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The State of Europe's Fertility: Causes, Consequences & Future Policies

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Abstract

Sub replacement fertility levels have persisted across Europe since the 1980s. This has resulted in a demographic transformation within Europe characterised by population ageing, a decline in population growth, and a subsequent rise in old age dependency ratios. European governments are increasingly concerned about their country's prospects for future economic growth, as well as the burgeoning effect on social and health care costs, in the context of a reduced tax base. This has led to several governments adopting pronatalist policies. This article analyses the relevant theories to date to explain the conceptual basis for fertility decline and the significant variation that exists across European regions. It appraises current policies designed to reverse low fertility rates. In Northern Europe, policies which have encouraged female labour participation, gender equity, and provided benefits to reduce the opportunity cost of children have had a partial effect, but overall the evidence indicates that sustained reversal of low fertility rates throughout Europe is unfeasible as many policies are likely to be based on a misunderstanding of the aetiology of this decline. The challenge for Europe is to re-engineer its economic paradigm to embrace this demographic transition rather than continue to try and reverse it.

Keywords: Fertility decline, Europe, policy, population ageing

Introduction: The European Fertility 'Problem' in Context

Fertility has been at the heart of human affairs from our earliest times. We see this in pre-history through fertility figurines, in early civilisation through extant ancient commentaries and now through the modern perspectives of economics, biomedical sciences, and sociology (Polybius 1997 (2nd

Century BCE)). For the last fifty years the study of fertility has been dominated by demographic transition theory, a theory whose axiom is the concept that modernization (i.e. economic development) and declining mortality lead to a decline in fertility after a lag period. Today a variety of conceptual frameworks jostle to explain the myriad of fertility patterns, both its rise and fall (Dyson and Murphy 1985). Modern demographic luminaries in this field – Charles Hirschman, John Bongaarts, John Casterline, John Caldwell, Peter McDonald, stand on fifty years of research led by pioneers such as Warren Thompson (Thompson 1929), Kinglsey Davis (Davis 1945) and Frank Notestein (Notestein 1953).

Whilst lacunae in the demographic transition theory have given rise to a wide range of competing historical and contemporary views what is unarguable is the fact that there is a fertility decline. The latest figures from the United Nations Development Program (UNDP) make for stark reading (see Table 1). Currently, the top ten countries in terms of Human Development Index (HDI) have an average total fertility rate (TFR) of 1.8 (range, 1.3 – 2.1) which is well below the replacement fertility rate (2.1 births per woman for most industrialized countries). In comparison, the bottom ten countries have an average TFR of 5.6 (range, 4.6-6.20) (UN 2010).

Table 1: Analysis of Total Fertility Rate Data for all countries in 2010 (UN 2010)

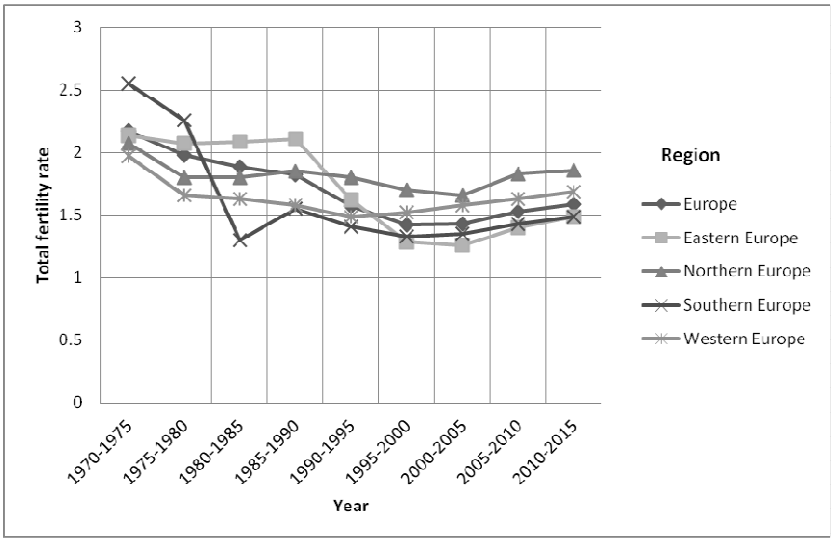
Period of Analysis	1970-75	2005-2010
Average TFR (*n*=197 countries)	4.99	2.99
Number of countries below replacement rate (defined as TFR = 2.1)	19	74

