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# Ageing, health status, and economic activity in Scotland: a twenty year view

Robyn Millar, Sir Harry Burns, Alec Morton

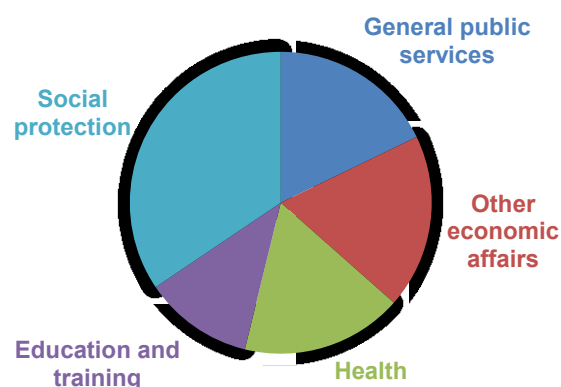
## Abstract

Countries worldwide face the economic and public expenditure challenges of an ageing population. However, ageing per se is but one part of the challenge. The forecast for Scotland's population health and labour market status will further impact on the scale of required public spending – in health and social protection - as well as on the base of those who are economically active and capable of bearing the scale of such expenditure (by way of taxation). This analysis points to the value on the public expenditure side of early health, education and social protection interventions to reduce future forecast expenditure in health and social protection. On the revenue raising side, it points to the need to expand Scotland's future effective working age population by way of reducing those considered NEET, expanding female and post age 65/67 labour market participation, and of attracting new working age migrants to Scotland.

## I Introduction and background

Scotland, like many countries worldwide, faces a future of dynamic demographic change (Scottish Government, 2010), amid recovery from economic crisis and the Great Recession. The latter has thrown into sharp relief the uncertainty over the future level – and nature - of public spending. This is now an increasing matter of public concern and debate and it is becoming ever more important to analyse how and why public spending might change in the coming decades. In this paper we survey some of the key variables which will drive future public spending levels in Scotland and discuss appropriate policy responses.

Figure 1: Total Managed Expenditure 2012/2013 (Scottish Government, 2014b)



Changes in the size and age structure of the population will have particularly important implications for economic growth performance, the demand for public services, and overall levels of public spending in

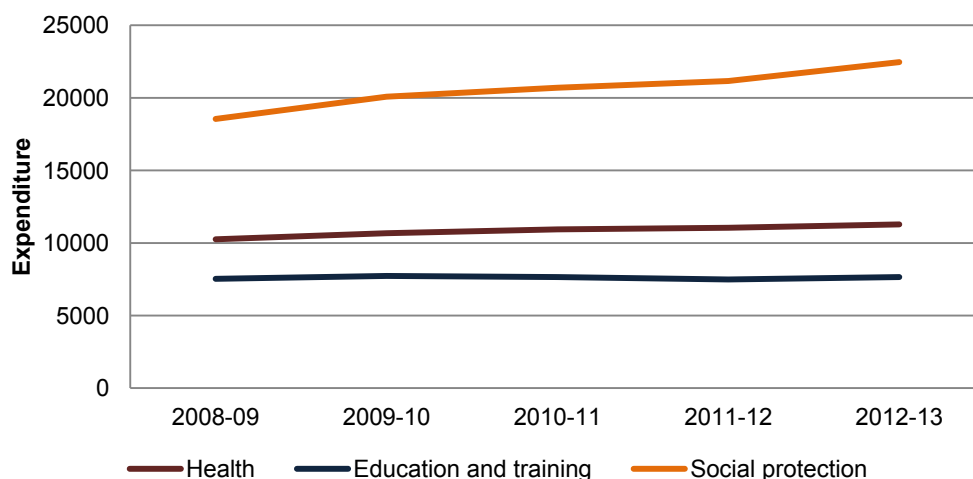
coming years (Scottish Government, 2010). As such, the future size and age structure of the population is an important perspective from which to consider future spending, and consequent areas for investment.

Figure 1 and Table 1 show that 51% of total managed expenditure in Scotland relates to social protection<sup>1</sup> and health, at 34% and 17% respectively. In 2012/13 this accounted for £33,742 million out of a total managed expenditure of £65,206 million. With spending on education and training, these three areas account for nearly two-thirds of public expenditure in Scotland. Figure 2 shows changes in the top three areas of public spending from 2008/09 to 2012/13. Though all post-2008 increases, social protection increased over the period by 21.0%; health spending by 10.0%; and education and training, the smallest increase of the three, by only 1.6%.

