Children and the Wealth of Nations*
(Preliminary)

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Abstract

The welfare of an individual depends on the quality and quantity of life. The quantity of life itself depends on longevity but also on the number of descendants. Specifically, children, grandchildren, etc, offer an alternative way to extend life for altruistic parents. Everything else equal, a lower fertility rate reduces the welfare of altruistic parents. This paper incorporates fertility into an overall assessment of the degree and evolution of cross-country inequality around the world and shows that it is quantitatively important. Our calculations suggest a major quantity-quantity trade-off: for the period 1970-2005, the overall welfare gains due to longevity improvements were mostly offset by the welfare loss due fertility reductions. The effective quantity of life remained roughly constant.

Keywords: fertility, children, welfare, quantity of life, world inequality
JEL classification: I10, I31, J17, O57

1 Introduction

It is well-recognized that GDP per capita provides an imperfect measure of average economic welfare in a country. As a flow measure, GDP describes the material *quality* of life in a given period but it is silent about the *quantity* of life, the number of years over which the flow of income is enjoyed. Thus, even if two countries share the same GDP per capita, average welfare is different if longevity differ in both countries. Recent works by Becker, Phillipson and Soares (2005), Jones and Klenow (2010), and Cordoba and Ripoll (2012) provide full measures of income that adjust for differences in life expectancy across countries and across time.

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The quantity of life, however, is not only determined by the life span of an individual. Altruistic parents also perceive their children as extensions of their own life and therefore parents increase their "effective" life span through their children, grandchildren, etc. The idea that longevity and children are equivalent is embedded in the "infinitely lived" model commonly used in macroeconomics which is often motivated by the analogy that it really represents a "dynasty," a sequence of finitely lived individuals who are linked by altruism. This idea is formalized by the Barro-Becker model of fertility (Becker and Barro 1988, and Barro and Becker 1989).

This paper uses quantitative versions of the Barro-Becker model to assess the significance of fertility for the welfare of countries across time and space. The presumption that fertility may substantially affect welfare evaluations is based on two facts. First, as illustrated in Figures 1 and 2, fertility has changed substantially over time and there are large differences in fertility across countries. Second, parents spend a significant fraction of their resources, wealth and time, in their children which suggests, at least from the point of view of altruistic models, that children are a major source of happiness and welfare. For example, the U.S. Department of Agriculture estimates that the total present value of expenses on a child born in 2009 for a middle-income husband-wife family with two children is $\$226,920$ in 2010 dollars (USDA, 2010, page 23). This is only a partial figure because it only includes direct parental expenses made on children through age 17 such as housing, food, transportation, health care, clothing, child care, and education, but excludes time costs and forgone earnings by parents, college costs and other costs after age 17.

To motivate the exercise, consider the one child policy in China. The idea of the policy is that controlling fertility helps eliminate poverty and alleviate social and environmental problems. Partly as a result of the policy, the total fertility rate dropped in 3.75 children between 1970 and 2005. During the same period, consumption per capita grew at an unparalleled rate of 5.77% per year, the largest in the period around the world. But is fertility control a welfare enhancing policy? After all, everything else equal, altruistic parents are better off by having more children. Is the observed consumption growth enough to compensate for the welfare loss due to lower fertility? This is the type of question this paper seeks to answer.

The core of the paper reports consumption equivalent measures of welfare for two calibrated versions the Barro-Becker model. The benchmark version uses the recent parameter estimates of Manuelli and Seshadri (2010). As second alternative version of the model is calibrated to match plausible values of statistical life and the value of children. The benchmark version turns out to place a strong weight on fertility and little weight on longevity while the alternative version places a more balanced weight on both. Our preferred model is the alternative but the benchmark also provides a plausible calibration.

The following are some of the main results. According to the benchmark model, while consumption per capita grew on average at an annual rate of 3.1% for the period 1970-2005 in a sample of 144 countries, welfare, measured in consumption equivalent units, grew only at an annual rate of 0.5%. The alternative model, in the other hand, suggests that consumption growth is a good proxy for welfare growth. The surprising result here is that the welfare gains due to more longevity, of around 12 years on average, were mostly offset by the welfare loss due to lower fertility, a loss of 2.62 children on average. The alternative model suggests that the "effective" quantity of life, one that takes into account longevity and fertility, remained roughly constant during the period 1970-2005, this in spite of the large longevity gains.