Fertility Trends in Europe

Europe has been no exception to these global trends. As the first region to experience the demographic transition, fertility decline has been profound across Europe since the early sixties. Indeed as Hans-Peter Kohler comments, early notions that declines would stabilise at or around replacement rate, "have been shattered" (Kohler, Billari, and Ortega 2006). Currently, all countries in Europe have TFR rates below replacement level (Hoorens et al. 2011). The situation was particularly acute at the turn of the century in Southern, Central and Eastern Europe where TFR rates were at or below 1.3, termed "lowest low fertility" (Billari and Kohler 2004). However since 2000, period fertility in most low and lowest low fertility countries has been steadily rising (Goldstein, Sobotka, and Jasilioniene 2009). However, this has been at variable rates with currently over 50% of the EU-27 countries having TFR rates at or below 1.5. If this rate were to be sustained, the European population size would halve in fewer than seven decades (Hoorens et al. 2011).

The mean TFR in Europe (EU-27) currently stands at 1.57 (Eurostat 2011). However, this aggregate figure hides considerable heterogeneity in the current member state-specific TFR and trends (positive and negative) in Europe as illustrated in Figure 1. Eastern, Southern and German-speaking European countries tend to have the lowest TFRs compared to Western and Northern European countries(Frejka, Hoem, and Sobotka 2008) (Hoorens et al. 2011). Germany (TFR=1.36), Poland (1.30) and Spain (1.36) all have low TFR rates despite initiation of family policies (Eurostat 2011). Conversely, countries such as Denmark (1.87), France (2.03), Sweden (1.9) and the UK (1.98), which were amongst the first to see below replacement rate fertility in the 1960's and 1970's, have all increased their TFR in the last decade (Eurostat 2011). This heterogeneity is important, as we will discuss when considering the effectiveness (or otherwise) of polices designed to raise fertility in Europe.

Figure 1: Total Fertility Rate by European Subregion: Source:(UN 2010)



The Demographic and Economic Impact of Low Fertility in Europe

Low and lowest low fertility has had a significant impact on the age demographics of the European population due to the onset of a negative population momentum. In 2010, Europe had its highest ever proportion of its population aged 65 or older, some 16%, which has been forecast to increase to 24% by 2030 (UN 2010). Likewise the projected old age dependency ratios (defined as the ratio of the population over the age of 65 to the population of working age (15-65)) are expected to double in Europe from the current figure of 25% to 50% by 2050 (Eurostat 2011).

Such a situation in the context of today's systems and policies would have a profound impact on economic growth (through a reduction in the labour force, tax payers, etc), health (dependency ratios in care-giving) and social cohesion (we have no real insight on how the dominance of an aged population will impact on social dynamics). The important point here to make is that these are, however, 'perceived' problems viewed through the prism of today's normative socio-cultural and socio-political systems.

As Coale and Hoover first postulated fertility decline increases the relative size of the working population thus improving the economy, a phenomenon termed the "Demographic gift" (Coale and Hoover 1958). However, to benefit from this high working age share it was imperative that governments developed appropriate economic and trade policies, invested in education and job creation as well as population health. This however, has been achieved with varying degrees of success, and once the gift has been used, ageing populations present their own particular problems. (Bloom and Sousa-Poza 2010).

A lower ratio of workers to dependents will tend to reduce per capita gross domestic product (GDP) (Bloom and Canning 2006). The ageing and early retirement of the skilled labour market also has profound effects on social security systems, and the benefits available. Again, experience has found that declining fertility coupled to this economic behaviour narrows the tax base for social security and potentially increases the tax burden on future working generations. Finally, there is evidence that an aged population has major financial impacts on healthcare, housing and social care costs (Yashiro 1996).

