

DEPARTMENT OF SOCIAL POLICY AND
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BARNETT PAPERS IN SOCIAL RESEARCH

Re-Examining the Fertility Assumptions for Pacific Asia in
the UN's *2010 World Population Prospects*

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WORKING PAPER 13-01

June 2013

Editor:

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Abstract

Pacific Asia is currently home to some of the lowest fertility rates – and hence the fastest aging populations – in the world. This paper presents a systematic overview of both the reasons for this low fertility, and why it is unlikely to increase fertility significantly in the near future. As well as a comprehensive review of scholarly opinion, the paper examines the uniquely low fertility ideals in the region, the results of a global survey of population experts on the future of Asian fertility, the assumptions of local statistical offices, and the theoretical background of ‘feedback’ effects. The paper systematically challenges the assumptions presented by the United Nations in their most recent global population projections which are based upon statistical models, suggesting that any assumption of fertility increase is profoundly Eurocentric and ignores the unique demographic experience of Pacific Asia over the past four decades. As such, the theoretical contribution of this work is to challenge the universality of a two-child norm as an endpoint to fertility transition. This is then considered in the context of various countries in South and South-East Asia that are in the midst of rapid fertility decline. The main policy conclusion is that any assumption of an immediate increase in fertility could be extremely counter-productive in terms of leading to complacency among policymakers. Indeed, the paper argues that radical family policy interventions as well as huge cultural shifts in work-life balance and gender roles will be the only way to challenge such low fertility.

Acknowledgements

I am very grateful to David Coleman and Gu Baochang for their assistance in an earlier version of this paper, and to participants at the PAA Annual Meeting in San Francisco – especially Minja Kim Choe. I am especially grateful for Patrick Gerland, Adrian Raftery and Leontine Alkema for their patient and thoughtful discussions with me. Finally, I am grateful to the Economic and Social Research Council who has supported this project (Grant No. ES/K001434/1). All views are entirely my own and do not reflect the University of Oxford or the Economic and Social Research Council.

Introduction: Population projections and the UN's *World Population Prospects*

This paper is about the future of reproduction in the modern world and the validity or otherwise of the assumptions made about it in the most recent World Population Prospects of the United Nations. Convergence of fertility is a core component of almost all international population projections. In this paper, we consider the inclusion of the 'fertility recovery in East Asia' as a justification for the model. As well as questioning the extent to which the fertility has, indeed, recovered in East Asia, we examine data concerning fertility intentions – which is, perhaps, one possible justification for assuming a fertility recovery – and find the evidence unconvincing. In particular, we present novel findings of a systematic review of fertility intentions in China over the past 30 years. These data are combined with a series of observations which suggest that the trajectory of fertility in East Asia to 2050 as projected by the UN model may be regarded as at best inaccurate and at worst detrimental to efforts to increase fertility.

Convergence of fertility and population projections

Convergence of fertility is a core component of almost all international population projections. In the 2008 *World Population Prospects (WPP)*, it was held that this figure would be a period Total Fertility Rate [TFR]¹ of 1.85 (UNPD, 2008). Once a country had reached this level, it would stabilise and continue at this point. It was held that almost all of the world would converge to 1.85 by 2050. In the 2010 *WPP*, meanwhile, a new theoretical structure utilising Bayesian Hierarchical Modelling was employed. As *Figure 1* shows, fertility

¹ The Total Fertility Rate is a synthetic period fertility measure which estimates the average number of children a woman would have if all of her childbearing were compressed into the one year under observation.

transition is modelled in three Phases. The first phase of high fertility does not concern us here. The second phase of fertility decline is modelled by a Bayesian Hierarchical Model [BHM], while fertility recovery in the third phase is modelled by a first order auto-regressive time series model. For complete details, please see (Alkema et al., 2011, UNPD, 2011b). The idea is that the model ‘learns’ from the experience of fertility transition in other countries, and projects these for other areas which have not progressed so far. For a full description of how this methodology fits with other types of population projection, see (Basten 2013).

As the UN observe in their description of the assumptions behind the 2010 *WPP*:

‘A time series model is used for projecting fertility, assuming that in the long term the total fertility will approach and fluctuate around the replacement-level of 2.1. The time series model uses the empirical information from countries that have had documented fertility increases from a sub-replacement level after a completed fertility transition. The assumption that fertility will converge toward and fluctuate around replacement-level fertility in the long run is driven by the extension of the projection horizon from 2050 to 2100 between the 2008 and 2010 Revisions, and the underlying assumption of a population stabilization within 3-4 generations.

The long term assumption of a fertility recovery is supported by the experience of many below-replacement fertility countries in Europe and East Asia’ (emphasis added) (UNPD, 2011a).

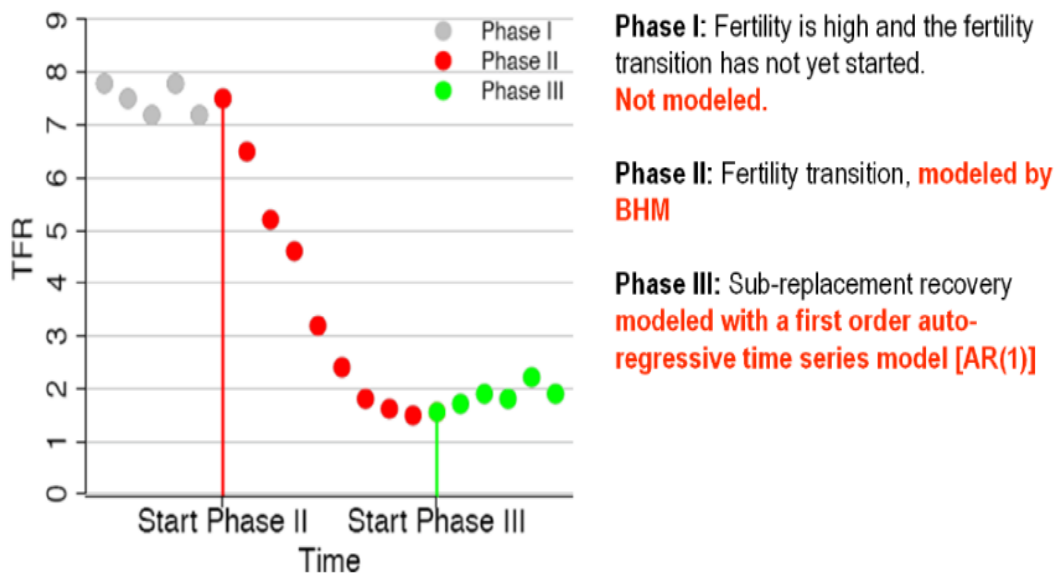


Figure 1. Model of fertility transition upon which the 2010 WPP is based (Alkema et al., 2011)

The final sentence in the assumptions above is crucial, with Goldstein et al.'s analysis of the 'end of lowest-low fertility' cited as evidence (Goldstein et al., 2009b). Indeed, it is quite correct to observe (and concur with a large literature) that fertility has recovered in many European settings – not least due to tempo distortion effects and that 'lowest-low fertility' has been almost entirely banished from the continent. Yet, in 2009, only one EU country had barely reached Replacement Rate (Ireland: 2.07) and eleven countries saw TFRs of below 1.5 (Eurostat, 2011). Indeed, between 2008 and 2009 TFR *declined* by 0.13 in Latvia, saw small declines in Spain, Portugal, Denmark, Hungary, Estonia, Austria, Luxembourg, Belgium, the UK, Germany, Malta and the Czech Republic and was almost static elsewhere. This suggests that the issues such as economic uncertainty can still play a role in unsettling the smooth move to the completion of fertility transition (Sobotka et al., 2011). The evidence from Europe, therefore, suggests that the fertility transition may not, after all, be complete.

What concerns us especially here, however, is the inclusion of the ‘fertility recovery in East Asia’ as a justification for the model and, indeed, how empirically justifiable the projected TFRs for East Asia might be. Fertility in East Asia has fallen rapidly and remains at extremely low levels. Indeed, in addition to extremely low fertility prevailing in Korea, Taiwan, Singapore, Hong Kong and Macao, Goldstein et al. estimated that 12 provinces of China, or *c.*470m people, were living under a regime of lowest low fertility (TFR <1.3) in 2000 (Goldstein et al., 2009a). Furthermore, new corrected estimates from 2005 1% Inter-censal Survey suggest that this figure may have stabilized or possibly even increased. In this context, large Chinese urban centres (each with the population of medium-size European countries) are reporting fertility rates of around – or even below – 1.0 (Basten, 2011). Any signs of a major recovery in these fertility rates are scarce. While there have been small increases in fertility in some Asian settings – some of which linked to extraneous factors such as the Zodiac or citizenship loopholes – the strong recovery from lowest-low levels of fertility as seen in Europe is simply not in evidence.

As we discuss in greater depth later, there is a large literature concerning the reasons why fertility is so low in East Asia – including work-life balance, economic and social context, little reproduction outside of marriage, housing issues, cost and expectation of investment in education and easy access to contraception (see Basten et al., 2010). Even in China, where the One Child Policy has been widely held responsible for current low levels of fertility in urban centres, an increasing number of studies have identified social and economic development, rather than policy, as being the key driver behind current rates (Cai, 2010).