The case of Asian miracles is particularly telling. According to the benchmark model, welfare growth in fast growing countries such as China, South Korea, Indonesia, Malaysia and Thailand was not higher than in the U.S. once the effect of fertility reductions is taken into account. The alternative model suggest that welfare growth was similar to consumption growth because the large welfare gains due to additional longevity were offset by fertility reductions. For the case of China, the alternative model suggests that welfare growth in China was below consumption growth by about 0.6% per year in the period 1970-2005.

This paper makes part of a growing literature that goes beyond GDP per capita as a measure of welfare. In addition to the papers already mentioned, this literature includes, among others: Cordoba and Verdier (2007), who consider inequality; Hall and Jones (2011) who consider adjustments for life span, inequality, leisure and consumption; the Stiglitz Commission (see Stiglitz, Sen and Fitoussi, 2009) who consider a variety of adjustments. To the extent of our knowledge, this is the first paper to consider adjustments for fertility changes.

2 A Benchmark Model

2.1 The Model

Consider a representative individual who lives T periods, consumes c per period and has n offsprings at age F. The utility of the individual is given by

$$V(c,n,T) = \sum_{t=0}^{T} \beta^t u(c) + \alpha\beta^F n^{1-\varepsilon} V'\left(c',n',T'\right), \tag{1}$$

where the prime superscript refers to variables associated to the offsprings. In this formulation, β is a pure time discount factor, $u(\cdot) \geq 0$ is a per period utility function, and $\alpha n^{1-\varepsilon}$ is the weight parents give to their children's welfare, a weight that increases with the number of children but at a decreasing rate: $\alpha \geq 0$ and $0 \leq \varepsilon \leq 1$. This formulation is due to Becker and Barro (1988) and Barro and Becker (1989).

We focus on a steady situation in which parents' and children's welfare is identical. In order for lifetime utility to be bounded, the parameter restriction $1 > \alpha\beta^F n^{1-\varepsilon}$ is needed. This condition defines an upper bound for the number of children:

$$n_{\max} = \left(\frac{1}{\alpha\beta^F}\right)^{\frac{1}{1-\varepsilon}}. \tag{2}$$

In steady state, $V(c,n,T)$ can be solved from (1) as:

$$V(c,n,T) = \frac{u(c)}{1-\beta}\frac{1-\beta^{T+1}}{1-\alpha\beta^{F}n^{1-\varepsilon}}. \tag{3}$$

This expression states that welfare increases with c, n and T. In this formulation, c describes the quality of life while T and n represent the quantity of life along two dimensions that can be termed the intensive, T, and the extensive margins, n. Given specific functional forms, (3) can be used to calculate the welfare at birth of a representative individual in a given country at a given time using realized values of c, n and T. Moreover, by making the proper transformation, welfare can be expressed in terms of consumption equivalents.

Two important concepts that will be used to discipline the quantitative exercise below are the willingness to pay for life extensions at the intensive margin, T, and the extensive margin, n.

2.2 The Value of Life

The willingness to substitute quality for quantity of life determines the economic value of life extensions. Function $V(c,n,T)$ can be used to calculate such values.

The value of a life year is the willingness to substitute consumption for an extra year of life. At the margin, it is defined as:

$$\frac{\partial c}{\partial T} = \frac{\partial V/\partial T}{\partial V/\partial c} = -\ln\beta\frac{\beta^{T+1}}{1-\beta^{T+1}}\frac{c}{\gamma(c)} \tag{4}$$

where $\gamma(c) = \frac{u'(c)c}{u(c)}$ describes the curvature of u. Notice that the willingness to pay for a year of life decreases with T, increases with the curvature of u and is proportional to c when $\gamma(c) = \gamma$, which is the case assumed below.

A related concept is that of the Value of Statistical Life, VSL, which is used in the context of stochastic life span and defined as the willingness to substitute consumption for extra survival probability (See Cordoba and Ripoll 2012 for more details). In order to relate to that concept, suppose for a moment that $T = \frac{1}{1-\pi}$ where π is an annual survival rate rate and T defined this way is life expectancy. Then the value of statistical life is given by:

$$VSL = \frac{\partial c}{\partial \pi} = \frac{\partial c}{\partial T}\frac{\partial T}{\partial \pi} = \frac{\partial c}{\partial T}T^{2} \tag{5}$$

The willingness to substitute consumption for an extra child is defined as:

$$\frac{\partial c}{\partial n} = \frac{\partial V/\partial n}{\partial V/\partial c} = \frac{\beta^{F}n^{-\varepsilon}}{1-\alpha\beta^{F}n^{1-\varepsilon}}\frac{\alpha(1-\varepsilon)}{\gamma(c)}c.$$

