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**Working Paper**

## Economic growth: A note on demographic and economic issues

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# **Economic growth**

## **A note on demographic and economic issues**

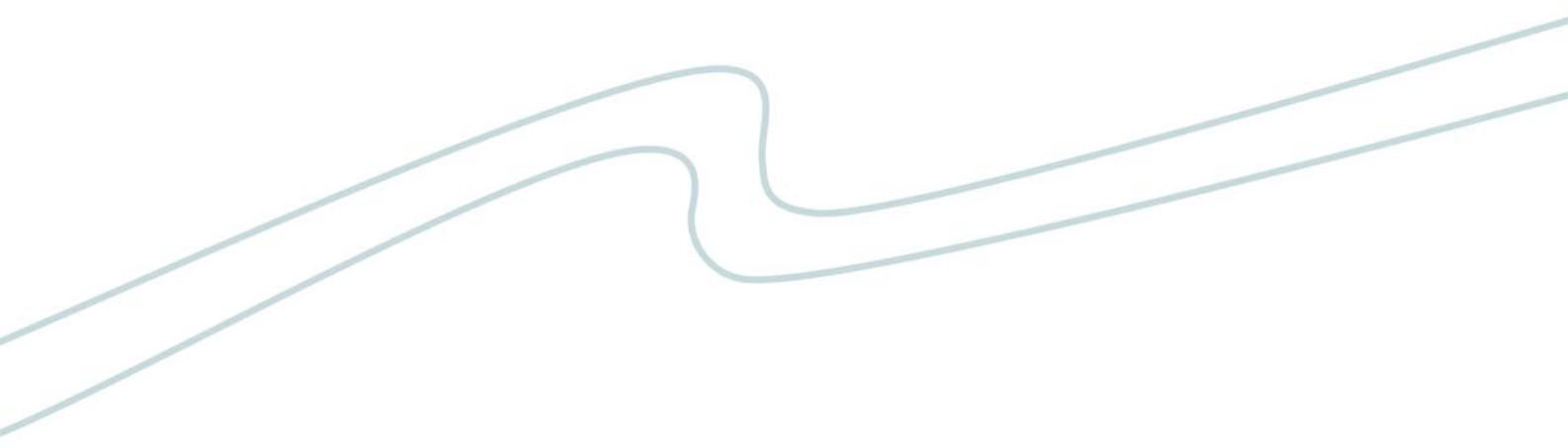
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**in association with the**

**New Zealand Institute of Economic Research (Inc)**





## **Preface**

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## Executive Summary

Understanding the relationship between economic growth and its supply side influences is fundamental to understanding the sustainability of future New Zealand real per capita growth rates. This note is primarily directed at developing a wider appreciation of the issues involved in the supply determinants of real per capita growth rates and examine the implications for New Zealand until 2010 and beyond.<sup>1</sup>

The supply side influences include:

- *changes in the working age population.* The growth in the working age population is declining as the population ages, driven by declining fertility rates. Fertility growth rates (i.e. the estimated number of live births per childbearing female in one year) have averaged approximately 1.4% per annum between 1950 and 2000 and are expected to decline to 0.55% per annum between 2000 and 2050. However, New Zealand's projected average fertility growth rates of 0.55% is higher than the expected fertility growth rates for most OECD nations.
- *employment participation rates among the working age population.* There have been major changes in participation rates over the last century as total participation increased and more significantly female participation rates increased faster than male participation rates. As the "baby boom" generation age, participation rates will drop, although how far they drop is a matter of some debate.
- *productivity rates.* The decline in the working age population is expected to impact on total productivity rates going forward. Productivity is assumed to slow slightly as the OECD populations age.

If New Zealand is to reach the top half of the OECD by 2010, growth rates need to be substantially higher than those achieved over the last decade. Given the structure<sup>2</sup> of the New Zealand economy, dramatic increases in growth rates do not seem likely. However, as we move forward into the new Century, per capita growth rates are likely to improve slightly against other OECD nations. This is because New Zealand's fertility rates are projected to be higher than other OECD nations that currently have higher per capita GDP growth rates than New Zealand's.