However, applying the model would require these East Asian settings (perhaps taking Hong Kong as a proxy for some of the large Chinese urban centres) to have a significant, sustained

turnaround in fertility with almost immediate effect (see *Figure 2*). In this context, therefore, it is more urgent than ever to properly understand the rationale behind assuming a completed fertility transition at replacement-level. We believe that there is strong empirical evidence for suggesting that this path – to 2050 at least – may be challenged. In the next section we present five broad reasons why this might be so.

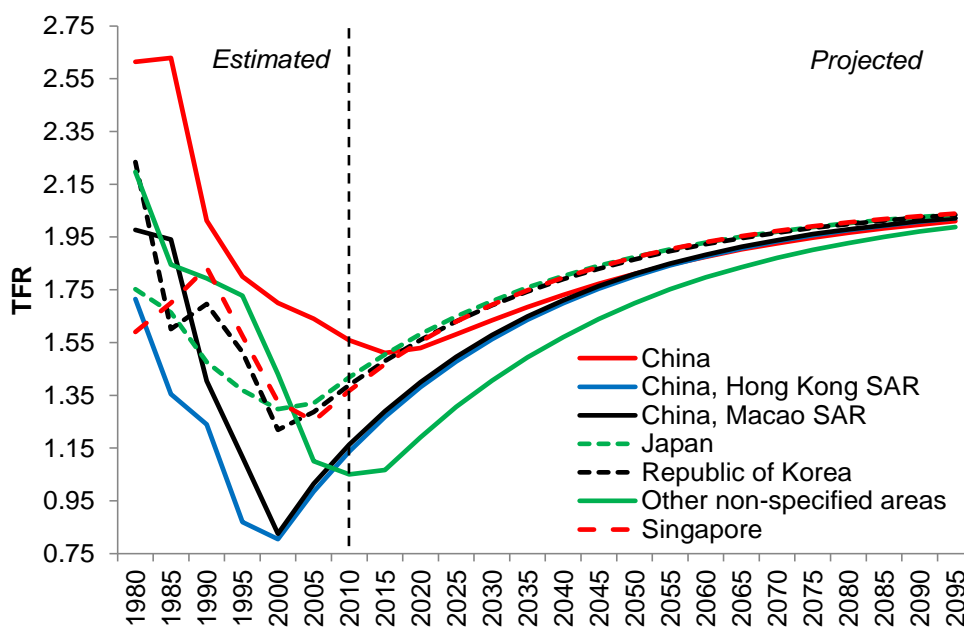


Figure 2. Projected TFR increases in East Asia as generated by the UN’s 2010 model (computed using Sevcikova, Alkema and Raftery, 2013)

Five reasons to challenge the trajectory of TFR for advanced Asian economies to 2050

In this section, we outline five possible reasons – or, indeed, *groups* of reasons why one might challenge the notion of a universal, sustained and rapid increase in period TFR in Korea, Japan, Hong Kong, Singapore and Taiwan.

1: There is a significant difference between the assumptions used by national statistical agencies than the United Nations

In order to interrogate the future TFR assumptions derived from the Bayesian hierarchical model in the UN's *WPP2010*, we have collected the TFR assumptions used by a number of East Asian statistical agencies including Statistics Korea, The National Institute of Population and Social Security Research in Japan and the Hong Kong Census and Statistics Department for comparison (see, also, Basten, forthcoming). The population projections produced by the Government of Macau do not include assumptions regarding TFR (DSEC, 2008). A personal communication from the Singapore Statistical authority states that 'we have assumed a resident total fertility rate (TFR) of 1.16 babies per female throughout the projection period for Singapore's resident population projections.'²

Given Taiwan's status, the United Nations does not explicitly produce population projections for the island. However, within the 'East Asia' country grouping, there is an entry for 'Other nonspecified areas' which bears a striking similarity to Taiwan in both total population size and past fertility trends. This is employed here as a proxy in this paper.

As *Figure 3* demonstrates, the discrepancies between the two are marked. This figure simply presents the published assumptions of local statistical offices compared to the median assumptions in the UN's 2010 *World Population Prospects*. Both Korea and Taiwan assume a much slower rate of growth to 2050 while Japan assumes a slight decline and, ultimately, stagnation. Hong Kong is clearly the most different in assuming further decreases in TFR to 0.9-1.0 to 2050. Furthermore, note that in both Korea and our Taiwan proxy, the starting TFR for national statistical agencies is lower than those employed by the UN.

² Wong Kwok Wing, *pers. comm.*, April 17th 2012

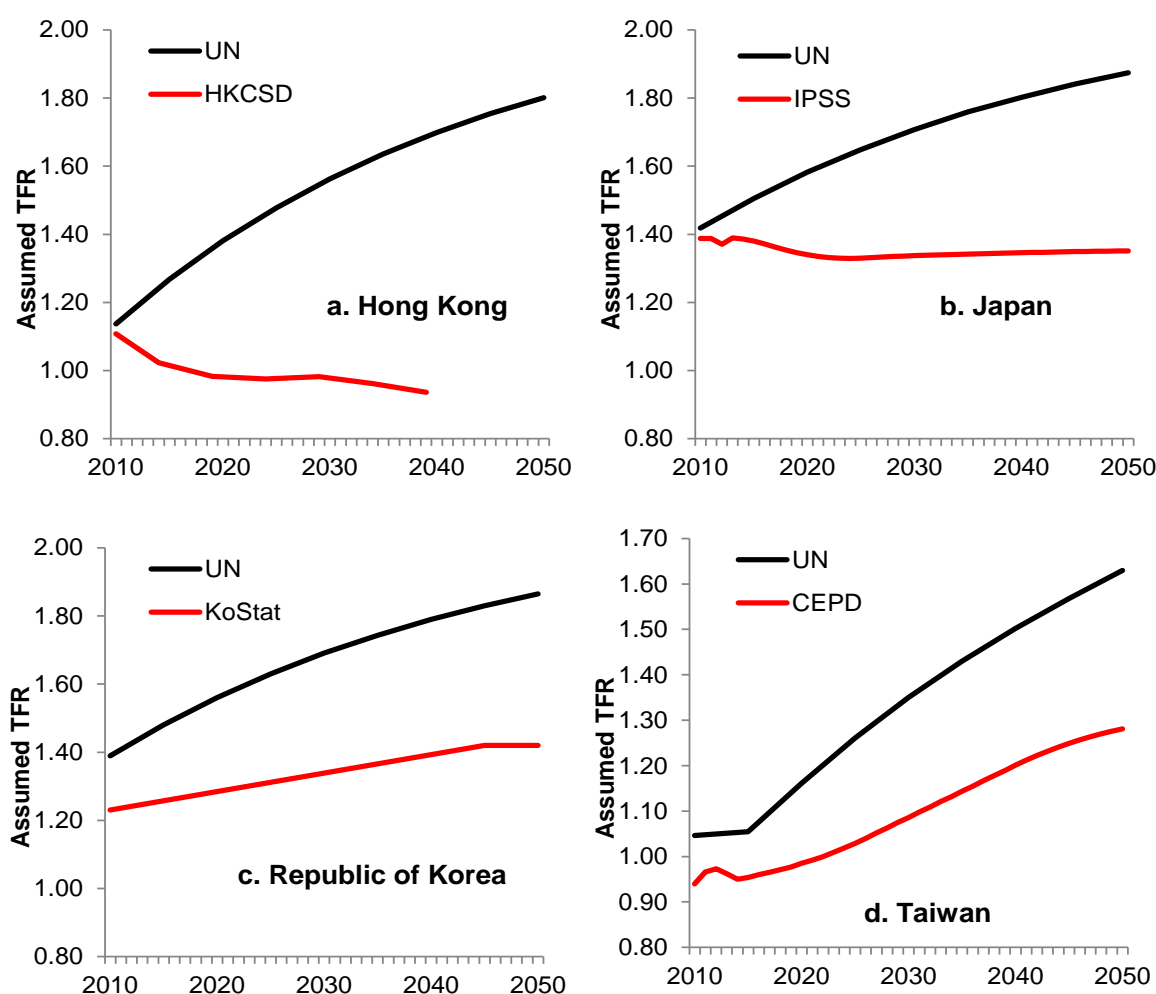


Figure 3. Comparing UN WPP TFR assumptions to 2050 with assumptions from regional statistical offices

Notes: a. Hong Kong Census and Statistics Department; b. Japanese National Institute of Population and Social Security Research; c. Statistics Korea and d. Taiwan Council for Economic Planning and Development.

Sources: CEPD (2010); UNPD (2011b); HKCSD (2010); IPSS (2012); KOSTAT (2011).

None of these statistical offices offer any qualitative underpinning of their methodology or reasons for these assumptions with the exception of *Hong Kong*. In the HKCSD 2010 projections, they explain that ‘in formulating the fertility assumptions, the process is not strictly a mechanical one that follows the extrapolated trends’. Rather, ‘because of marriage postponement, the proportion of now married women in the younger age groups is expected

to decrease and the childbearing period shortened. On the other hand, as the first childbearing age is postponed, the marital fertility rate of women after late twenties is expected to rise.’ Furthermore, recent upturns in Total Fertility Rates seen in Hong Kong are examined more carefully and reveal that this development is mainly due to the large increase in what the HKCSD calls ‘Type II babies’, or children born to mainland women whose spouses are not Hong Kong Permanent residents. The Hong Kong Government is placing increasing numbers of restrictions on these kinds of births which can serve to skew the population data. On the contrary, the number of so-called ‘Type I’ babies – born to mainland women whose spouses *are* Hong Kong Permanent residents – as well as babies born to Hong Kong mothers remained ‘relatively stable’.

