditional immigrant-receiving countries. There is no question that the labour-excess countries will be able to provide these workers. The conditions under which this immigration occurs is the fundamental issue. The issues are the brain drain of skilled workers from poor countries to rich countries, the potential for exploitation and maltreatment of poor and low skilled workers from developing countries and the extension of human and civil rights to persons regarded as temporary or 'second-class' residents. Besides its social superiority, we have shown that settlement migration, demographically, is considerably more efficient than guest worker migration.

The debates about our population futures in the next century need to embrace the issue of labour supply and international migration. Reversal of the trend to early retirement or early permanent retrenchment from the labour force is a sensible option in the short-term for many countries as are incentives to increase labour force participation rates for women. In the long-term interest, we need also to be talking about arresting and for many countries, reversing, the fall in fertility. In order to maintain even the current level of labour supply, many countries face the challenge that fertility and labour force participation rates of mothers will need to increase simultaneously. This will involve change in family cultures and in the levels of social support for workers with family responsibilities, that is, a massive shift in gender equity will be needed (McDonald 2000;

McDonald forthcoming). All of this work is about positioning countries for the long-term. This does not sit well with the short-term monetary framework of economic policy in most countries.

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