This threat has been acknowledged by the European Union's economic policy committee (Part 2012) who have commented that, "The ageing of the population is becoming a growing challenge to the sustainability of public finances in the EU Member States. The increase of the ratio between the number of retirees and the number of workers will amplify expenditure on public pensions and health

and long-term care and thus puts a burden on maintaining a sound balance between future public expenditure and tax revenues."

Bo Malmberg has examined the relationship between low fertility and the housing market. Population ageing could result in a reduced demand for housing, when compared to younger cohorts, resulting in a slowing of the growth of house prices. This could have a significant economic impact given the importance of the housing market to the economy (Malmberg 2010; Bloom and Sousa-Poza 2010).

Furthermore, the social context in which ageing is occurring in Europe is also undergoing change. An increase in the proportion of lone parent families, individuals living alone, high rates of divorce and a weakening of family ties all result in a decrease in household size which may impact on availability of informal care for the growing elderly population, particularly for women (Grant et al. 2004; Clarke 1994).

The problem of sustained economic growth in the face of a declining population is now an acute problem but *only* in the context of today's economic paradigms (Kosai, Saito, and Yashiro 1998). Thus, the reaction has been to treat fertility decline as a threat and something to be reversed.

Causes/Models of Fertility Decline in Europe

Much of the thinking around policies designed to increase TFR in Europe rests on the variety of causal explanations for the decline in the first place. For example, it was Regine Stix and Frank Notestein who were the first to show the importance of attitude rather than biology or contraceptive use in declining fertility (Stix, Notestein, and Fund 1940). Hot on their heels Kinglsey Davis also espoused the same causal framework but unlike Stix and Notestein (who saw fertility as culturally embedded), Davis minimized the impact of culture and religion (Davis 1955). In the footnotes one mention should also be made of Ronald Freedman's contribution who, whilst operating in the same framework as Davis and Stix instead emphasised the central role of norms for family size (Freedman et al. 1963).

Between the mid-1970s and late eighties John Caldwell put forward a set of papers challenging the economic basis of most explanatory mechanisms of demographic theory and fertility decline. Caldwell saw declining fertility within the framework of 'Intergenerational Wealth Flows'. In his view low fertility in modern society was a result of the reversal of wealth flow with parents contributing time, money and support to children, i.e. with few economic incentives for fertility (Caldwell 1976). But it was left to Easterlin and colleagues who melded economic theories with traditional sociological research to develop the Supply-Demand theory of fertility decline. Their model demonstrated how modernization can first lead to a rise then fall in fertility as the forces of regulation cost (money, time, psychic factors), supply (environmental factors that constrain natural fertility) and demand (standard socioeconomic factors) combine to depress fertility (Easterlin 1975).

An in-depth analysis, points to a number of factors emerging in the late 60's and 70's to bring about this fertility decline (Frejka, Hoem, and Sobotka 2008). The initial driver particularly in Northern and Western Europe was the "delay" in childbearing and family formation (so called tempo effects) which resulted in a fall in annual fertility rates (Sobotka 2004). This was considered to be a transient phenomenon, with fertility rates expected to recuperate in later years as women completed their families.

Demographers developed "tempo adjusted" fertility rates, which were based on the premise that current fertility rates underestimated the actual levels of fertility (Bongaarts and Feeney 1998; Kohler and Ortega 2002). However, fertility rates have remained at lowest-low and low levels, primarily as a result of delayed births not occurring as predicted. The extent to which this occurs has been very much dependent on the social and political context of a particular country (McDonald 2007).

Tempo effects were coupled with a change in the values and attitudes towards family life which has been termed the "second demographic transition" by Ron Lesethaege (Lesthaeghe 1983) and Dirk Van de Kaa (Van de Kaa 1987). There was a reduction in marriage rates, increasingly a delayed age at

marriage, higher instability of relationships, and increased cohabiting with a concomitant rise in non-marital child bearing. Individual autonomy and personal self-fulfilment were key tenets underpinning the transition. It has also been suggested that men and women were increasingly reluctant to make decisions that had long-term consequences and could limit their future freedom of choice (Lutz 2006; Goldstein, Lutz, and Scherbov 2003; Bongaarts and Feeney 1998).