**Table 1 Total Managed Expenditure 2008-09 - 2012-13 (Scottish Government, 2014b)**

(£ million nominal terms)	2008-09	2009-10	2010-11	2011-12	2012-13
General public services	10582	10641	12220	12484	11624
Other economic affairs	12533	12963	12589	12695	12189
Health	10255	10679	10938	11046	11284
Education and training	7528	7729	7651	7490	7651
Social protection	18543	20076	20692	21159	22458

**Figure 2: Total Managed Expenditure 2008/09 - 2012/13 top three areas (Scottish Government, 2014b)**



<sup>1</sup> Social Protection accounts for both personal social services and social security while personal social services covers both social work and social care services (residential homes etc.). Social security primarily covers cash benefits given to individuals (pensions; employment-related benefits) (Scottish Government, 2010)

There are three key variables that have a key influence on overall levels of such public spending; one, the number of those in receipt of social protection; two, the number of those in receipt of healthcare services; and, three the number of those in education and training. However all of these are impacted by demographic change including ageing as well as health status and economic (in) activity. All three of these factors impact directly on Scotland's top three spending areas noted above (SHARE, 2014; and European Commission, 2012).

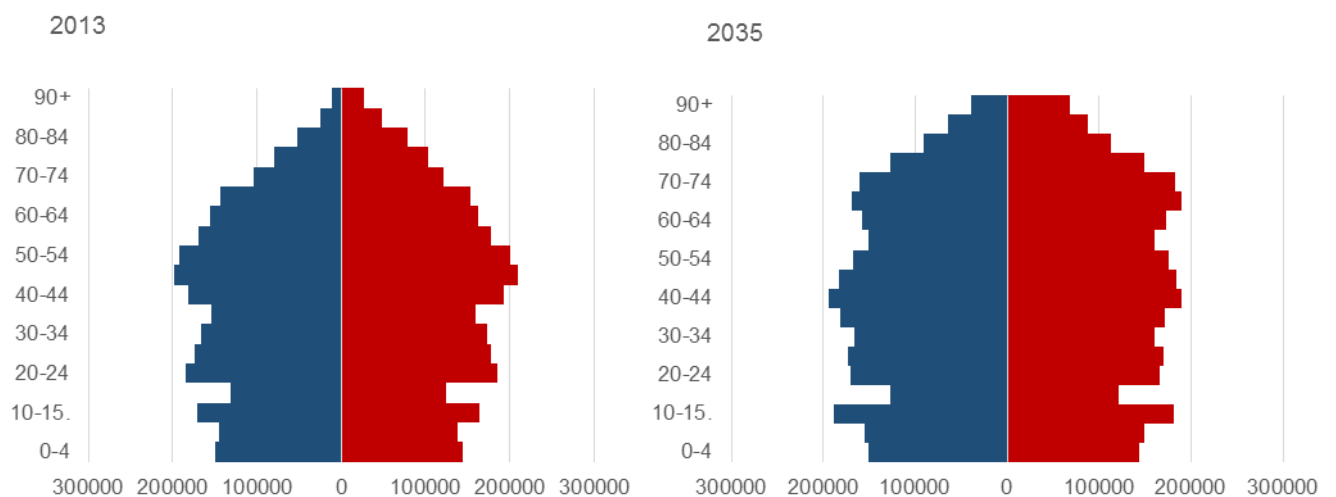
The implications for this in terms of the public finances can be captured in the following inequality:

$$Cost_{Ageing} + Cost_{Health\ status} + Cost_{Economic\ Inactivity} \leq Surplus$$

The logic of this expression is that the costs of ageing (social protection) and health status (health spending) plus the costs of economic inactivity (social protection and health) need to be less than, or equal to that which can be generated from those of working age able to support those dependent upon society<sup>2</sup> if budget balance is to be preserved. Hence, much hangs upon an economically active workforce to provide sufficient support – via taxation - for forthcoming demographic change (Allen, 2011). In this paper we consider ageing, health status, and economic activity in terms of their economic consequences for future public spending in Scotland.

## II Economic consequences of demographic change

**Figure 3: Current and Projected Population Pyramids 2013 and 2035 (GRO, 2014)**



We now consider trends in ageing, health status, and economic activity and how these might impact upon potential future levels of public spending in Scotland.