Other demographic reasons which are explicitly cited to explain recent trends in Hong Kong and, as such, to underpin the assumed TFRs in the projections include:

1. *Marriage postponement and increased prevalence of ‘spinsterhood’*: in 1986, 62 per cent of women aged 25-29 were married, with the corresponding figure for 2006 as just 31 per cent. Further, the proportion of never married women in the 40-44 age group increased from 6 per cent in 1986 to 16 per cent in 2006. These trends of postponed marriage and increased ‘spinsterhood’ are assumed to continue with the assumption that around one-third of women will remain never married during their childbearing years in 2039 – increasing from around one-eighth in 2010.
2. *Curtailment of high-order live births*: the percentage of births at parity 3 and above declined rapidly from 17 per cent in 1989 to 9 per cent in 2009.
3. *Increased divorce rates*: rising from 0.98 per 1000 population in 1989 to 2.43 in 2009.

4. *Postponed low-order live births and increased marital fertility rates for women aged 30-49:* In 1989, about 74 per cent of parity 1 births were born within three years of marriage. In 2009, the proportion had declined to 69 per cent. Births in the older age group rose from 28.4 per 1000 women in 2001 to 30.9 in 2006, account for tempo displacement and part of the recent rise in pTFR. It is assumed that the marital fertility rates after the late twenties will have a ‘moderate increase in the coming few years before tapering off’, while rates for other ages will remain ‘steady’ throughout the projection period (i.e. to 2039). The age specific fertility rates (AFRs) for the different age groups are projected to change differently over the projection period. The projected AFRs for women in the younger age groups would decrease while slight increase in AFRs is projected for women aged 35 and over. As a consequence, as *Figure 4* demonstrates, there is a high degree of discrepancy between the projected *structure* of the ASFRs as well as the overall *levels*.

Finally, there is a ‘reality check’ performed in that ‘the average number of children ever born and the percentage of women having at least one child as implied by the fertility assumptions are assessed in the light of past experience in Hong Kong and the experience of other economies’ (HKCSD, 2010).

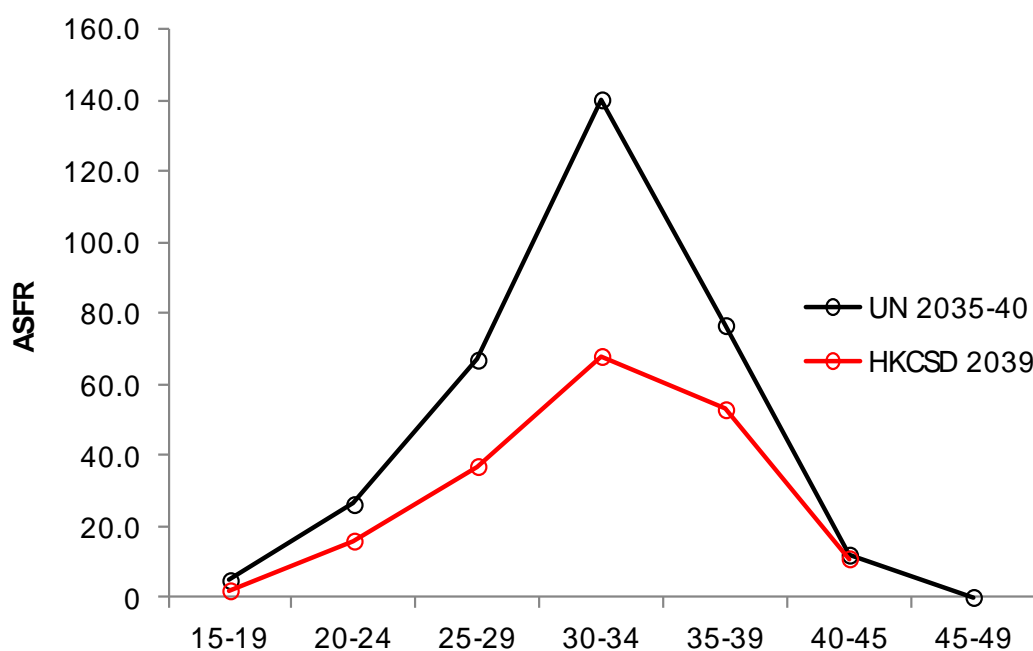


Figure 4. Comparing assumed ASFRs from UN WPP2010 and the Hong Kong Census and Statistics Department

Source: UN (2011); HKCSD (2009).

In conclusion, there are clear discrepancies between the assumptions used by *local* statistical agencies upon which their projections are based and the medium variants used by the United Nations. Of course, there is no way of saying that one projection is any ‘better’ than another whether derived locally or from the model. Similarly, there are possibly even other factors such as local political pressures or biases which influence the choice of assumptions. Despite this, it would be churlish to ignore these regionally-derived projections performed by demographers and statisticians ‘on the ground’ in these advanced Asian economies. Furthermore, at least for Hong Kong the production of a series of reasons for past trends and justifications/expectations for the future – all of which seem entirely rational and reasonable – underpin the need to pause and reflect upon locally-derived TFR assumptions. Indeed, we intend to write to other statistical agencies in the region to ask them to follow Hong Kong’s

example and explicitly describe their methodological and empirical reasoning for choosing the assumptions used in their projections.

2: The literature on East Asia does not suggest an increase in fertility is forthcoming in the short term

There is a burgeoning literature concerning the reasons behind the low fertility seen in advanced Asian economies. So much so that a full-length literature review here would seem superfluous. In essence, though, the reasons *generally* given for the current fertility conditions in East Asia can be divided into ‘second-order’ demographic reasons, and ‘first-order’ societal reasons.

Demographic reasons for low fertility in East Asia

These fundamental shifts in the quantum and tempo of marriages and births as outlined for Hong Kong above can be broadly applied elsewhere in other countries in East Asia. The postponement of marriage, increasing levels of singlehood and childlessness, curtailment of high-order births, postponed low-order live births and increased marital fertility rates for women aged 30-49 can all be seen in Japan, Korea, Taiwan and Singapore. Comparing these changes to Europe, we can see a number of important differences in terms of generally higher rates of childlessness, singlehood, later marriage and lower fertility (Sobotka, 2009; Jones, 2007; Goldstein et al., 2009b). As well as the patterns of TFR observed above in *Figure 1*, singulate age at first marriage has risen considerably in these territories (see *Figure 5*).

Furthermore, and crucially, there appears to be a marked difference between Europe and advanced Asian economies regarding tempo and quantum. After years of marked decline, fertility in Europe has generally recuperated and is rising or stable – not least because of the current economic crisis. Much of this is related to the effect of the disproportionate postponement of births by a series of birth cohorts and recuperation at older ages which has led to a distortion in the period Total Fertility Rates (Goldstein et al., 2009a; Sobotka, 2004). However, the evidence from Hong Kong, Japan, Singapore, and Taiwan – albeit based upon relatively short data series – suggests that recuperation at older ages is, in fact, weak. Comparing the 1960s cohorts to their counterparts in German-speaking countries – often the sites of among the lowest national fertility rates in Europe – only Korea saw a comparable degree of recuperation at older ages with the other countries ‘distinctly lower’ (Frejka et al., 2010). This strongly suggests – as echoed by other scholars – that the quantum *has* declined overall, and that East Asian national period TFRs are unlikely to be ‘raised’ by the effects of tempo distortion.