Another factor to emerge in the 60's and 70's was a change in the socially prescribed gender roles. Women increasingly accessed educational opportunities and became part of the labour force. This improved gender equity resulted in women making informed choices regarding the timing and number of children they wished to have (McDonald 2000a).

The introduction of the oral contraceptive pill in the 1960's and subsequent improvement in access and choice of contraception allowed women to control their reproductive options (Lutz 2006). However, as well as the voluntary aspect of fertility control, there has also been an involuntary component. This is thought to relate to the delay in childbearing towards the end of a woman's reproductive life where higher rates of sterility and miscarriage are reported. In Eastern Europe, infertility has been linked with the high incidence of repeat abortions and the spread of sexually transmitted diseases (Botev 2006).

In a competitive labour market, investment in "human capital" becomes of increasing importance (Lee and Mason 2010). Young people not established in the labour market or who fear unemployment with the consequent loss of income and social status, display "risk averse" behaviour (Lutz 2006; McDonald 2007). Personal investment in education (higher-level education) is seen as essential to secure a stable job (Frejka, Hoem, and Sobotka 2008). Employees need to be increasingly mobile, and work long and antisocial hours which may promote delaying long-term commitments, such as having children, until sufficient human capital and labour market experience is accumulated (Sobotka, Skirbekk, and Philipov 2011). Other factors include postponed home leaving, the rising cost of housing, and delayed home ownership which are relevant in societies where home ownership is seen as a precondition to parenthood (Sobotka, Skirbekk, and Philipov 2011).

The human behavioural ecology (HBE) perspective presents additional insight in this area as theorists seek to provide adaptive hypotheses to explain fertility decline (Nettle et al. 2013). They postulate that economic factors are the key driver of low fertility trends. The costs of rearing socially and economically competitive children are increasing. Therefore parents have fewer children and invest more time and resources into individual children in order to increase the survivorship and fitness of their off-spring and consequently enhance future reproductive success. (Lawson and Mace 2011). There is also evidence to support that this approach, in combination with high socioeconomic position predicts socioeconomic success for future generations (Goodman, Koupil, and Lawson 2012).

However, in reality this investment has not enhanced the reproductive success of future generations as predicted (Boone and Kessler 1999). In fact there is no evidence to support that a higher rate of fertility negatively impacts on an individual's fitness to have children compared to those with lower fertility (Goodman, Koupil, and Lawson 2012). Theorists therefore suggest that we are displaying maladaptive behaviours to maximise socioeconomic success at the cost of reduced fertility (Nettle et al. 2013). However, one should consider whether this in fact represents optimised adaptation, in light of the sustainability of our species due to improved public health and medical advances.

One also needs to consider the rising "opportunity cost" of children in explaining fertility decline in Europe. This is defined as the time, skills and income expended due to childcare and childrearing commitments rather than investing in human capital, consumer goods (cars, houses, holidays etc) or careers (Lutz, Skirbekk, and Testa 2006). However, as fertility levels fall, the relative opportunity costs for those having children increases. This creates a "fertility trap" where people follow the social norms and conversely decide to have fewer children or remain childless (Lutz, Skirbekk, and Testa 2006; McDonald 2007). In this regard government policy has an important role in defining the extent of the social and financial costs of having children.

There has been a decline in the traditional two child family model (Frejka 2008; Sobotka and Testa 2008). Whilst the rate of childlessness in most European countries is approximately 10% (Botev 2006), this is steadily increasing with rates of childlessness among women born in 1965 at 30% in West Germany and 25% in Italy (Frejka and Sardon 2007; McDonald 2007). In some countries, for example Germany and Austria (Billari 2005), childlessness is considered as a lifestyle choice. Such observations have not been witnessed in other parts of Europe, but still remains a possibility. In the Russian federation, for example, 37% of women only had one child by the end of their reproductive lives, although the reasons for this have not been established (Frejka and Sardon 2007).

European Fertility Policies

Governments were late to act on the low and lowest-low fertility rates that were a feature of the late 1990's and turn of the century. Reasons cited include the association of pronatal policies with excessive state intervention, fascism, and antifeminism (if low fertility was seen as failure on the part of women) (Botev 2006). Politically there remained a concern that investment into child and family policy would be criticised as diverting resources from those who do not wish to have children. For example, it may be argued that those wishing to have children should be able to undertake the costs associated with this commitment (McDonald 2007).