<sup>2</sup> In this analysis we assume no changes / increases in taxation.

We use trend-based forecasts as our primary method of analysis. These forecasts are based solely on past trends and as such, do not include future policy interventions i.e. they do not take into account the future impacts of policy implemented during the given time frame. However, trend-based forecasts do allow us to envisage what might happen in the coming years in Scotland if things continue on their current trajectory.

### Overall Demographic Change

Figure 3 illustrates the General Registry Office's (2014) current and projected Scotland population levels per age cohort for 2013 and 2035. Over the period 2013 to 2035 Scotland is expected to see the following changes in population ; an 8% increase in population; and 0.47% increase in the working age population and a 37.4% increase in the 65+/67+ age population (refer to Table 1).

**Table 2: Population Change 2013 - 2035 (GRO, 2014)**

Year	Overall population		Working-age (16-pensionable age)			65+(2013)/67+(2035)		
	Level	%change	Level	% change	% of total population	Level	% change	% total population
2013	5,327,700	8.03%	3,469,159	0.47%	65.1%	946,862	37.4%	17.8%
2035	5,755,558		3,485,596		60.6%	1,300,742		22.6%

#### 1. Ageing

In any welfare state, increasing numbers of those of pensionable age, mean increasing expenditure required to fund the state pension system, and also indicates a lesser proportion of the population contributing to the economy in terms of tax revenues. In fact, the UK Department of Work and Pension (DWP (2014b) figures show that social security benefit<sup>3</sup> expenditure per head in Scotland has increased steadily since 1996/97, especially expenditure per pensioner.

Those of pensionable age are reliant upon society<sup>4</sup> in this way to have their pensions paid, and do not contribute to tax revenue. The extent of reliance can be measured by the dependency ratio: the ratio of those not in the labour force (dependents: <16 and those of pensionable age) to those typically in the labour force (working-age population) (Scottish Government, 2010). Although the dependency ratio also includes those <16, it can still be deemed representative of dependency due to ageing, as the proportion of total population <16 is not forecast to change greatly over the given time frame (2013 – 2035) (refer to Figure 4).

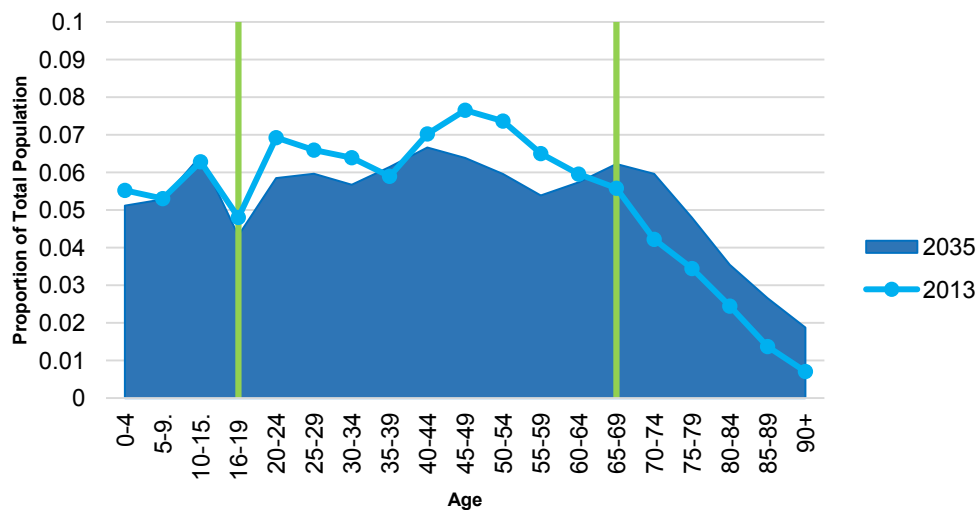
Using General Registry Office (2014) projections, figure 4 also illustrates how we can expect the dependency in Scotland to change by Taking those of pensionable age in 2013 and 2035 to be 65+ and 67+ respectively, we can see a dependency ratio of 54 'dependents' per 100 working-age people in

<sup>3</sup> Social Security primarily covers cash benefits given to individuals (DWP, 2013).

<sup>4</sup> The state pension is paid weekly by the UK government to all citizens of state pension age (HM Government, 2014)

2013 rising to 65 'dependents' per 100 working-age people by 2035. This 17% increase in dependency can be considered as a conservative estimate given the assumptions implicit in constructing the dependency ratio<sup>5</sup>. Nevertheless, it serves to highlight the magnitude of changes in dependency Scotland might expect.