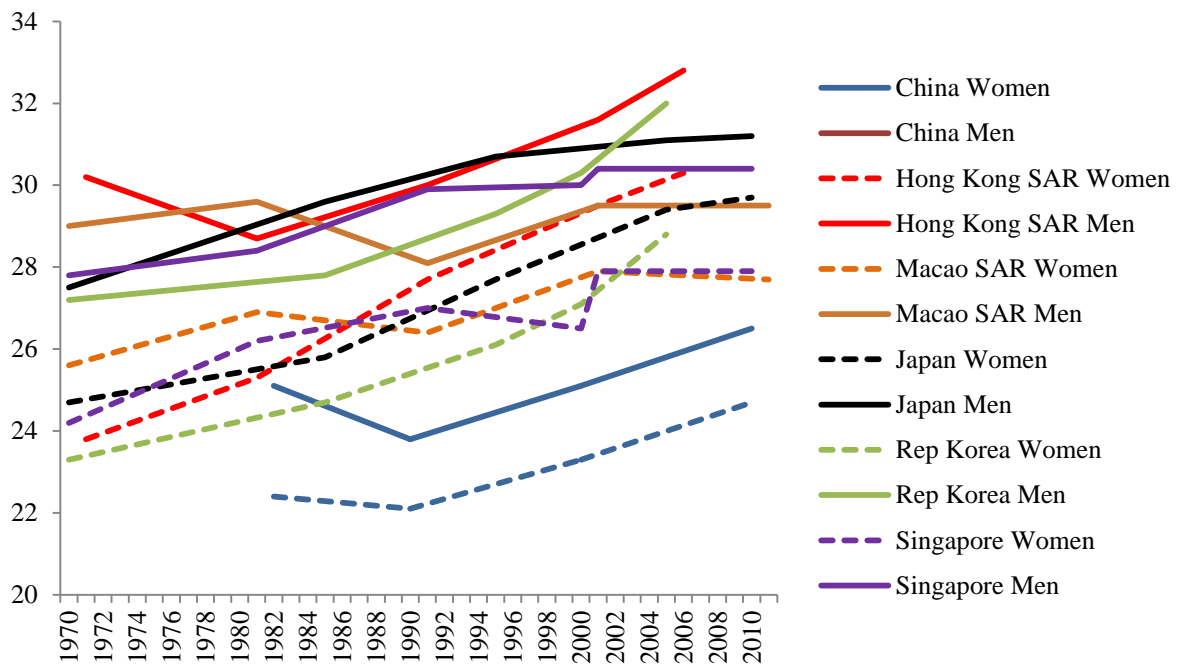


Figure 5. Singulate age at first marriage, Five East Asian territories

Source: UN World Marriage Data 2012

Finally, an important demographic – or at least ‘bridging’ issue – to consider is that of migration which has had an important impact on fertility in many European countries and the United States. The quantum of births brought about by, perhaps, a change in immigration policy or some other development, as well as from the effects of differential fertility rates is clearly important. However, the overall impact upon the Total Fertility Rate in many countries has been reported to be rather small. Given the low rates of international migration in advanced Asian economies both historically and contemporarily, it is hard to envisage a significant upturn in fertility from these quarters. Two important exceptions exist, however. Firstly, in Hong Kong, recent increases in the pTFR have been almost entirely driven by mothers travelling over from Mainland China to deliver their children in order to gain settlement rights (Ling Sze Leung, 2011). However, the Hong Kong SAR Government has sought to crackdown on this practice and significantly reduce this number of births to

Mainland mothers. A second major feature is the development of cross-border marriages as a response to the ongoing ‘marriage squeeze’ resulting from female hypergamy and skewed sex ratios (Constable, 2005; Wang and Chang, 2002). While number of such marriages have, indeed, increased dramatically in recent years, given that the fertility in the sending countries are low anyway – particularly in Mainland China and many south-east Asian settings – the overall net impact is likely to be relatively small. Indeed, in Taiwan, women from China in marriages to local men were found to have a lifetime fertility of just 1.4 children, mainly because they were more prone to marry later, have a very large spousal age gap, be separated or divorced, and because their current marriage is their second marriage (Liaw et al., 2011). Finally, while the impact of these exceptions – and other migratory-based fertility developments – on the number of *births* seen in a given Asian country might be noteworthy, the fact that total fertility among these groups is currently low implies that the impact on TFR is likely to be slight – as observed in Europe.

The above are *demographic* explanations for the kinds of rates observed in East Asia. However, a mistake often made in the literature is to state, for example, that ‘low fertility rates are caused by late marriage and high rates of childlessness’ rather than examining what are the core reasons for these second-degree effects.

Socioeconomic and cultural reasons for low fertility in East Asia

‘Incomplete gender revolution’: The public roles of women have been revolutionised in advanced Asian economies to the extent that in many areas younger women are, indeed, better educated than men, thus increasing – and enhancing the quality of – female labour force participation (Esping-Andersen, 2009; McDonald, 2000). However, developments in the private sphere have been much slower and resistant to change. In a society where births

outside of marriage are still relatively rare, entry into a married relationship where the onus is still frequently firmly placed upon the woman for caring for children, parents/parents-in-law as well as looking after the household is often unappetising given the extraordinarily high opportunity costs. Avoidance of this ‘marriage package’ of home and children is a central reason for both the postponement of family formation and, in a growing number of cases, its rejection altogether.

Direct costs: Raising a child is ‘expensive’ anywhere in almost all societies. However, in East Asia the high cost of childcare relative to incomes, combined with the high costs of housing means the costs are often deemed prohibited – especially if offset against a growing world of other consumption opportunities and where the burden of care for aged relatives is most often placed on the shoulders of an increasingly small set of children. For example, the expectations regarding children in advanced Asian economies is exceptionally high and could be a key force in pushing down the number of children which people realistically assume they can raise (see *Box A*) (Ogawa et al., 2009; Choe and Retherford, 2009). Indeed, there is relatively strong evidence that an increasingly educated population will, in turn, invest disproportionately more in the education of its offspring. In Singapore, for example, the overall household expenditure on educational services has increased from 4.4 per cent in 1997 to 5.3 per cent by 2007/08. However, there is a strong gradient by highest qualification attained by the main income earner of the household – rising from 1.6 per cent with no qualification, through 4 per cent with primary education, 5 per cent with secondary education to 6 per cent with university education. All of these can be translated in the quality-quantity trade-off, with fewer children receiving higher individual investment (Becker, 1960). Finally, employment practices and systems render the opportunity costs of childbearing high in a

number of ways, either through job insecurity among the young or through inflexible work practices and work cultures which are often incompatible with childrearing.

Relatively weak policy provisions: While many Asian countries have developed wide ranging policy responses to ultra-low fertility, these need to be placed into the context of the developmental welfare state which, in these cases, are characterised by low rates of tax and, hence, relatively little absolute expenditure – compared, for example, to European spending on family policy (Kwon, 2007). This characteristic of such developmental welfare states in East Asia does little to offset the high direct costs associated with childbearing.

Box A. Cram schools – a sample ‘cost’ of money and time

A number of studies and opinion pieces have suggested that cram schools and private tuition are now a fundamental part of many east Asian public education systems – primarily as a result of a mismatch between the extremely high expectations placed upon children to achieve educationally and get the best college places and the prevailing view of the unreformed public education sector in many East Asian settings (Roesgaard, 2006, Sato, 2005).

In Hong Kong in 2004, 47 per cent of children of school-age receive private tuition at home or at educational institutions outside school hours, each for an average time of around 4.8 hours per week (Chan, 2010). In 2007, it was estimated that households with students taking private tuition spend on average HK\$1,150 per month (Chan, 2010).

In Taiwan, the number of tuition schools (*buxiban*) has increased from around 1,200 in 1997 to over 7,000 by 2006. Cram school fees are around NT\$100,000 (US\$3,400) a year for a high school student — a two-month salary for many Taiwanese. One study suggests that 73 per cent of secondary school students and 70 per cent of primary and pre-school children receive some form of tuition and, on average, students pay at least NT\$7,000 a month for tuition in two subjects. Furthermore, a survey by the non-profit Taiwanese Child Welfare League Foundation found that 40 per cent of children are still present in tutorial classes beyond 7pm on an average day (Li, 2009).

In Korea, meanwhile, it was estimated in 2003 that 83.1 per cent of primary pupils were receiving tutoring, while the proportion in middle schools was 75.3 per cent and in high schools 56.3 per cent (Bray, 2006, Kwak, 2004). Lee estimated that in 2003, Korean households spent about 10 per cent of their annual incomes on private tutoring, while families with middle and high school students spent about 30 per cent (Lee, 2005). It has recently been reported that government employees have been ordered to monitor cram schools, or *hagwons*, to ensure they do not break a curfew of 10p.m. for children studying (Ripley, 2011).

Finally, in Japan there are estimated to be around 50,000 cram schools, or *juku* with the average fees per student coming to around ¥260,000 (\$3,300) annually (Economist, 2011). A 1993 survey found that 70 per cent of all students had received tutoring by the time they had completed middle school (Russell, 1997). In 2003, a Japanese government survey found 62.5 per cent of all 3rd year middle school students attended cram schools.

As *Gavin Jones* succinctly observes:

‘There is a great irony in the apparent fact that the very pressures to prioritize economic growth and the human capital factors that can contribute to it – long hours of work, involvement of women in the workforce on much the same terms as men, strong pressure on children to perform outstandingly in school, and the extra tuition and coaching that is considered indispensable for reaching this goal – contain the seeds of an inability of the population to replace itself’ (Jones, 2012).

But what about the future? To what extent are these socioeconomic, cultural and policy factors changing – and changing in such a way to suggest the kind of TFR increases predicted by the UN’s model?

The general view held by most scholars appears to be that while comprehensive policies to raise fertility consisting mainly of financial and material incentives as well as assistance with child-care and leave have their role, they also have their limits and are not a ‘silver bullet’ by any means. Indeed, many government programs have been in evidence for some years now in this part of this world, leading Jones *et al*, to claim that ‘the general consensus about

pronatalist policies in East Asian countries seems to be that they have failed because there is no evidence that fertility has risen as a result of their introduction' (Jones et al., 2009). Despite this, explicit policy interventions unsurprisingly receive the lion's share of policymakers' attentions. Furthermore, as Retherford and Ogawa – and others – observe, many governments have been slow to act upon the dangers inherent in ultra-low fertility, with some continuing to under-invest in the area. This, they argue, is owing to the slow-burning impact of low fertility and population ageing further clouded by population growth caused by demographic momentum (Retherford and Ogawa, 2009).