However, following the advent of lowest low fertility, most countries have seen the fertility decline as a direct national threat and responded with a broad range of policies. These have taken a variety of forms, including financial incentives, work & family initiatives, as well as broad social change supportive of children and parenting (McDonald 2000b).

A United Nations survey in 2005, monitoring population policies worldwide noted that 32 European governments viewed their country's fertility as too low, with 27 countries having implemented policies to increase or sustain the national fertility rate (UN 2006). The clear imperative for these policy actions has been the dominant view that very low fertility does not go away of its own accord (Goldstein, Lutz, and Testa 2003). However, some countries for example Denmark and Switzerland still report a policy of "no intervention" (Goldstein, Sobotka, and Jasilioniene 2009).

It is helpful to consider fertility policy in the context of three culturally broad European camps (adapted from McDonald 2007). This allows review of fertility patterns and the resultant policy approaches within the EU along with their relative successes.

Group 1 includes all the Nordic countries, English-speaking countries and the French and Dutch-speaking Western European countries. This group have demonstrated an increase in the total fertility rates, (due to recuperation of delayed births) over the last decade with current rates between 1.7 and 2.0 (Eurostat 2011). This rise is thought to be due to the institutional settings within these countries, which encourage female participation in the labour market, promote gender equity, and provide child care and benefits to reduce the opportunity cost of having children (Hoorens et al. 2011; McDonald 2007).

Group 2 countries include all of the Southern European countries, and German-speaking Western European countries. These countries have TFR rates at or below 1.4, which have shown no significant increase over the last decade despite implementation of fertility policies by governments. There appears to be limited recuperation of delayed births (Eurostat 2011). The persistence of the "male breadwinner model" of the family is considered to be a significant factor. This is in contrast to Nordic countries and France where a woman's fertility and labour force participation is not directly associated with her partner's income (Köppen 2002). Other factors, particularly in Southern European countries, include the maintenance of traditional family patterns, inflexible childcare provision, low female employment, leaving home late, high unemployment amongst young adults and the social acceptance of childlessness (Billari 2008).

The third group includes Central and Eastern European countries. The TFR rates are similar to those of Group 2 countries, although a higher proportion had "lowest-low" fertility rates at the turn of

the century (Eurostat 2011). The reasons are multifactorial but a significant factor which contributed is thought to be the economic decline in the mid 1990's as a result of the collapse of state socialism (Frejka 2008). Other factors include the integration of Western attitudes and ideals with respect to family formation and patterns of childbearing. However, unstable employment with a lack of job security is considered to have had the most significant impact on inhibiting fertility patterns (Frejka 2008). Emigration has also influenced these low fertility rates, with a number of women of childbearing age having children in other countries such as the UK, Spain and Sweden (Hoorens et al. 2011).

The role of specific policy interventions in the recent upsurge in fertility rates over the past decade in Group 1 and 3 countries is difficult to precisely define. What does appear to be emerging however is a clear divergence between the fertility rates in north western European countries, which appear to be approaching replacement levels, and fertility rates in southern, central and eastern European countries remaining persistently at low and very low levels (Frejka, Hoem, and Sobotka 2008). We review the current evidence for policy successes in Europe.

Financial incentives are credited with stopping declining TFR in both Estonia (Goldstein, Sobotka, and Jasilioniene 2009; Laroque and Salanié 2008) and Russia (Zakharov 2008). Estonia experienced a significant increase in TFR between 1998 and 2008. This has been attributed to the introduction of family policies and in particular the "mothers salary;" a parental benefit introduced in 2004 to compensate for the income lost by staying at home with children.

Russia has a long history of introducing pro-natalist policies (Zakharov 2008). The low fertility rate has become a significant concern as a young, dynamic and growing population is considered to be a sign of political and economic power. Again a number of policies have been introduced. An example is "maternal capital" a fee paid in a mother's lifetime to be used three years after childbirth towards education, housing and retirement. This policy was initiated in 2007 and associated with a direct rise in fertility rates, although it remains difficult to separate this from an improvement in the country's economic situation at that time.