**Figure 4: Proportion of Total Population/Age Cohort 2013 and 2035 (GRO, 2014)**



## 2. Health Status

The health of the population also indicates how dependent people might become upon society, in terms of the health care needs and utilisation, their call on social security benefits<sup>2</sup>, and on their ability to remain economically active over a longer period.

Self-reported health is used to measure how the health of Scotland's population might develop. There are criticisms of this measure that state that it does not reflect actual health; however much literature supports the measure's validity<sup>6</sup>. Moreover, self-reported health is a commonly used measure among international studies of demographic change and ageing (SHARE; and the European Commission).

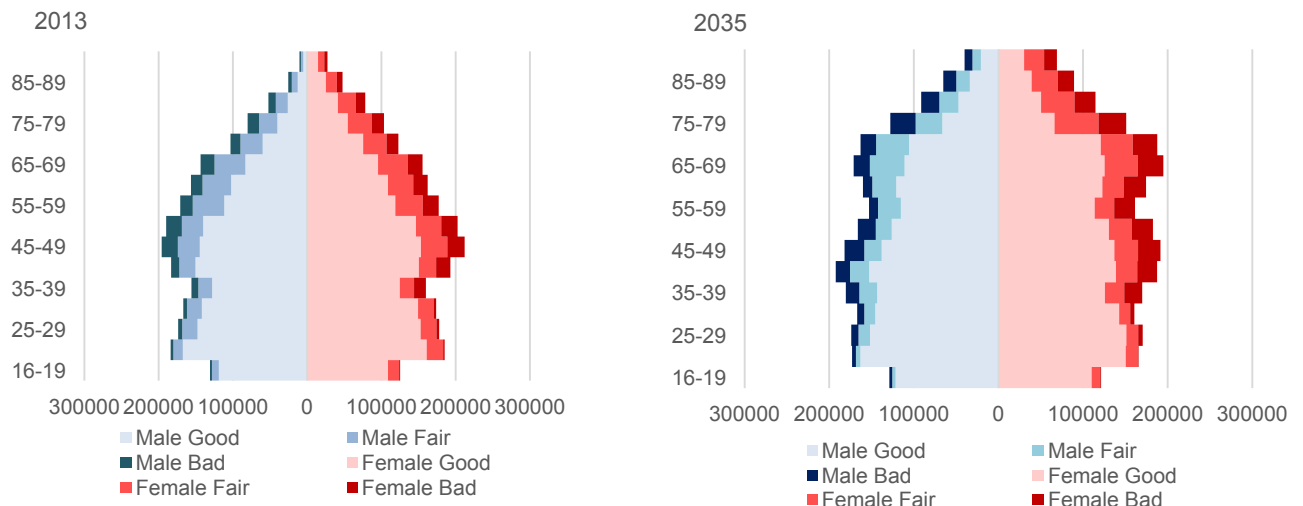
The Scottish Health Survey results from 2003 to 2013 provide the data upon which to conduct a trend-based forecast. Use of the logit function allows us to rate health status as good, fair and bad health and to forecast it by gender and age cohort. As such, we can formulate the population pyramids set out in Figure 5.

<sup>5</sup> Scottish Government (2010) and Spijker and MacInnes (2013) state that the dependency ratio takes no account of labour market or education participation rates. Börsch-Supan, Chłoń-Domińczak, and Skirbekk (2012) note that the ratio assume all those above pensionable age are economically inactive.

<sup>6</sup> Miilunpalo et al. (1997) found a strong and nearly linear relationship between self-rated health status and the use of physicians during the year following the survey. Self-reported health is inherently subjective and contextual; however Jylha (2009) states that the basis of self-reported health lies in the biological and physiological state of the individual organism.

The data (refer to Table 3) shows that although the overall percentage of the population in fair or bad health increases only slightly in the 2035 estimates, by 0.9 percentage points, distribution of fair or bad health does change somewhat. In 2035, we see a greater proportion of elderly age cohorts in fair- or bad health, with less fair or bad health in the working-age population. The net result is an increase in dependency due to an increasing ageing population suffering from ill-health, and hence placing greater demands on health care services and social care. Figure 3 and Figure 4 highlight that this might follow from a change in the population mix (i.e. an increase in the number of ‘old old’<sup>7</sup>).