In this context, there are also questions to be raised about the extent to which such developmental welfare states will be able to afford significant levels of investment in social policy (Westley et al., 2010). Aside from the general impact of the on-going financial crisis, key countries such as Japan are facing difficult future economic periods. Aside from the humanitarian and reconstruction needs resulting from the Great East Japan Earthquake, the countries fiscal situation has, according to the OECD, 'reached a crisis point' where chronic budget deficits are projected to push up gross public debt to an unprecedented 200 per cent of GDP, and net debt to 115 per cent in 2011 (OECD, 2011). This fiscal situation must surely render difficult the kind of (education system) reforms which Ogawa *et al.* claim would lower the cost of 'acquiring high-quality children', for example (Ogawa et al., 2009). In Korea, too, while overall budget deficits are relatively low, when adding in the debt of public financial institutions such as the housing, deposit insurance and public capital redemption funds. When including these, the debt of the public sector rises to 710 trillion won, or 69 per cent of GDP. In other words, the financial resources required for a massive investment in family policy reforms are not likely to be forthcoming in the near future; nor is the low tax burden to which many states in East Asia, most of all Taiwan, have become accustomed to.

Finally, the rising presence of labour market dualism, instability of employment and unemployment could all work to lessen the impact – or at least complicate the implementation – of comprehensive family policy programs. As a number of studies conclude, it is too early and too unclear to tell how successful any such policy interventions would be (Bumpass et al., 2009).

Meanwhile, as Frejka et al. observe, ‘little attention is devoted to generating broad social change supportive of children and parenting.’ In particular, they note that because ‘patriarchal customs and attitudes in the family, the workplace, and the political domain are deeply engrained...changing the patriarchal social environment will require special focus on policies to increase male involvement in the household and in the upbringing of women and to change the attitudes of employers.’ They conclude that ‘unless current conditions are radically changed and child- and family-friendly environments are fostered, it is difficult to believe that fertility patterns will change’ (Frejka et al., 2010).

Again, this is not the place for a full review of the views and prescriptions given in each study of low fertility in East Asia. However, it is important to observe the strength of pessimism to be seen in many studies if current circumstances prevail.

Yip et al. concluded in their 2006 discussion of the impact of fertility decline in Hong Kong by declaring that ‘the fertility rate will neither go back to 1.0 in the short or medium term nor rise considerably above 1.0 in the long term unless there is a significant fertility rebound, or a substantial increase in the number of births out of wedlock, or a consistent rise in the married proportion of females. *Judging by the past reproductive behaviours and marriage habits, these pre-requisite conditions will be most unlikely to occur*’ (emphasis added), not least when combined with the somewhat *laissez-faire* approach to family policy as employed

by the Hong Kong government (Yip et al., 2006). Indeed, these views are clearly reflected in the low projected TFRs used by the HKCSD in their projections (see above).

As Koh observed, low fertility in Singapore was a due to a quantum fall rather than being a tempo phenomenon and, as such, ‘rebounds or a catch-up in period fertility in Singapore’s context is unlikely, given that completed family sizes and cohort fertility have correspondingly fallen, and are likely to continue falling.’ In this context, Singaporeans are simply responding to changes in the socioeconomic environment outlined above by focussing greater investment in the fewer children they now have and with changing values and ideations about marriage and family. Koh concludes that responses to policy intervention by the national government – some of the most famous and wide ranging in the world – have ‘so far been muted.’ Yet even if the youngest cohorts do indeed respond positively to these incentives; ‘an upswing in their fertility would slowly and eventually translate to increases in period fertility’ (Chuan, 2010).

A final theoretical construct which suggests a possible prolongation of low fertility in parts of East Asia is the so-called ‘Low Fertility Trap’ introduced by Lutz and his associates (Lutz et al., 2006a). We discuss this in more depth in the subsequent section.

In their 2010 *AsiaPacific Issues* paper, Westley, Choe and Retherford conclude that ‘fertility in East Asian societies will remain low – at least for the foreseeable future – as women make difficult choices between careers and motherhood’ (Westley et al., 2010). This view is echoed by many other studies of low fertility in the region and is, therefore, submitted as a second reason to challenge the UN assumptions of TFR increase in the short- and medium-term.

3: A recent survey of experts concluded that fertility would not increase as markedly as the UN predicts

A world survey of population experts

In 2010, a collaborative project between IIASA's World Population Program and the University of Oxford was launched to create probabilistic projections of age, sex, and level of education for every country of the world based upon transparent, scientifically-derived assumptions.³ At the heart of these projections was a global Internet survey on the likely future trends in fertility, mortality, and migration and the main factors behind them was conducted among the members of major population associations and selected other professional organisations. By allowing a large number of experts to participate and by providing an argument-based underpinning of numerical estimates about future fertility trends, the survey addressed two common weaknesses of population projection-making: 1) a very limited or no theoretical foundation and 2) a participation of a small and often closed group of experts formulating the parameters of projection scenarios.

Given the global reach of the survey, it was determined that the format should be exclusively online. A link was e-mailed to all members of the major population associations – IUSSP, EAPS, PAA – members of which were deemed to be 'experts' in population.⁴ Respondents were asked to select a country to which their assessment pertains, and were initially asked to

³ For a full description of this survey please see 'The future of low fertility: results of a survey of global experts'; report available from author.

⁴ We are very grateful to these organisations for their assistance in the dissemination of the survey.

provide point and range estimates (80 per cent probability) of the period total fertility rates in 2030 and 2050. TFRs for 2010 (derived from the PRB) were presented for reference.⁵

Respondents were then presented with a series of qualitative statements ('arguments') envisaged to cover a very broad series of possible influences on current and future trends in fertility for which they were asked to rate both the 'likelihood' of its occurrence (validity) and the 'impact' upon future fertility trends *if it were to be completely true*. As well as providing a qualitative justification for the assumptions and a wealth of valuable information concerning what experts felt to be the main drivers of future trends of fertility, this exercise was designed to force experts to 're-examine' their views on possible future TFRs by inserting their projections both before and after answering these questions.

Altogether, 184 questionnaires on the low-fertility module of the survey were completed by more than 170 experts (some experts chose to make two or more assessments). Concerning Asia, 14 responses were made for China and 6 for Japan (as well as 1 for Hong Kong SAR). In this section we concentrate on China and Japan firstly, then move onto elsewhere in East Asia.

New assumptions of fertility to 2050 and 2100

One of the key elements of the exercise was to gain predicted period TFR point projections from respondents for 2030 and 2050. The overwhelming message from the survey is that the experts expect that fertility in 'low fertility countries' would stay below the replacement level in the future, even in a long-term horizon when current negative tempo effects should

⁵ In a small number of cases – China being the most obvious – the 2010 'reference' point may have been unreliable. However, this reference point was placed there for guidance only, with the assumption that, for example, scholars of Chinese demography would be familiar with the difficulties in estimating current TFRs.

eventually lose relevance. Among the experts who have changed at least some of the predefined future TFR values (N=142 out of the total of 184), only in five anticipated that the period TFR in their country of choice would reach 2.0 or higher in 2050 and only one in ten expected it would be higher, i.e., above the replacement level. The remaining 90 per cent felt that fertility will remain below replacement and 19 per cent expected it would reach a very low level of 1.3 or below. Even in the high (“max”) variant, delineating the boundary of 80 per cent probability, as many as 32 per cent of experts believed that fertility would remain below 2. Because recent fertility rates were very low in many countries, more experts expected a TFR increase between 2010 and 2050 (N=75) than was the number expecting a decline (N=61). Only few expected that these increases or falls will be of a large magnitude of 0.5 or higher.

In East Asia, the respondents generally predict either stagnation or decline in TFR. In particular, the views of the respondents are at odds with the UN model moving to 2050, where almost all responses predicted a lower TFR (see *Table 1*). The 14 respondents for China generally predicted stagnation at or around 1.5, while the UN’s medium variant is 1.79 and the low variant 1.31. For Japan, the four respondents predicted a marginal increase from 2010 figures to 2030 (1.3 rising to 1.4) then stagnation to 2050. The HIGH bound bore most resemblance to the UN’s medium variant. Indeed, in Japan the mean of the HIGH 80% confidence interval predicted by the respondents were similar to those predicted by the UN model. The one respondent for Hong Kong predicted lowest-low TFRs to 2050 (1.1).

Table 1. Observed period TFR in 2010 and projected period TFR in 2050 in six largest low-fertility countries; expert's expectations (mean value of point estimates) and UN medium projection variant

	2010	2030		2050	
	Baseline	Expert	UN	Expert	UN
Japan	1.37	1.40	1.68	1.41	1.86
China	1.50	1.43	1.61	1.43	1.79
Russia	1.54	1.46	1.76	1.48	1.91
Iran	1.80	1.71	1.36	1.38	1.64
Brazil	2.00	1.80	1.61	1.70	1.68
United States	2.01	1.93	2.09	1.83	2.09
Mexico	2.20	1.87	1.80	1.50	1.70

Source: (UNPD, 2011b)

The quantitative assessments performed by the survey respondents were then discussed at a meeting of meta-experts from Europe, East Asia and the Americas held in Vienna in December 2011. Here, experts in low fertility met and considered the evidence gathered and – in conjunction with the qualitative assessment (which will be examined later) decided on the TFR assumptions which would, ultimately, be employed in the final population projection exercise. For other countries in East Asia where the response rate was too low, a broader discussion on likely future trends was had which was then translated into TFR assumptions which were approved by the meta-experts. The resulting TFR assumptions for East Asia can be found in *Table 2*. While some adjustments were made, they are generally faithful to the original estimates given by survey respondents.