Explicit pro-natalist policies have been relatively rare in Europe, except for the former socialist regimes of Eastern Europe (Buttner and Lutz 1990; Andorka and Vukovich 1985), so these implicit policy measures to steer family formation decisions with financial incentives have been the general approach (Grant et al. 2004).

However, there have been notable examples where direct financial incentives have not had a discernible effect on fertility rates. In 2007 both Spain and the Czech Republic introduced generous financial incentive schemes for each newborn. In addition enhanced parental leave benefits were also introduced in the Czech Republic (Frejka, Hoem, and Sobotka 2008; Goldstein, Sobotka, and Jasilioniene 2009). However, the increases in fertility rates were relatively small, with rates rising even prior to the introduction of these incentives.

France is considered an example of a country which has implemented successful family policies. As with Nordic countries such as Sweden they have implemented a coordinated and comprehensive system of family and population policies as part of an overall long-term strategy to support parenthood (Bloom and Canning 2006) These include monthly allowances to couples with children, which increases for families with three children. In addition, they benefit from generous paid maternal and paternal leave as well as free day care at crèches for younger children (Bloom and Canning 2006; Fagnani 2002).

Have European Policies Reversed Fertility Decline?

How effective these policies have been is remarkably difficult to assess due to the multiplicity of interactions and policy approaches. Gerda Neyer's work on family policies and fertility in Europe which has synthesised the effectiveness evidence for fertility policies at the intersection of gender politics, employment and care policies has found very mixed results with no clear pattern (Neyer 2003). What this work does expose is the complex interplay of national level policies with those

emanating from the European Commission, e.g. The Barcelona European Council 2002, that member states should by 2010 provide substantial childcare (e.g. 33% coverage for under 3's) (Plantenga et al. 2008) and the 1996 Directive which introduced individual parental leave rights (Directive 1996).

The RAND perspective towards European policies directed at fertility provide an interesting counterfoil (Grant et al. 2004). In their view, immigration policies could slow population ageing. National fertility policies could work but the example of France with aggressive pro-natalist policies over many decades typified how difficult these were and the need for sustained political will. Indeed, and stating the obvious, RAND concluded that no single policy was effective and the heterogeneity of Europe meant what worked in one place might not work in another.

Adkins saw "a very substantial, significant positive effect (on fertility) of the national mean child benefit level after controlling for other confounding factors" (Adkins 2003), whereas Gauthier has been much more cautious in his assessment of success. He noted only that '"there appears indeed to be a positive (albeit very small) impact of cash benefits on fertility (Gauthier 2004). Even Neyer agrees that those countries which regard their family policies as part of the labour market policies have only fared marginally better at keeping fertility rates from dropping into the very low category but nevertheless TFR still remain below replacement level (Neyer 2003).

Furthermore, although child care availability may have a strong effect it seems that no country has applied a coherent set of interventions over a sustained time period (with the possible exception of France but even here we still see below replacement rate fertility). Sleebos in his review for the OECD (Sleebos 2003), surmised that whilst Europe has a broad mix of approaches their combined effect has been very weak, almost negligible.

The RAND update in 2011 (Hoorens et al. 2011) which reviewed European policies directed at fertility, considered it too early to determine whether policy interventions have played a significant role in the recent rise in EU-27 TFR rates. They concluded that on balance it is unlikely that a specific policy intervention has been the primary driver of this change especially given that the causal mechanisms for fertility decline in Europe have not been precisely defined. They comment on the complexity of childbearing decisions and that specific (narrow) policy interventions are unlikely to have a role in changing behaviours. Hoem (Hoem 2008) argues that for fertility policies to be effective, it is imperative that they are embedded in a family friendly culture. Neyer and Andersson further emphasise this point, commenting explicitly upon the importance of the societal perception and symbolism of family policies rather than specific policy detail in changing behaviours (Neyer and Andersson 2008).