**Figure 5: Scottish population pyramids, based on self-reported health for 2013 and 2035 (Scottish Health Survey, 2003- 2013)**



**Table 3: Forecasted changes in good, fair, and bad health 2013 and 2035 (Scottish Health Survey, 2003-2013)**

Measure	2013		2035	
	Good	Fair/Bad	Good	Fair/Bad
% population 16+	73.8%	26.4%	73.5%	27.3%
% population 16+ of working-age	61.8%	17.0%	56.5%	13.8%
% population 16+, 65+	12.1%	9.4%	17.1%	13.5%

Figures may not add due to rounding

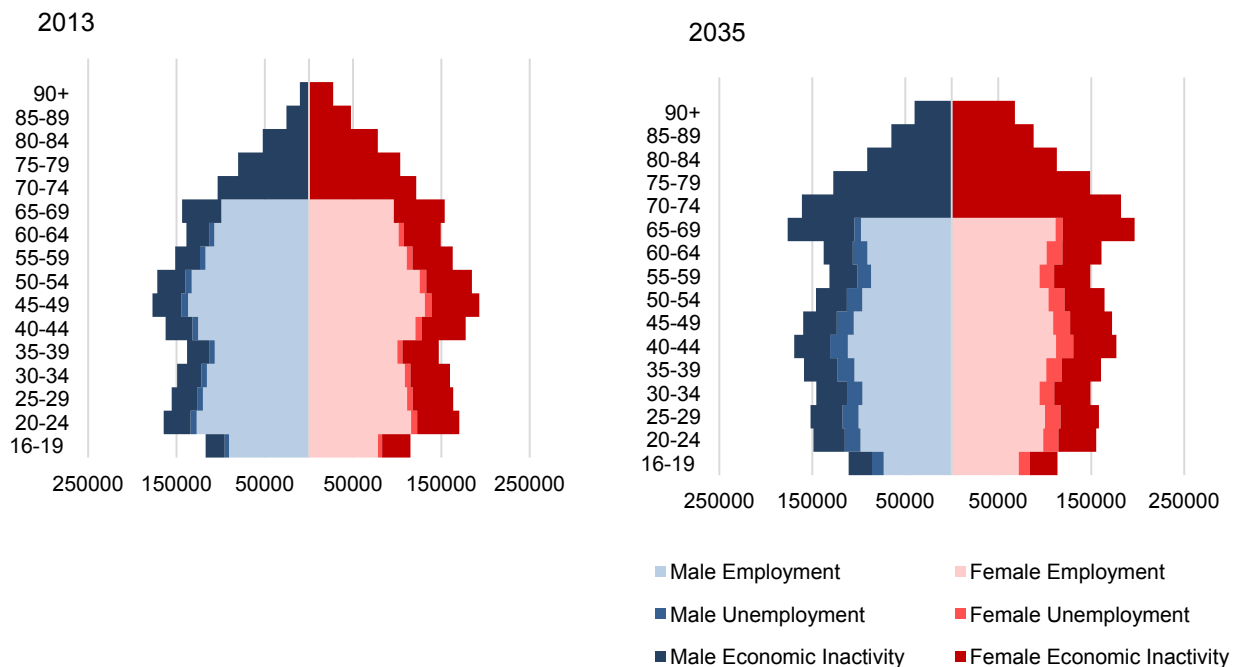
Source: based on Scottish Health Survey results, 2003-2013

<sup>7</sup> This paper defines an increase in ‘old old’ as increases in the numbers of those aged 75+

### 3. Economic Activity

Population growth, particularly increases in the working-age population, is a key supply side driver of GDP growth, along with labour market participation and productivity (Scottish Government, 2010). Lisenkova et al. (2010) note the economic impact of the working-age cohort as a *decreasing* proportion of total population (expected case in 2035 – see Figure 4). As such, a shrinking number of the economically active working-age will have to support a growing number of economically dependent people (SHARE, 2014), not only in terms of state pension, but also in terms of public service demands.