The willingness to pay decreases with n as long as $n \leq \left(\frac{\varepsilon}{\alpha\beta^{F}}\right)^{1/(1-\varepsilon)} < n_{\max}$, increases with the curvature of u and is proportional to c when $\gamma(c) = \gamma$.[1] The value of a child, VC, can be defined as the present value of this flow,

$$VC \equiv \beta^{-F} \sum_{t=0}^{T} \beta^t \frac{\partial c}{\partial n} = \beta^{-F} \frac{1-\beta^{T+1}}{1-\beta} \frac{\partial c}{\partial n} \tag{6}$$

which is defined in terms of age-F consumption units, the time at which the child is born.

2.3 Welfare Measures in Consumption Equivalent Units

In this section we use (3) to define consumption equivalent measures of welfare.

Welfare Measures Across Countries

Consider the welfare of a representative individual in a certain country i relative to the welfare of a representative individual in the United States. A consumption equivalent measure of relative welfare, λ_i, can be defined as the factor by which consumption of a representative individual in the U.S. must be multiplied to obtain the same welfare of a typical individual in country i. Formally, λ_i is implicitly defined by the condition:

$$V(\lambda_i c_{US}, n_{US}, T_{US}) = V(c_i, n_i, T_i).$$

Thus, for example, $\lambda_i = 0.5$ means that a representative individual in the U.S. is indifferent between a 50% permanent drop in consumption, keeping U.S. fertility and life span, or the consumption, fertility and life span of country i. One can define analogous welfare measures for individual components as follows:

$$V(\lambda_i^c c_{US}, n_{US}, T_{US}) = V(c_i, n_{US}, T_{US});$$

$$V(\lambda_i^n c_{US}, n_{US}, T_{US}) = V(c_{US}, n_i, T_{US}).$$

$$V(\lambda_i^T c_{US}, n_{US}, T_{US}) = V(c_{US}, n_{US}, T_i);$$

In words, λ_i^c, λ_i^T, and λ_i^n are the factors by which U.S. consumption must be multiplied to equalize welfare between the U.S. and an hypothetical country that is similar to the U.S. except in one component, either consumption, fertility or life span, which value is set to country's i value. Thus, for example, $\lambda_i^T = 0.5$ means that the representative U.S. individual is indifferent between a 50% permanent drop in consumption, keeping U.S. fertility and life span, or the life span of country i keeping U.S. consumption and fertility rate. λ_i^c is the most common indicator of relative welfare but it only describes differences in welfare due to consumption differences but not on fertility or life span differences.

[1] That the williginess to pay for a child can increase with number of children in the Barro-Becker model is due the fact that the weight that parents can place on their children is unbounded. Cordoba and Ripoll (2011) consider an alternative, termed *exponential discounting*, which is bounded.

The following explicit solutions for the welfare ratios are found by using (3) and the definitions above:

$$\lambda_i^c = \frac{c_i}{c_{US}},\ \lambda_i^T = \left[\frac{1-\beta^{T_i+1}}{1-\beta^{T_{US}+1}}\right]^{1/\gamma},\ \lambda_i^n = \left[\frac{1-\alpha\beta^F n_{US}^{1-\varepsilon}}{1-\alpha\beta^F n_i^{1-\varepsilon}}\right]^{1/\gamma}$$

and

$$\lambda_i = \lambda_i^c \lambda_i^T \lambda_i^n.$$

An alternative way to define welfare measures is to adjust country's i consumption rather than U.S. consumption, what Klenow and Jones (2010) call compensated variation as opposed to an equivalent variation. The compensated variation measure is implicitly defined by the equation:

$$V(c_{US}, T_{US}, n_{US}) = V(c_i/\lambda_i, T_i, n_i).$$

Fortunately equivalent and compensated variations are identical in our set up due to the assumed functional forms (in particular additive separability and a power per-period utility function).