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<sup>1</sup> The per capita growth rate forecasts are made until 2010, however fertility rates, working age population, and population rates are projected further out.

<sup>2</sup> Biologically constrained by the major export industry: agriculture.

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# 1. Introduction

Fundamental long term changes are under way in the New Zealand population which will have major consequences for economic growth and the role of government within society. The population is aging as the “baby boom” generation moves through middle age towards retirement; however this change is happening at a slower pace in New Zealand than in other OECD nations.

In this information note we will:

- review the supply side influences that have long term impacts on economic growth within New Zealand and other OECD nations. To make projections of OECD per capita real growth rates, we will examine:
  - the impact of an aging population on the working age population
  - participation rates and the issues behind the levels of participation, and
  - the assumptions/projections for productivity rates of OECD nations.
- examine the growth rates required for New Zealand to move up the OECD real per capita growth rankings, and
- make some comments/conclusions about the relationship between demographic transition and economic growth.

The aim is to briefly sketch some of the economic/demographic issues that face New Zealand and look at some of the implications for growth.



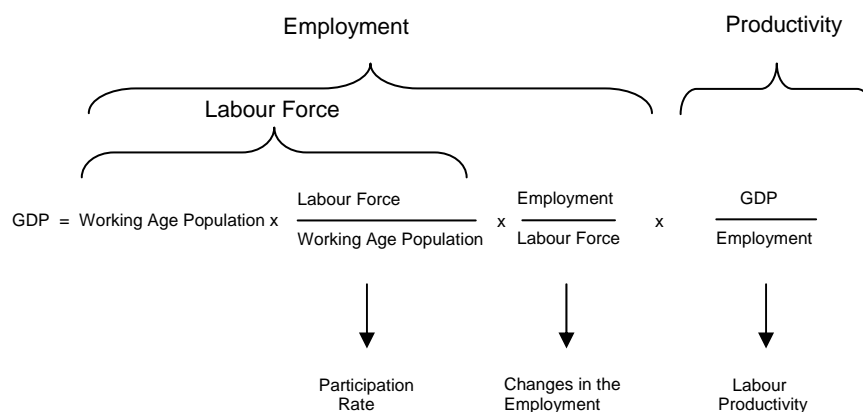
## 2. Supply side influences

Over the long term, economic growth will reflect, among other things, three variables:

- changes in the working age population (working age population divided by population)
- employment participation among the working age population.
- the rate of growth in productivity (Gross Domestic Product divided by employment).

The first two of these factors examine the growth in the workforce and the growth in employment. The last factor looks at growth in GDP per employed person employed.. Figure 1 graphically illustrates the supply side GDP components.

**Figure 1: GDP and its supply side components**



Source: Commonwealth Treasury (2000)

### 2.1 Changes in the working age population

#### 2.1.1 Population and fertility growth rates

The working age population in New Zealand is projected to decline rapidly as population growth rates decline. By population growth rates we mean the average annual percent change in population, resulting from a surplus (or deficit) of births over deaths and the balance of migrants entering and leaving New Zealand.

Driving a reduction in the population growth rates are lower fertility rates. Fertility rates are the estimated number of live births occurring in a particular year, per childbearing female (15-49 years).

The average fertility growth rate between 1950 and 2000 was approximately 1.4% per annum, while the projected average fertility growth rate between 2000 and 2050 is expected to be 0.55% per annum. As the comparison shows (see Appendix A), this is relatively low by historical standards, however, it is relatively strong compared with other OECD nations. For example, French, German, and Japanese fertility growth rates, for the same period, are expected to be on average 0.09, -0.19, and -0.42 respectively.

The slow down in population growth will not only have implications for economic growth but will also accentuate the shift towards an aging working population. The decline in the working age population (and its implications for the demographic structure of the workforce) is largely unavoidable since it is due to lower average fertility rates.

### **2.1.2 Average total fertility rates**

Average total fertility rates represent the number of children born to a woman assuming that she survives to the end of her childbearing age. According to Statistics New Zealand, the total fertility rates for the year 2002 averaged 1.9 births per woman. This is higher than the 1950-2000 average (see Appendix B). Even at this level, total fertility rates are approximately 10% less than the level required for the population to replace itself – hence the slow down described above will have an impact on New Zealand.