The RAND report authors also suggest that the potential impact of immigration in halting demographic trends has been overstated with fertility rates of immigrants falling to that of the indigenous population within two to three years. Also the number of working age migrants required to retard ageing or promote population growth in the context of below replacement fertility is politically unfeasible and unrealistic in most European countries (Hoorens et al. 2011). Even if this were possible, it does not take into account the significantly higher number of immigrants that would be required to maintain the ratio of working age (15 to 64 years old) to retired age groups (65 years and older) at current levels in Europe (Keely 2001).

Accepting Europe's Fertility Decline

In summary, there is no clear evidence that any specific policy intervention has succeeded in producing the desired fertility reversal across Europe. To halt the trend of population ageing the fertility rates would have to reach and remain above replacement levels for several decades, which is very unlikely. This on the backdrop of the current recession is likely to dampen fertility rate rises, as occurred in 2009 (Sobotka, Skirbekk, and Philipov 2011). The effect of the recession is most pronounced amongst young people aged below 28, who remain childless; a situation which is fuelled by high levels of unemployment, financial uncertainty, low satisfaction in life, and reduced availability of affordable housing (secondary to lower availability of mortgages and affordable loans) (Sobotka, Skirbekk, and Philipov 2011)

In many countries the series of societal and economic policies that would need to be employed to encourage fertility would not be financially sustainable and cuts to existing benefits are likely to occur. This is likely to deepen the fertility crisis and exacerbate the "fertility trap" by increasing the relative costs (opportunity costs) of childbearing (Žamac, Hallberg, and Lindh 2010; Lutz, Skirbekk, and Testa 2006).

This is of particular concern in the United Kingdom where welfare cuts as part of recent austerity measures may exacerbate fertility decline. The escalation of university tuition fees will impact on uptake of educational opportunities (Bolton 2012) and could saddle university graduates with considerable debt. Furthermore, this generation may be levied with higher taxes to compensate for the projected rise in old age dependency ratios. This financial burden could have a detrimental effect on period fertility rates, through promoting delays in childbearing and smaller family environments. However, it should be noted that the UK currently has comparatively high fertility rates within Europe despite receiving less child and maternal support compared to countries such as France and Sweden, and the impact of tuition fees on future fertility rates is still debated.

Accepting the changing demographic profile of Europe and designing policies to cope with this seem a more realistic solution than explicit pro-natalist approaches. There needs to be a change in the current perception that demographic change represents a crisis for European governments, with the fertility challenge for Europe therefore not in reversing the decline in fertility but developing policies and cultures that embrace 'older' societies. It is possible that globalisation of the fertility decline will actually lead to a re-setting of the economic thermostat as the global market adapts to the changing demographics of the labour force. Therefore, policies can be initiated to facilitate this future transition.

Such policies would focus on investing in "human capital" particularly the current working population and children through education. This would increase future productivity, maximise job opportunities and potentially facilitate the resource base for payment of future pensions. An educated and highly skilled labour force in the future would provide a platform for economic growth and global competitiveness if there is sufficient political will.

Governments need to avoid burdening future generations with increased tax rises to support dependents, which alludes to the concept of "intergenerational equity". It is important to support future incomes without suppressing the net incomes of the working population and capital accumulation, (Ermisch 2008). Measures could include increasing the retirement age encouraging new entrants into the labour force (particularly those over 60 and women), and increasing social security and pension contributions of current workers. Additional measures would improve the flexibility of workforce participation by encouraging part time work and facilitating the option to leave and re-enter the workforce at different stages. Industry could offer training in new and transferable skills, as well as reallocate physically demanding tasks to younger employees, which would facilitate retention of older employees in the workforce. Change in pay structures, whereby salaries are based on performance rather than seniority would encourage active recruitment of older workers (Bloom, Canning, and Fink 2010)

Other options would involve reform of health and social care services (note recent UK commission Dilnot report 2011) (Dilnot, Warner, and Williams 2011) and facilitating private pension and personal saving schemes with tax incentives (Ermisch 2008). Current evidence suggests that social security systems within developed countries are in fact encouraging retirement between the ages of 60 and 65 (Bloom, Canning, and Fink 2010). These may include direct or indirect financial incentives which promote individuals to retire early rather than continue working (Gruber and Wise 1998) placing additional fiscal pressure on the state. This has had a direct effect on old age labour participation rates both in the US and other European countries (Bloom, Canning, Fink, et al. 2007). Changes in tax and benefit policies may therefore encourage increased labour participation amongst the elderly.