**Figure 6: Economic activity vs economic inactivity 2013 and 2035 (Scottish Government, 2014a)**



Hence, we need to consider the levels of economic inactivity which can be expected over the next twenty years, both in terms of those of pensionable age, but also those considered economically inactive within the working-age population itself. The same trend-based forecasting methods are used to formulate the population pyramids for economic in/activity<sup>8</sup> in Figure 6

As for between males and females (aged 16+) overall levels of economic inactivity (including unemployment rates) are higher for females – and may reflect the fact that informal care is not classified

<sup>8</sup> Data on economic inactivity and employment rates is available on a national basis; however, some rates are not available disaggregated by age cohort. This makes graphical representation within the population pyramid difficult – the pyramids in this instance do not account for differing levels of economic activity at different ages. This is dealt with separately, as it does in fact have important economic implications.



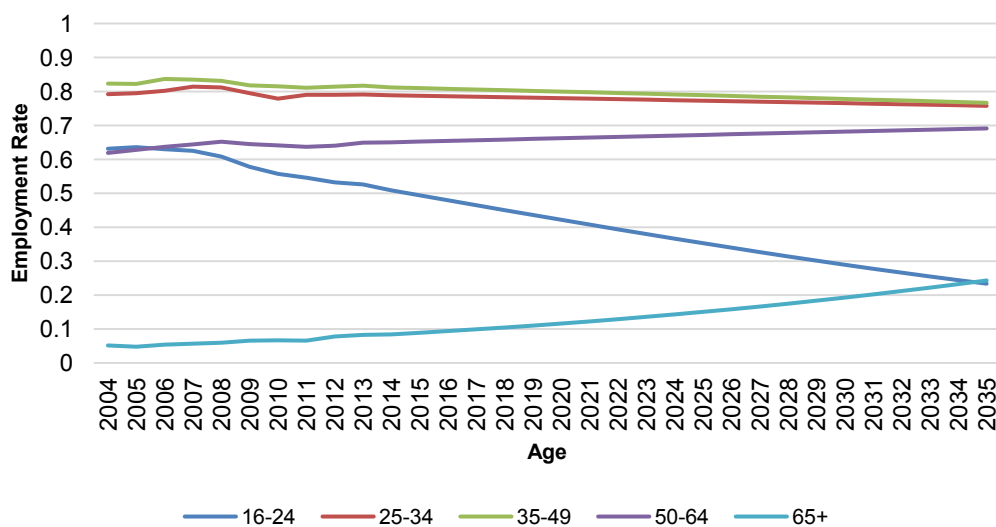
as formal economic activity – and that the impact of this continues throughout the working age life course.

The only available labour market data disaggregated by age are employment rates. Employment rates from 2004 – 2013 (Scottish Government, 2014a) show the three age cohorts displaying potential decreases in employment rates are: 16-24; 25-34; and 35-49, with the 16-24 cohort seeing by far the largest decreases. Projecting these trends forward shows that by 2035, the 16-24 age group would have the same employment rate as the 65+ age cohorts. A caveat concerning this forecast is that in doing so this extrapolation carries forward the labour market effects of employment rates that have been significantly impacted by post-2008 financial / Great Recession.

**Table 4 Economic activity vs economic inactivity 2013 and 2035 (Scottish Government, 2014a)**

Measure	Year	Male	Female	Overall
Employment Rate	2013	75%	68%	71%
	2035	61%	63%	63%
Unemployment Rate	2013	4%	4%	8%
	2035	10%	10%	21%
Economic Inactivity	2013	18%	28%	23%
	2035	21%	26%	24%

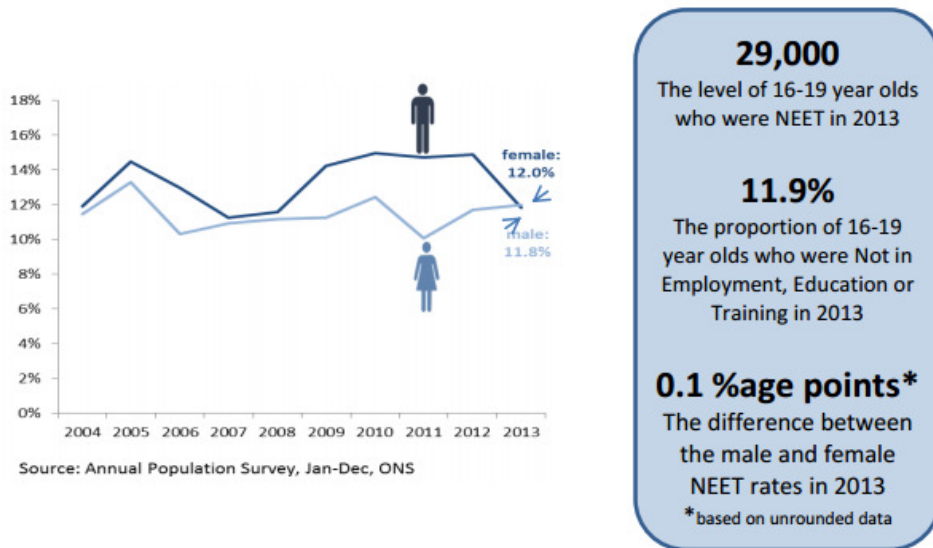
**Figure 7: Employment rate forecasts by age cohort (Scottish Government, 2004-2014)**