As time goes on, it is expected that average total fertility rates in New Zealand will remain relatively constant (see Appendix B). While New Zealand total fertility rates remain static, most other OECD nations are expected to have reduced total fertility rates. This is the main driver for the reduction in the workforce going forward in OECD nations. For example, in Appendix B New Zealand total fertility per women is 8<sup>th</sup> = in the OECD for the period 1950-2000. Despite its static nature, New Zealand's total fertility per women is expected to push New Zealand up to 3<sup>rd</sup> = in the total fertility rankings between 2000 and 2050.

### **2.1.3 Immigration flow**

One possible factor that could upset this forecast is the immigration flow. If more immigrants were to be accepted in New Zealand in greatly increased numbers, then it may have some impact on the workforce. However, given current policy settings and general unwillingness of the general public to accept large numbers of immigrants, this is unlikely to occur.

This perception may change if the unemployment rate stays low. New Zealand born residents may be more relaxed about increasing numbers of immigrants settling in New Zealand if there is a perception that they do not appear to be “stealing” jobs from local workers.

## 2.2 Participation rates and changing roles

There have been major changes in labour force participation rates over the last Century. The key changes have been:

- total participation rates going up.
- female participation rates are rising faster than males participation rates.

The underlying social and economic trends that underpin these movements include:

- increasing numbers of women returning to work after child bearing (this is supported by the build-up in child minding infrastructure and changing social attitudes towards woman who go back to work after having children).
- families are becoming smaller with woman either remaining childless or not having as many children (which also leads to higher workforce participation among women).
- growing employment opportunities in services and the corresponding decline in manufacturing and manual labour. The move away from traditional labouring jobs suits women more than it does men.
- the shift towards part-time and casual work (which better fits in with the lifestyle choices of woman).

The key change over the Twentieth Century was the increased participation of women in the workforce. This has had a major impact on participation and changed the shape of the workplace.

### 2.2.1 Participation rates and an aging population

While total participation rates are an important indicator, an important issue is the age-sex structure of the population because of the different participation rates by different age groups. As the population ages, we expect that total participation will change. For example, Table 1 shows the percentage growth in the working age population for selected OECD nations and forecasts to 2050. This illustrates the changing nature of past and expected availability of labour in any particular year for those economies.

By 2050 we expect participation rates to be trending down in all OECD countries, including the newly industrialised nations such as Mexico<sup>1</sup> as the

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<sup>1</sup> Newly industrialised nations (such as Mexico) will have a lagged transition period relative to other industrialised nations.

population ages.<sup>2</sup> For countries such as Japan and Italy the drop in participation rates are marked and will have a major impact on economic growth rates in those countries.

For New Zealand, participation rates have been historically lower than other OECD nations (apart from Mexico and other newly industrialised nations). The forecasts for New Zealand point to a convergence between participation rates in other OECD nations and New Zealand. The changing demographic profile for New Zealand suggests an increase in the per capita growth rate relative to other OECD nations.

However, in all OECD nations we expect a slow down in overall growth rates as the demographic transition means that there are less workers relative to the total population.

**Table 1: Selected OECD workforce forecasts**

Percentage of population

	1950	1975	2000	2025	2050
Australia	58.6	54.7	60.1	57.8	54.0
Japan	49.3	60.6	62.2	54.3	46.7
New Zealand	55.0	51.6	58.3	57.8	53.9
Mexico	Na	40.8	51.3	58.7	55.7
US	56.9	54.5	59.0	55.5	53.3
Italy	61.1	56.7	62.6	59.2	50.0
France	57.8	54.9	58.6	56.0	53.0

Source: US Census Bureau and UN population data base

### 2.2.2 Future trends

The estimates above set out a naïve forecast for future participation rates in the work force. Crucially, it ignores the supply response to the shortage of labour and does not attempt to mimic the social and economic behavioural responses within each age-group to this labour shortage. A number of factors need to be kept in mind when considering these forecasts:

- basic economics suggests that if a labour becomes relatively scarce, as its price rises. This encourages employers to develop labour

<sup>2</sup> The increased numbers of people not in the prime working age cohorts reflects the increased life expectancy and the “baby boom” generation gradually moving into the over 65 category.

saving devices that offset the labour shortages, mitigating the impact on productivity and economic growth of labour shortages.