Table 2. Expert-derived assumptions for TFR compared to UN WPP2010

	2030		2050		2100	
	Expert	UN	Expert	UN	Expert	UN
Japan	1.40	1.71	1.40	1.87	1.52	2.04
Republic of Korea	1.40	1.69	1.40	1.87	1.52	2.03
Singapore	1.40	1.69	1.40	1.87	1.52	2.04
Hong Kong SAR	1.20	1.56	1.40	1.80	1.52	2.02
Macao	1.20	1.58	1.40	1.81	1.52	2.02
China	1.50	1.63	1.50	1.81	1.58	2.01

Source: (UNPD, 2011b)

Furthermore, for projections beyond 2050, meta-experts discussed long-range scenarios and arrived at the simple proposition of assuming a long-range convergence on a point roughly mid-way between countries with relatively stable fertility around replacement (e.g. the US, UK, Sweden) and lower fertility, yet highly advanced economies such as Korea (~1.3). As such, a sub-replacement level of 1.75 by 2200 was assumed. A linear approximation between the 2050 figure and this ‘endpoint’ was then made to identify rates in intervening years. The figures for 2100 can be found in *Table 2*.

There are, of course, many limitations to this exercise. Ideally, of course, we would have liked to see many more responses from East Asia and more empirical basis for countries such as Korea, Singapore and Macao. Furthermore, the fact that the questionnaire was only in English may have put off some respondents. Indeed, we plan to perform a similar exercise in Chinese, Japanese and Korean in the near future. However, in the meantime we feel that the output of the exercise, being as it is derived from some of the world’s leading experts in the field, does still have some merit. As such, we submit this as further evidence for questioning the assumed increases in TFR as predicted by the UN to 2050.

4: Fertility intentions evidence does not suggest an immediate appetite for children in certain settings

Fertility intentions in Europe

The subject of fertility intentions and ideals is one which has often been side-lined by demographers, not least because of the intrinsic difficulties in comparing like-for-like through differences in subjectivity, measurement and context and because, prior to the mid-2000s, fertility intentions and ideals were broadly static around or above replacement rates in developed countries. Despite this, the suite of measures associated with personal/societal ideal family size and fertility intentions have each been used in a wide variety of studies and theoretical constructs in an attempt to better understand micro- and macro-level reproductive decision-making (Philipov et al., 2009; Philipov, 2009, Testa, 2007). Indeed, the European Commission has in the past used evidence of the gap between fertility intentions and reality within the EU to suggest an ‘unmet need’ for children which could be met by policy interventions (Philipov et al., 2009).

In 2004, however, the subject of fertility intentions and ideal family size was brought to the fore in Europe with the finding by Goldstein et al. that in the low fertility, German-speaking parts of Europe the average ideal family sizes given by younger men and women had fallen as low as 1.7 children (Goldstein, 2003). The fact that these fertility preferences had deviated from ‘the two-child ideal’ which had ‘held such sway since the end of the baby boom’ was deemed highly significant, with the authors finding it ‘hard to imagine that this re-conceptualisation of family life will be without any consequences, just as it is hard to imagine that low fertility can persist indefinitely without being accompanied by a change in ideals’ (Goldstein, 2003).

Evidence from the latest round of *Eurobarometer* surveys, however, suggests that this may have been merely a temporary ‘blip.’ Rather than other countries ‘following the lead’ of Germany and Austria, the continent-wide average has stayed above two and, indeed, there has been a notable recuperation in mean personal ideal family sizes and fertility intentions in both Germany and Austria.⁶ In this context, such a recuperation in fertility intentions is often taken alongside the increases in pTFR to provide further evidence for the end of the so-called ‘low fertility crisis’ in Europe.

What is already ‘known’ about ideal family size/fertility intentions in Asia?

Despite the extremely low fertility in East Asia, studies of fertility intentions are relatively few – and many of those do tend to confirm the stubbornness of the measures to deviate from at or above two. In one of the few full-length studies of the subject, Retherford et al. observed a slight decline on overall stated ideal family sizes of currently married women of reproductive age in Japan between 1965 and 1995 from ~2.7 to ~2.6 (Retherford et al., 1996). Suzuki (2006) confirmed that the average ideal number of children (for married women aged below 50) has never fallen below for 2.5 for the previous quart-century and that ‘very few singles expressed a preference to remain single’ (Suzuki, 2009).

In Korea, Kim et al. found little fluctuation in reported ideal number of children among currently married women aged 15-44 between 2.1 and 2.3 from 1991 to 2000 (Kim et al., 2003). Similarly, Choe et al. show that the mean ideal number of children has not fallen below 2.0 in the preceding two decades (Choe et al., 2004).

⁶ Testa, M.R. *pers. comm.*, April 2012

In Singapore, similar figures were reported by Yapp for 1997, where he found the mean ideal family size among married women rising from 2.2-2.7 according to age (Yap, 2003). Furthermore, Call et al., using the 2007 Singapore National Study of Work-Life Harmony, did indeed find a continuation of well above replacement level ideal family sizes among both men and women (Call et al., 2008).

All of this evidence combined seems to suggest that Suzuki's observation that 'recent fertility decline [in Japan] should be explained not from demand itself but from obstacles to fulfilling the demand' can be broadly applied in other East Asian settings (Suzuki, 2006). Indeed, the latest evidence available from the OECD *Family Database* confirms these findings, and suggests an ideal family size among married Japanese men and women of 2.48 and, for married Korean women aged between 15-44, 2.20-2.30 (OECD, 2012).

As MacDonald states, 'if these studies and their interpretations are correct, advanced Asian countries are not yet in the situation of the "low-fertility trap" where individual ideal fall to a level that corresponds with the number of children that people are actually having' (McDonald, 2009).

Is this the end of the story? Evidence from Taiwan and Hong Kong

Despite this, a growing body of evidence is building to suggest that fertility intentions and/or ideal family sizes as measured in other ways – as well as pure means – are, in fact, falling below replacement rates in certain key East Asian settings (Basten, Lutz and Scherbov, 2013). Firstly, we must take into account one of the key methodological problems in dealing with these types of data. Separating out 'demand' from 'obstacles' is, for example, especially difficult. Choe et al., for example, find that 'planned fertility' in Korea – or the final number of children which women plan to have, was just 1.4 in 2000. Furthermore, only 50 per cent of

women with one child planned to have another. As such, they observe that gap between TFR/'planned fertility' and the reported mean ideal number of children desired suggests that 'women would have more children if their socio-economic circumstances were also ideal' (Choe et al., 2004). It is, of course, tempting to state that the 'planned fertility' is more reflective of the 'real life' situation in East Asia rather than the ideal. Indeed, within Europe the difference between 'ideal' and 'intended' number of children is usually extremely small.

By using data from Taiwan, we can examine this discrepancy between 'ideal' and 'planned' fertility in another low fertility, East Asian context. Given the repeated cross-sectional nature of the *Women's Marriage, Fertility and Employment Survey*, we will be able to examine the stability of stated ideal family size over successive representative samples in order to see in much greater depth how ideal family sizes are constructed in Taiwan (Heiland et al., 2008). This is currently an on-going project scheduled for completion in December 2013. However, in this paper we will simply be exploring firstly how stated ideal family sizes change across the rounds of the survey and, secondly, make an attempt to explore the concept of 'planned fertility' by examining progression to a further birth at Parity One.

For Taiwan, we employ four waves of the *Women's Marriage, Fertility and Employment Survey* from 1993, 2000, 2003 and 2006.⁷ From 1979 to 1988, this survey was annually conducted to supplement the *Manpower Survey* however since 1988 the survey has only been conducted periodically (National Statistics ROC, 2012). The eligible interviewees for this survey are civilian women, with citizenship, aged 15 years and above. Women are surveyed face-to-face by interviewers recruited by the *Hsien*-, or prefecture-level offices of the Directorate General of Budget, Accounting and Statistics in or City governments. For

⁷ 1993 N=28,851; 2000 N=28,846; 2003 N=29,711; 2006 N=28,955

comparison, we use the published results of five cross-sectional rounds of the Hong Kong *Youth Sexuality Survey* performed by the Hong Kong Family Planning Association. Over 1,200 young people aged 18-27 were interviewed in the 2006 round of this survey which has been conducted every five years since 1981. The survey is a blend of random household surveys (one-third) and cluster sample school surveys (two-thirds).

In the 1993, 2000 and 2003 waves, women in the Taiwanese survey were asked ‘How many children do you think it is most ideal to have?’ Interviewers were reminded that this should be entirely irrespective of how many children the respondent already has or, indeed, of their marital status. The responses are summarised in *Table 3*.