Taking the trend among the 16-24 cohort, we can disaggregate economic inactivity further to account for those who are so-called ‘NEET’ (not in education, employment, or training)(refer to Figure 8). Much of

the NEET literature focus on the lifetime economic impact of being NEET at a young age (Coles et al., 2011; Scott, et al., 2001; and Eurofound, 2012). In fact, being NEET at 16-19, has lifetime impacts for both the individual *and* for society, in terms of the cost of economic inactivity over long periods, and in terms of their own health and well-being. Trend-based forecasts of those considered NEET in Scotland (16-19) are given in Table 5 (though it should be noted that there is a lot of volatility in the data).

**Figure 8: NEET population in Scotland (Scottish Government, 2014a)**



**Table 5: Levels and rates of NEET 2013 and forecasted 2035 (Scottish Government, 2014a)**

Year	% of 16-19 NEET	Total 16-19	Level NEET
2013	11.9%	255920	30454
2035	19.9%	248771	49520

Despite a decreasing number of those aged 16-19, trend-based forecasts<sup>9</sup> estimate an increase in the absolute numbers of those who are considered NEET.

At 0.5% and 0.9% of *total* population in 2013 and 2035 respectively, the NEET group, although proportionally extremely small, is an easily identified group and represent a challenge both for future economic activity levels (and hence tax / revenue raising potential) and from a service utilisation / public expenditure perspective, given the known lifetime health and wellbeing impacts of being NEET at such formative stages in one's adult life.

<sup>9</sup> A drawback of these forecasts comes from the volatility surrounding past rates of NEET (Scottish Government, 2014a)

### III Conclusions

Scotland faces a future of dynamic demographic change which, as the literature shows, has a wide range of economic, health and public expenditure consequences. We have used trend-based forecasts to allow us to analyse Scotland's future demography, with particular focus on those trends that have a notable economic and public spending impacts. Although trend-based forecasts take no account of any planned policy or economic changes, they do present a picture of how things might be in the future if present trends continue and *if nothing were to change*.

As noted, the top three areas of public spending in Scotland are social protection, health and education and training – and all these areas are impacted by key known demographic trends that will have significant economic impact for Scotland into the future: ageing, health status and economic activity. For the system to remain in financial balance, the costs associated with ageing, health status and economic inactivity must be less than or equal to that which need be generated via the economically active, to support those dependent upon society.

$$Cost_{Ageing} + Cost_{Health\ status} + Cost_{Economic\ Inactivity} \leq Surplus$$

Our analysis shows a systemic increase in dependency due to increasing numbers of 'old old'<sup>10</sup>, both through state pension/social protection recipients and prevalence of ill-health among the elderly. Although overall levels of fair or bad health do not increase much, the prevalence of chronic disease due to ageing will heighten the pressure and demand on public services.

We also anticipate, given present trends, that there will be an increase in economic inactivity, particularly among the youngest age cohorts, the 'cost' of which can therefore be anticipated to rise – both in terms of foregone lifetime earnings (and tax revenues) but also the health and wellbeing impacts which will raise their demand for health and social protection of the youngest age cohorts across their life-course.

*"Our economic future depends on providing the tools for upward mobility, and building a highly educated, skilled workforce"* Heckman (2012) – picking up the costs of those, say NEET and economically inactive, can have long-term costs spanning the life-course, as opposed to investing to prevent those individuals realising such states in the first place.

Changes in Scotland's forecast demography have significant impacts on future public spending in Scotland (as well as impacts of foregone tax revenue due to labour market inactivity). If Scotland wishes to remain a welfare state, caring for those most in need, policy must engineer a sustainable financial balance. This paper concludes that to generate sufficient surplus to cope with forthcoming demographic change, policy in Scotland needs to be targeted in order to ensure that the working-age population (and beyond) is economically active, skilled, healthy, and sufficiently supported to cope with the impacts of known forthcoming demographic change.