- in response to the slowdown in the growth of the working age population, business may introduce incentives to retain existing workers, defer their retirement or look at innovative ways of retaining staff (part time work, tele-commuting, and more generous maternity leave arrangements).
- the ‘baby boom’ generation may simply defer retirement. Given the social and economic upheavals that the ‘baby boomer’ generation have caused as they have moved through the age cohorts, to expect this group to behave in the same way that other generations have, is a heroic assumption. For example, those with higher education qualifications tend to have lower levels of involuntary early retirement. The ‘baby boomers’ have attained a higher level of education than previous generations, therefore we would expect less involuntary retirements.
- the ‘baby boom’ female population have maintained a greater attachment to the workforce than previous generations. This could have a major influence on patterns of work going forward.

These caveats could have a major impact on participation rates and make the forecasts less certain. What is certain is that there will be major changes to patterns of work as the projected slow down in the labour force growth occurs.

### **2.3 Productivity growth**

While the outcomes are uncertain so far out into the future, it is useful to consider the implications of projections and assumptions for long term productivity growth (see Table 2).

Forecasting productivity rates is fraught with difficulty, since economists find it problematic to identify with certainty the exact causes of productivity gains that drive economic growth. For example, there is still debate over the productivity growth rates of the late 1990s in the USA. Some studies suggest that the pick-up in productivity growth reflected technology improvements in the production of computers (Gordon, 1999). However, more recent studies argue that productivity improvements should be attributed more widely (Oliner & Sichel, 2000 and Jorgenson & Stiroh, 2000). It is now widely accepted that the take-up and use of ICT are the key drivers for productivity gains not the production of computers (capital deepening, see below) – although gauging the value of ICT products is difficult, meaning that the role of capital deepening is strongly debated in the literature.

The most common form of productivity measurement is labour productivity, which measures the amount of output that can be produced for a given labour input. Typically, labour productivity is broken into two affects:

- capital deepening i.e. the increase in capital per worker, and
- multifactor productivity (the residual left over), i.e. the impact of changing technology and other factors which has the impact of increasing labour productivity. This measures the amount of output that can be produced keeping all inputs (usually capital and labour) in fixed supply.

Since we are looking at demographic transition we have concentrated on labour productivity statistics (see Table 2). The declining working age population is expected to have a dampening impact on productivity rates going forward in the OECD, which turn will depress total economic growth (as well as per capita growth).

**Table 2: Labour productivity rate projections and assumptions for selected OECD nations**

Percentage, five yearly moving average

	1995	2000	2010	2025 <sup>5</sup>	2050 <sup>5</sup>
Australia	1.0	2.5	1.7 <sup>4</sup>	1.7	1.6
Japan	2.4	1.0 <sup>1</sup>	-0.1 <sup>3</sup>	0.1	0.0
New Zealand	1.0	1.4 <sup>1</sup>	1.5 <sup>5</sup>	1.5	1.4
Mexico	-2.1	2.3 <sup>1</sup>	2.3 <sup>5</sup>	2.0	1.9
US	1.0	2.2	1.7 <sup>2</sup>	1.6	1.5
Italy	3.0	1.1	1.0 <sup>5</sup>	1.0	0.9
France	2.0	1.4	1.4 <sup>5</sup>	1.3	1.2

Notes: (1) 2001. (2) US Council of Economic Advisers (2000), estimates for 1999-2007 (3) Japan Centre of Economic Research (1999), estimates for 2005-2015 (4) Gruen (2001) (5) NZIER assumptions.

Source: OECD Main economic indicators (various years), Gruen (2001)

In Table 2 we have estimate long run productivity growth rates for OECD nations based on OECD labour productivity estimates, NZIER projections, and government agencies in the countries concerned. These estimates are based on past performance and assumptions about the growth of the labour force going forward in each country.