A further paradox appears to be emerging. Individuals are living longer and in better health than preceding generations as they approach their 60's and 70's due to compression of morbidity (i.e. the years spent in ill health is decreasing) (Fries 2002) However, the proportion of individuals over 60 continuing to be retained in the labour force is decreasing in most OECD countries over the past few

decades (Bloom, Canning, and Fink 2010), despite evidence suggesting that they wish to do so (Kulish, Smith, and Kent 2006). Some of this may be cultural with individuals preferring to spend more time in retirement on completion of their statutory working life. However, the reasons are likely to be more complex, with unpredictable labour markets, inadequate skills and training, and increased demands for leisure time providing disincentives to old age labour participation.

In the UK the retirement age is projected to increase to 67 by 2028 with similar increases in the statutory retirement age set to be achieved in the European Union by 2020. There have also been attempts to equalise the statutory retirement age in men and women (European Commission 2010). The European commission has also suggested that the retirement age should be kept under constant review and raised periodically to ensure that an individual does not spend more than one third of their adult life in retirement (European Commission 2012). However, such changes have resulted in considerable public opposition, with strikes noted in the UK and France, particularly from public sector workers and students who see the retirement age as something that should be fixed for all. Such resistance should be considered when setting the policy agenda.

There should be caution in undertaking radical form, as some commentators have argued that the demographic transition in Europe, if managed effectively, may actually contribute to economic development and long term fiscal sustainability. For example, fertility declines have resulted in an increase in female labour participation, which potentially mitigates the effects of changes in the population age structure on the working population (Bloom et al. 2009).

It has also been projected that healthier lifestyles amongst the working population and elderly would result in a relative decrease in health expenditures in later life assuming that people in developed countries are living longer in better health. They would also be able to work more productively for longer with a decreased burden on welfare resources (Bloom, Canning, and Fink 2010).

Evidence also suggests that individuals, who live longer, whilst not remaining in the labour force, tend to increase their savings over their working life to maintain a high standard of living in retirement, reducing the economic burden on the working population (Bloom, Canning, and Graham 2003). This is particularly relevant in developed countries which provide universal pension coverage (Bloom, Canning, Mansfield, et al. 2007).

As fertility rates fall, there is increased investment by parents in their children's education, with higher levels of educational attainment noted (Lee and Mason 2010). Despite the proportion of the working age population decreasing, their relative productivity has been projected to increase, thus contributing to economic growth as a result of this investment in human capital (Lutz et al. 2007).

Conclusion

In conclusion, the long-term economic and societal consequences of low fertility and population ageing remain unclear. Current rates of improvement in the standard of living may slow down or potentially decline. Additionally, changes in population size and structure could change dramatically over short periods of time depending on the interplay of technological, environmental and behavioural factors. Of particular concern is the future health of the population at all ages. It has been predicted that due to the compression of morbidity, individuals will live for longer in better health. This in turn may increase the productivity of the elderly population and reduce their health burden.

However, recent evidence suggests that this morbidity compression is not occurring, and in fact the prevalence of chronic disease at older ages and the negative impact on independence and quality of life is increasing (Crimmins and Beltrán-Sánchez 2011). There also remains a concern that future generations and working populations will live in poorer health as a result of diet and lifestyle factors which have contributed to an obesity epidemic and a rise in associated diseases (Olshansky et al. 2005).

To mitigate these effects, clear defined policies that have long-term public and political support are required to address the complex processes underpinning the demographic transition in Europe. It is too late to hope that boosting fertility rates to above replacement level will have any overriding impact

as their benefit will not be seen for decades. Instead focus should be on investing in the current and future working populations and accepting the demographic challenge ahead. Lifestyle factors play a significant role in population health and behavioural public policy will become important in defining the productivity of future generations and the capability of a country to engage their elderly populations in economic growth.

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