Table 3. Stated ideal family sizes; women aged 18-24; Taiwan, 1993-2003

	Mean number of children desired	% desiring each number of children					total
		0	1	2	3	4+	
1993 [N=4680]	2.1	2.3	6.7	72.2	12.4	6.4	100.0
2000 [N=4328]	1.9	3.1	10.1	77.3	8.1	1.4	100.0
2003 [N=4021]	1.8	4.8	18.1	74.2	2.2	0.7	100.0

Source: Women’s Marriage, Fertility and Employment Survey

In Hong Kong, as part of the *Youth Sexuality Survey*, 1,205 young people aged 18-27 years were asked a series of questions regarding family planning, sexual activity and life plans. One such question concerned ‘ideal parity’, or the ideal number of children which these young

people would have. The mean ‘ideal parity’ for five studies performed since 1991 is shown in *Table 4*.

Table 4. Mean ‘ideal parity’ as reported by young people aged 18-27; Hong Kong, 1991-2011

	‘Mean ideal parity’	
	Females	Males
1991	1.8	1.9
1996	1.7	1.8
2001	1.6	1.7
2006	1.5	1.6
2011*	1.5	1.5

Note. * Preliminary result.

Source: Youth Sexuality Survey

It is impossible to deny the significant shift from ideals of larger families (>2 children) towards smaller families (<2 children.) Fully 24 per cent of young people in Taiwan state a mean ideal family size of one or fewer children compared to 7 per cent in 1993 and 11 per cent in 2000 – for the reasons covered elsewhere in this paper.

Despite the clarity of these patterns over time, we are still left with nagging concern about the relative strength of the measurement itself. In the 2006 *Women’s Marriage, Fertility and Employment Survey*, the question regarding ideal number of children was dropped and replaced with the following: ‘How many births do you expect to give in the future?’ asked to married women aged 15-49. This question allows us to examine the ‘planned fertility’ of women at given parities. Women are asked how many boys or girls they ‘expect’ to give birth to in the future. Of course, the chromosomal lottery suggests that this is really more about

desire than *planning* in terms of the gender of the future child. However, in the context of wide spread foetal screening and high abortion rates, these sex intentions have more chance of being ‘realities’ than ever before (Huang, 2010). Nonetheless, the indications of future general reproductive trajectories are quite clear.

In *Table 5* we examine the ‘planned fertility’ of Taiwanese women at Parity One in two age groups – all women aged below 30 and all aged below 35 – where a further birth is possible. Firstly, the table clearly demonstrates an overall preference towards a family size of two composed of one boy and one girl. 62 per cent of women aged below 35 with one girl ‘expect’, or at least desire, one boy while only 45 per cent of women in the same age group would like to have a girl. Similar differences exist among women aged below 30. This demonstrates the on-going gendered preference towards boys.

Table 5. Planned fertility of women in two age groups at Parity One by sex of current and future children; Taiwan 2006 (%)

Age group	Current family	Planned fertility				total
		no more children	1 more boy	1 more girl	other	
Below 35	1 boy only (N=542)	42.3	11.5	45.4	0.6	100.0
	1 girl only (N=460)	32.6	62.4	4.3	0.7	100.0
Below 30	1 boy only (N=320)	32.4	11.3	55.7	0.6	100.0
	1 girl only (N=258)	23.1	71.1	5.2	0.6	100.0

Source: Women’s Marriage, Fertility and Employment Survey

What is particularly striking, however, is that over two-fifths of women aged below 35 with one boy and almost one-third with one girl intend to limit their childbearing at Parity One, despite having many reproductive years left. Among the young age group, this is slightly less at around one-third and one-quarter.

Furthermore, at Parity Two, the number of women planning a third or fourth birth is extremely small. Only 7.7 per cent of women at Parity Two aged below 30 intends to have a third child and only 0.6 per cent intends to have a fourth. The respective figures for women aged below 35 are 5.5 per cent in both cases.

These data demonstrate that the large family (>2) is, for the vast majority of women in Taiwan, an undesirable proposition – either under current socioeconomic circumstances, or in terms of reporting such an intention. Furthermore, even at Parity Two, when the household has been through the period of adjustment to childbirth twice, very few extra children are intended. As such, to link back to the ‘family-building’ and value of children theory posited by Bulatao (Bulatao, 1981) and recently cited by Morgan (Morgan, 2003), the evidence from Taiwan suggests that Bulatao’s hypothesis that second children are indeed rationalised as “family building”: to provide a sibling for the first child and also to balance the sex composition which is still highly desirable in Taiwan. However, the relative indifference towards progression to a third birth suggests that the desire for complete balance in sex composition is small, as Pollard and Morgan find for the United States (Pollard and Morgan, 2002).

However, the strength of the desire for a mixed-gender, two-child family can also be a drag on future patterns of fertility as well as a boon. Combined with the on-going desire to have a boy and increasing access to foetal screening technology and abortion there could be serious

consequences for both the quantum and tempo of fertility, including further skewing the sex ratio at birth – and the other features associated with it such as the ‘marriage squeeze.’ The possible effects of this can be clearly seen in *Table 5* by the number of women with one boy or girl who *imply* that they do not want, or anticipates having another child of the same sex.

Evidence from intentions

Further research is desperately needed into fertility intentions, planned fertility and ideal family size in East Asia. In particular, qualitative analysis should be both developed and published in the extra-regional literature (Nie and Wyman, 2005).⁸ While regression analysis can, do doubt, deliver a more nuanced analysis of the behaviour of certain sub-groups, the evidence in *Table 5* strongly suggests a move towards the acceptance and normalisation of one-child families in Taiwan and, by implication of the low overall parity sizes, Hong Kong. The low ‘planned fertility’ numbers in Korea elucidated by Choe et al. (2004) seem to confirm the notion of ‘finding’ much lower fertility intentions data when digging deeper beneath a vague concept of ‘ideal family size’. Intentions in Taiwan and Hong Kong have not yet, indeed, fallen to reach current pTFR levels. However, if we can question the ‘sanctity’ of the two-child norm by using these data which strongly suggest a degree of acceptance/normalisation of *one*-child families then we might need to re-examine the extent to which these advanced Asian economies have, indeed, fallen into the ‘Low Fertility Trap.’ This evidence, combined with the data showing declining mean ideal family size in East Asia lends further support to the suggestion that there is little context to see an immediate and

⁸ A plan to perform a qualitative analysis of fertility intentions in Taiwan is planned for 2012-2014 as a joint exercise between the University of Oxford and the National Taiwan University.

constant up-turn in TFRs as forecast by the UN's BHM model under current socioeconomic, policy and cultural conditions.

5: Feedback effects to increase fertility from low levels are far from certain

In the first section we questioned the extent to which there was any strong theoretical underpinning behind the idea of fertility increase in Asia within the UN model apart from following the past experience of other countries. We also discussed the theoretical basis for assuming a universal fertility convergence – if at all – on around two children per woman (or 1.85 depending on the series of UN projections used). A further theoretical consideration revolves around the possibility of feedback effects which we briefly explore in this section. In general, feedback effects can be examined in a number of ways – firstly through short-term societal mechanisms or responses to changing demographic circumstances, or longer-term effects under conditions of heading towards a homeostatic population system.

General feedback mechanisms

In their responses to the UN's *World Population to 2300*, Demeny, Dyson and Coleman each make pointed observations regarding the possible impact of feedback effects in population projections (UNDESA, 2004). In particular, Demeny observed that the UN's medium projections 'implicitly assume that the trend toward lower birth rates...will elicit negative feedbacks that by the middle of the twenty-first century will bring fertility back to near-replacement levels everywhere.' However, Demeny also observed that *positive* feedbacks were 'equally plausible...reinforcing a tendency for further falls in fertility.' As a consequence of population ageing, individuals needing to provide for their old age have an

increased incentive to accumulate human capital, savings and to acquire pension benefits. This could result in the institutionalisation of many of elements we have seen above driving low fertility in East Asia. Furthermore, as Demeny concludes, the *deus ex machine* of pronatalist population policy has been shown to have rather limited impacts to rectify this (Demeny, 2004).

The Low Fertility Trap

The ‘Low Fertility Trap’ hypothesis is a more developed elucidation of possible feedback effects under a given set of scenarios (Lutz, 2008; Lutz et al., 2006a). This formulation is demonstrated in *Figure 6* below. Here, LFT-1 (demographic mechanisms) concerns population dynamics and negative population growth leading to fewer women of reproductive age and, hence, fewer births. LFT-2 (sociological mechanisms) concerns social norms relating to ideal family size and fertility intentions. This assumes that, through socialisation and social learning, family size ideals are influenced by the experiences of younger people. Hence in an environment with few children (e.g. siblings, larger families), children will figure less prominently in their own image of a desirable life. Finally, LFT-3 (economic mechanisms) concerns economic reasoning and, in particular, the impact of ageing societies on pessimism among the young regarding their own economic opportunities and chance for receipt of limited state funds. This – combined with overall improvements in standard of living and widening consumption opportunities – can lead to an ever greater gap between aspirations and income; a gap which childbearing would only further exacerbate, net of emotional gains. Should each of these conditions be met, then increasing fertility would, according to the authors, prove to be extremely difficult.

Density?

A final possible feedback effect suggested by some scholars revolves around the relationship between population density and fertility. Lutz et al., using fixed effects models on the time series of 145 countries and controlling for key social and economic variables, found a consistent and significant negative relationship between both human fertility and fertility preferences and population density (Lutz et al., 2006b). In this vein, it has been observed that ‘...it is conspicuous that the very low-density regions of Northern Scandinavia have significantly higher fertility than the high-density areas of Central and Southern Europe’ (Testa, 2004).