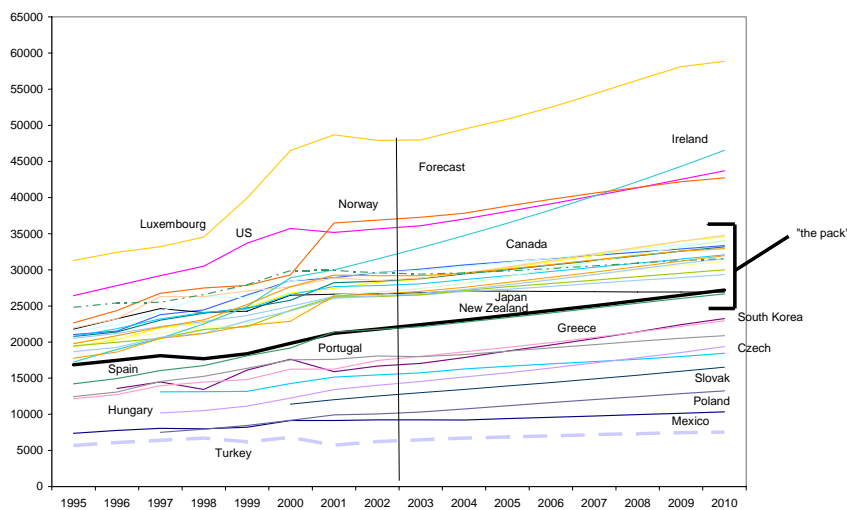
Table 2 infers a slow down in total economic growth which is driven by demographic factors. This includes slower growth in total population and an aging workforce.

### 3. Required per capita real growth rates

For New Zealand to improve its per capita real growth rates relative to other OECD nations it will have to do better than we have projected in this paper (see Figure 2). While we expect New Zealand to do marginally better than other OECD nations on a real per capita basis, it will not be enough to catch up with the per capita incomes (measured in US \$) of other OECD countries by 2010.

For New Zealand to “catch up”, requires growth rates to be higher than other OECD nations. Unfortunately, this does not appear to be the case as the countries we need to catch up (a group of nations we have called “the pack”<sup>3</sup>) are growing only at marginally slower per capita rates than New Zealand’s real per capita growth path.

**Figure 2: Projected per capita growth rates**



Source: NZIER

Table 3 shows the current and required per capita growth rates for New Zealand to catch up to “the pack” of faster growing OECD nations. At present, the approximate average per capita growth rate since 1998 is roughly 2.1% and this rate is expected to be maintained over the next 5-10 years. To join “the pack” of OECD nations by 2010 New Zealand’s growth rates need to be substantially more than the average since 1996 (5%

<sup>3</sup> The pack include: Iceland, Netherlands, Switzerland, United Kingdom, Sweden, Italy, Germany, Finland, Denmark, Austria, and Belgium

average). To beat “the pack” requires growth rates in excess of 6% on average.

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***Table 3: Per capita growth rates required to reach “the pack”***

Year	2010
Current growth rates	Approx. 2.1%
Growth rates required to reach “the pack” by 2010.	5%
Growth rates required to “beat the pack” by 2010.	6%

Source: NZIER

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## 4. Conclusions

Population projections point to significant changes to New Zealand's demographic profile over the next 50 years. It indicates that New Zealand's population is aging and that the labour force will decline. It is expected that the average growth rates in the workforce over the next decade will be much lower than in the period 1950-2000 (1.4%) and will decline even further by 2050 (an average of 0.55% per annum between 2000 and 2050). However, the working age population is not expected to decline as fast in New Zealand, relative to other OECD nations. Total fertility rates are expected to remain relatively static at 1.8.

The supply response from an aging workforce is a major uncertainty, since it is difficult to forecast how the aging workforce will respond to the changing work situation, particularly if there is financial pressure applied by increasing numbers of older people consuming health, social welfare, and other government transfer services. Furthermore, the "baby boom" generation have responded differently in each age cohort it has past through to the economic challenges confronting them, relative to previous generations.

While the future is highly uncertain, the emerging trends suggest that New Zealand's GDP growth will be lower over the next 50 years. However, GDP real growth per capita is not expected to decline to the same extent, so-much-so that New Zealand may do marginally better than other OECD nations whose demographic profile is more dramatically affected by a workforce diminishing more quickly.