#### *Policy Options*

- I. Increase economic activity amongst the working age population (as well as amongst those of pensionable age)

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<sup>10</sup> This paper defines an increase in 'old old' as increases in the numbers of those aged 75+

- a. Increase in retirement age – increase economically active as a proportion of total population (as demonstrated by dependency ratio).
  - b. Investment in education and learning (particularly in early and formative years of life) to prevent realisation of NEET states.
  - c. Increases in immigration levels (Lisenkova et al., 2010) to sustain such large increases in 'old old' and subsequent dependency.
- II. Decrease future demands for health care services and social protection
- a. Finding new models to provide cost effective care for 'old old' due to prevalence of chronic illness. As the analysis shows, relatively small numbers of 'old old' consider themselves to be in poor health – so there is no reason to suppose that people in this life stage cannot have a rich a fulfilling quality of life.

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## Appendices

### Appendix I – Key assumptions and clarifications with regard to sources of data and their respective data sets

Demographic Trend	Assumption/clarification
Dependency Ratio	<p>2013 – working age population 16-64</p> <p>2035 – working age population 16-66 (planned changes in retirement age)</p> <p>Dependents – those &lt;16; and 65+/67+</p> <p>Assumes those &lt;16 and of pensionable age are economically inactive</p> <p>Assumes those of working age are economically active</p>
Self-Reported Health	<p>Scottish Health Survey: covers health of those 16+; living in private households (might not represent reality); in 2012/2013, 4815 adults took part in the survey; monitors trends in population health over time. Assumes those stating bad/fair health will require some form of health care expenditure, and are therefore dependent in that way</p> <p>Self-reported health accounts for only those 16+ as the Scottish Health Survey cover age cohorts 16+</p> <p>Scottish Health Survey officially published every 5 years therefore forecasts are made for the time frame 2033-37, but applied to 2035 population estimates</p> <p>Some rates are given for larger age bands than 5 year cohorts so when this is the case, this paper analyses the proportion in the smaller age cohort and applies it to the overall number of people the rate applies to.</p> <p>Self-reported health is subjective however this paper only illustrates health using this measure as a proxy – it is realised that this is not fully representative.</p>
Economic Activity	<p>Annual Population Survey: covers the year ending 31 December 2013; it combines results from Labour Force Survey; primary source of information on local labour markets providing headline estimates on employment, unemployment and economic activity; largest annual household survey in Scotland</p> <p>2013 – working age population 16-64</p> <p>2035 – working age population 16-66</p> <p>2013 – average age of retirement 65 (AGE UK, 2014)</p> <p>2035 – average age of retirement 67 (AGE, UK, 2014)</p> <p>Forecasts allows rates to be projected for cohorts up to 60-64; in 2035 estimate, those 65-66 are assumed the same employment rates as those 60-64</p> <p>Those classified by Annual Population Survey results as Unemployed/Economically Inactive are all considered economically inactive in the case of this paper as, at that specific point in time, the people in question present a cost in terms of public spending (social security).</p> <p>Not all employment based rates are given by age cohort and therefore cannot be aggregated in this respect. In this case, the same rate is applied to all age cohorts. It is deemed too unreliable to change/manipulate this data.</p>
Overall	<p>Projections are trend based, not policy forecasts and therefore do not take account of policy change; and also ignore any economic upturns etc. Uncertainty and inaccuracy in this respect hampers analysis</p> <p>As population projections are trend-based and not policy forecasts, the reliability of projections decreases over time, since the process of change is cumulative (General Registry Office, 2014) i.e. if new policies are introduced, they may result in the original projections not being realised; a key justification for the relatively short time horizon that this paper adopts.</p>

### Author Details

Robyn Millar,  
 Department of Management Science  
 University of Strathclyde  
[robyn.millar@strath.ac.uk](mailto:robyn.millar@strath.ac.uk)

Sir Harry Burns  
 Professor of Global Public Health  
 University of Strathclyde  
[henry.burns@strath.ac.uk](mailto:henry.burns@strath.ac.uk)

Professor Alec Morton  
 Department of Management Science  
 University of Strathclyde  
[alec.morton@strath.ac.uk](mailto:alec.morton@strath.ac.uk)