Figure 7 demonstrates the current population density in four East Asian advanced economies and the projections to 2100 based upon the UN’s *WPP2010*. For comparison, six other countries with varying fertility rates are included. Firstly, the high overall population density of the Asian countries is clear. This could, indeed, be another factor in shaping contemporary fertility. Secondly, while negative population growth will set in some of these Asian countries over the next century, the impact upon population density is slight, thus diminishing the possibility of population decline and reduced density causing a fertility upswing by 2050.

There are, of course, many possible criticisms and inconsistencies in the population density argument. In *Figure 7*, for example, we see countries such as the UK and the Netherlands with very high population density which we know have correspondingly high fertility rates – in comparison to East Asian settings and other European countries. Similarly, if we were to include China we would see extremely low density rates, certainly relative to fertility. However, there are good reasons to consider the evidence from animal ecology which places a

strong emphasis on the phenomenon. As such, it is perhaps worth considering as a possible ‘add-on’ to the more socially determined influences on fertility. In this setting, therefore, the high density of population in East Asian settings could perhaps be playing a role in maintaining low fertility there, while reductions in density to 2050 in some settings will not be large enough to have a large enough feedback effect on increasing fertility.

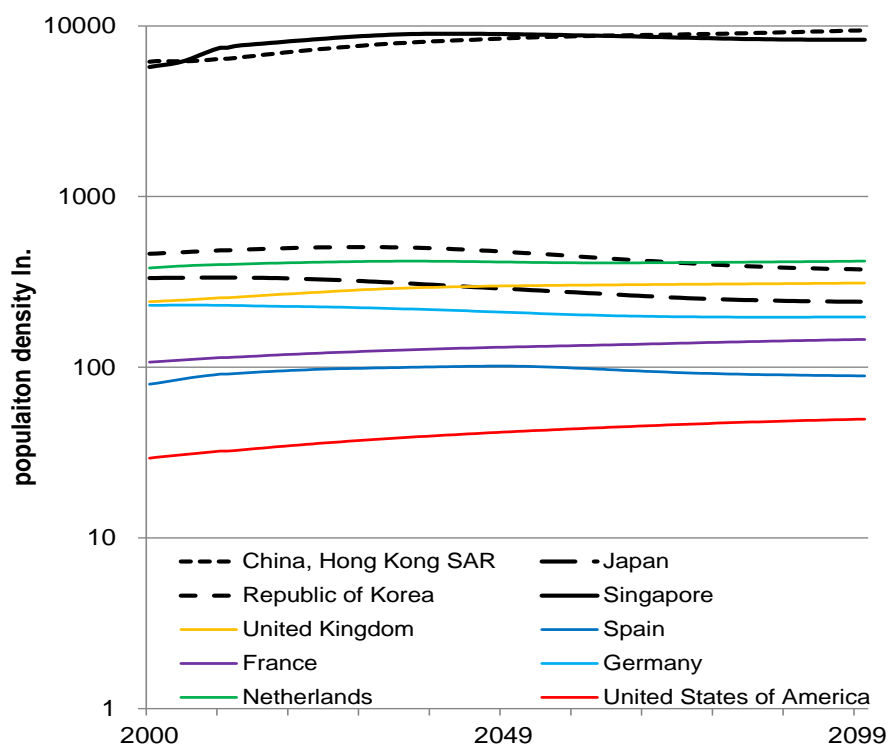


Figure 7. Population density in selected countries, logarithmic scale, calculated from UN WPP2010, persons/km²

Source: (UNPD, 2011b)

A role for feedback effects?

Clearly, building complex feedback effects into long-range population projections is fraught with difficulties and dangers (Cohen, 1998). However as Sanderson argues, this should not

remove our obligation to think about inter-relationships between variables and constraints (Sanderson, 1998). The projections for which Demeny asserts there is some inherent feedback effect built in are, of course, of a very different nature than those produced by the BHM in the 2010 *WPP*. However, the question does still remain and is worth answering. The empirical evidence seems to suggest that such a feedback effect on *increasing fertility* in East Asian economies seems unlikely to 2050, at least in the absence of wide scale social and economic change.

Conclusions

In this paper we have drawn together five reasons – or groups of reasons – which substantiate our claim to challenge the future trajectory of certain key advanced Asian economies as derived from the model used in the UN's *WPP2010*. To recapitulate:

1. Regionally used assumptions regarding the future trajectories of fertility are significantly lower and should not be simply ignored.
2. The academic literature on low fertility in these countries strongly suggests that their experience is different from Europe where fertility recuperated largely as a consequence of tempo distortion. Rather, unless wide scale social, economic and policy reform is forthcoming, the kinds of fertility increases suggested by the UN's model will not occur. There is strong evidence and a large body of opinion to suggest that such wide scale reform is only slowly being developed and could be hard to implement.

3. A panel of internationally respected meta-experts on fertility, drawing upon a global survey of population experts, concluded that TFR increases across East Asia would, indeed, be much slower than the UN *WPP* model predicts.
4. New evidence concerning fertility intentions and ‘planned fertility’ strongly suggests the growing normalisation of the one-child family, the growing acceptance of voluntary childlessness and the strong move away from intending to have more than two children in some key advanced Asian economies.
5. Feedback effects from low fertility in East Asia are just as likely to keep fertility low as to force them to increase.

Together, these seem to be a compelling set of *qualitative* arguments to suggest that East Asia may not, after all, follow those countries which preceded it on the fertility transition and, hence, that the trajectory designed by the UN is, in this case, strongly likely to be wrong.

We have tried to argue in this paper that the projected trajectories of TFR in certain East Asian economies as predicted by the UN’s model and used as assumptions in the UN’s latest round of global population projections are at odds with the empirical evidence from these regions. Evidence from local statistical offices, the academic literature, a panel of experts and a fresh look at fertility intentions has been employed to substantiate this claim. In particular, we feel that while the statistical model may *predict* a sustained fertility increase in Pacific Asia based upon a fundamentally *European* perspective of fertility transition, the *qualitative* evidence from *Asia* strongly suggests that this is unlikely to be the case.

However, we feel it is important to conclude with why any of this really matters. Firstly, there is clearly an issue relating to estimating the future of global and regional population. Altering the fertility rates in the assumptions in the world’s most widely cited population projections

would clearly have important effects on the total population size and structure of the individual countries concerned and, because of the sheer numbers involved in China in particular, at a global level. In Zhao and Chen's projections of China using the lower fertility rates for the period 1995-2010 *but then reverting back to the higher, UN TFRs generated by the model*, the difference in total population size of China by 2050 is almost 60 million people (Zhao and Chen, 2011). That such a large number of people can be added or subtracted by simply altering recent *trends* of fertility let alone future trajectories is telling. Furthermore in this context one should not fall into the trap of thinking that 60 million people next to a population of 1.4 billion is small fry. In a world of increasing consumption and energy/land/water use, the addition of the current population of the United Kingdom into a developed economy over the next 38 years is not insignificant.

Secondly, to return to the theoretical discussion in the first section, in questioning the predicted prolonged and immediate upturn in fertility in East Asia, the exercise necessarily questions the BHM itself and the notion of a set trajectory of fertility transition towards convergence. Has the fertility transition in Europe entirely run its course? And what is the evidence that East Asia, or indeed other parts of the world should follow its trajectory? Hong Kong, Korea, Singapore and China are *very* different to Sweden, the USA and France in so many ways – and their recent social, economic, political and cultural histories have been very diverse. If one is to anticipate divergent futures in these spheres, then why would we anticipate the demographic outcomes of fundamentally different societal movements to be the same? For example, Korea currently has high rates of economic growth, relatively low rates of structural deficit, some of the highest educational attainment rates in the world, a highly sophisticated industrial and service economy and extremely low mortality rates. It also has a fertility rate which has 'stabilised' at between 1.1 and 1.4 for the past decade. Is it not

possible to consider the possibility that Korea has reached the end of its fertility transition? Could one even go further to ask whether or not Korea or the United States/Sweden represent the end of the global fertility transition? While there are certainly biological and anthropological reasons to suggest that humans will still continue to reproduce, the total number of children that people will have is rather more empirically and theoretically unexplored (Foster, 2000, Basten, 2009).

Our final observation regarding why this matters is, possibly, the most important. The evidence presented here strongly suggests that if the *status quo* remains in East Asia regarding gender relations, policy interventions, working practices, educational expectations and general societal and political attitudes towards childbearing, fertility is highly likely to stay low. In order to achieve this serious, large-scale social and cultural change is required by policymakers, stakeholders, employers and the general public. The message from the BHM as it stands is that there is something ‘inevitable’ about fertility rebound and that in following the past experiences of Europe TFR in east Asia will rise in the short term. If this is interpreted as a ‘given’ in demographic change as endorsed by the United Nations, there is a real danger that this could contribute to complacency among the key stakeholders in the region. On the contrary, what is actually required is *action*. We would argue that there is nothing ‘inevitable’ about the increase of fertility in East Asia along the trajectory suggested by the UN’s model. Indicating otherwise could, indeed, be detrimental to changing the conditions which are keeping fertility so low.

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