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## Appendix A: OECD forecast fertility growth rates

### Forecast fertility growth rates (averages)

	2000- 2009	2010- 2019	2020- 2029	2030- 2039	2040- 2049	2000- 2050
Canada	0.82	0.80	0.62	0.33	0.21	0.56
Mexico	1.09	1.09	0.84	0.60	0.37	0.88
US	1.19	0.75	0.80	0.75	0.69	0.85
Australia	0.82	0.74	0.50	0.26	0.08	0.52
Japan	0.10	-0.27	-0.49	-0.62	-0.72	-0.42
South Korea	0.57	0.33	0.07	-0.22	-0.48	0.10
<b>New Zealand</b>	0.83	0.79	0.51	0.24	-0.01	<b>0.55</b>
Austria	0.13	0.02	-0.10	-0.29	-0.43	-0.12
Belgium	0.19	0.04	-0.04	-0.17	-0.30	-0.05
Czech	-0.07	-0.17	-0.36	-0.52	-0.64	-0.35
Denmark	0.30	0.25	0.17	-0.03	-0.18	0.11
Finland	0.15	0.05	-0.11	-0.31	-0.41	-0.11
France	0.35	0.22	0.08	-0.06	-0.23	0.09
Germany	0.03	-0.07	-0.18	-0.28	-0.36	-0.19
Greece	0.17	0.02	-0.13	-0.20	-0.31	-0.08
Hungary	-0.24	-0.29	-0.36	-0.45	-0.52	-0.38
Iceland	0.60	0.31	0.12	-0.08	-0.28	0.18
Ireland	1.04	1.02	0.69	0.51	0.33	0.74
Italy	0.12	-0.31	-0.85	0.04	-0.62	-0.24
Luxembourg	1.17	1.17	1.03	0.88	0.74	1.02
Netherlands	0.51	0.36	0.21	0.01	-0.15	0.21
Norway	0.38	0.37	0.30	0.10	-0.06	0.24
Poland	0.00	-0.05	-0.25	-0.43	-0.54	-0.24
Portugal	0.19	-0.05	-0.19	-0.32	-0.51	-0.17
Slovak	0.11	0.06	-0.15	-0.33	-0.49	-0.15
Spain	0.55	-0.31	-0.32	-0.35	-0.52	-0.18
Sweden	0.15	0.19	0.10	-0.09	-0.14	0.04
Switzerland	0.61	0.20	0.03	-0.19	-0.36	0.05
Turkey	1.03	0.90	0.59	0.31	0.04	0.63
UK	0.28	0.30	0.20	0.06	-0.06	0.16

Source: US Census Bureau

## Appendix B: OECD total fertility rates (2000 and 2025)

Total Fertility rates	2000		2025
Mexico	2.7	US	2.2
Turkey	2.2	Mexico	2.1
US	2.1	<b>New Zealand</b>	<b>1.8</b>
Iceland	2	France	1.8
France	1.9	Iceland	1.8
Ireland	1.9	Ireland	1.8
Norway	1.9	Canada	1.7
Australia	1.8	Australia	1.7
<b>New Zealand</b>	<b>1.8</b>	Belgium	1.7
Denmark	1.8	Denmark	1.7
Luxembourg	1.8	Finland	1.7
Finland	1.7	Luxembourg	1.7
Netherlands	1.7	Netherlands	1.7
UK	1.7	Norway	1.7
Canada	1.6	Sweden	1.7
Belgium	1.6	Turkey	1.7
South Korea	1.5	UK	1.7
Portugal	1.5	South Korea	1.6
Sweden	1.5	Portugal	1.6
Switzerland	1.5	Japan	1.5
Japan	1.4	Austria	1.5
Germany	1.4	Germany	1.5
Poland	1.4	Greece	1.5
Austria	1.3	Hungry	1.5
Greece	1.3	Italy	1.5
Hungry	1.3	Poland	1.5
Slovak	1.3	Slovak	1.5
Italy	1.2	Spain	1.5
Spain	1.2	Switzerland	1.5
Czech	1.1	Czech	1.4

Source: US Census Bureau