Welfare Measures Across Time

Under some additional assumptions the previous set up can be used to compute the evolution of welfare over time for a given country i. Suppose economy i is in a steady state at time 0 with the allocation $[c_{i0}, n_{i0}, T_{i0}]$. At a later period t the economy moves to a new steady state $[c_{it}, n_{it}, T_{it}]$. The welfare gain can be measured by the factor λ_i by which time-0 consumption must be multiplied to equalize welfare in both steady states. Formally, λ_i is implicitly defined by:

$$V(\lambda_i c_{i0}, n_{i0}, T_{i0}) = V(c_{it}, n_{it}, T_{it}).$$

λ_i measures the overall welfare gain during the period due to changes in consumption, fertility and life span. One can define similar welfare measures for each single component as follows:

$$V(\lambda_i^c c_{i0}, n_{i0}, T_{i0}) = V(c_{it}, n_{i0}, T_{i0});$$

$$V(\lambda_i^n c_{i0}, n_{i0}, T_{i0}) = V(c_{i0}, n_{it}, T_{i0}).$$

$$V(\lambda_i^T c_{i0}, n_{i0}, T_{i0}) = V(c_{i0}, n_{i0}, T_{it});$$

The corresponding formulas are

$$\lambda_i^c = \frac{c_{it}}{c_{i0}},\ \lambda_i^T = \left[\frac{1-\beta^{T_{it}+1}}{1-\beta^{T_{i0}+1}}\right]^{1/\gamma},\ \lambda_i^n = \left[\frac{1-\alpha\beta^F n_{i0}^{1-\varepsilon}}{1-\alpha\beta^F n_{it}^{1-\varepsilon}}\right]^{1/\gamma}$$

and

$$\lambda_i = \lambda_i^c \lambda_i^T \lambda_i^n.$$

3 Data and Calibration

3.1 Data

Cross country data

Data for 143 countries for the period 1960-2005 was assembled using consumption data from the Penn World Table Version 7.0. and fertility and longevity data from the World Development Indicators. Unless stated otherwise, 2005 prices are used.

The cost of raising a child

To discipline the calibration below, it is convenient to compare the implied willingness to pay for a child derived from the model against existing estimates about the cost of raising children. Standard economic arguments would suggest that both values must be similar if fertility decisions are nearly optimal. Table 1 summarizes the main calculations that follow.

The U.S. Department of Agriculture estimates that the total present value of expenses on a child born in 2009 for a middle-income husband-wife family with two children is $226,920 in 2010 dollars (USDA, 2010, page 23). These expenses include direct parental expenses made on children through age 17 such as housing, food, transportation, health care, clothing, child care, and education. Major items excluded are the time costs and forgone earnings by parents, college costs and other costs after age 17. Moreover, the estimate implicitly assumes a zero real interest rate. If instead an interest rate of 4% is used then the total cost of raising a child up to age 17 would be of $163,222 in present value. The baseline calibration below assumes an 4% interest rate.

Adjustments for time costs of child rearing and college costs can be made. Regarding time costs, Folbre (2008, pg) estimates an average amount of parental-care hours per child from birth to age eleven of about 40 hours per week which comes to around 2,080 hours per year for both parents. In the other hand, the Bureau of Labor and Statistics[2] estimates that the median hourly wage for all occupations was $16.27 in 2010. These figures suggest an annual time cost of raising children for both parents of $33,841 up to age 11. Folbre does not provide estimates for time costs after age 11. For the calculations below, I assume time costs between ages 12-17 to be 1/3 of the costs at earlier ages. As a result, the present value of time costs of rising a child until age 17 is $367,000.

Regarding college costs, the College Board (2011) estimates net costs of attending college in different type of institutions. Net costs includes tuition, fees, room and board minus grant aid from all sources, federal education tax credits and other deductions. The estimated annual costs for Full-Time Undergraduates in a Public Four-Year institution is $11,380, $6,600 in a Public Two-Year institution, and $23,060 in a Private Nonprofit Four Year institution for the

[2] http://www.bls.gov/oes/current/oes_nat.htm#00-0000

2011-12 academic year. Enrollment in those institutions are 44%, 26% and 19% respectively which represents 89% of the total enrollment. The average cost for a 4 year college is $\$14,902$. These figures suggests college costs of around $\$27,352$ in present value at time of birth which would allow to finance annual expenditures of $\$14,902$ for four years starting at age 18.

In summary, the present value at birth of the cost of raising a child for a middle-income family with two children, including college costs and parental-time cost, is in the order of $\$640,000$ for both parents or $\$320,000$ per parent. These calculations assume annual returns of around 4%. The costs per parent are in the order of $\$370,000$ per parent if a return of 2% is assumed instead.

The Value of Life Year and the Value of Statistical Life

There is a large literature estimating the value of statistical life. The VSL is often estimated from wage differential across occupations with different mortality risks or from market prices for products that reduce fatal injuries. Actual estimates of the VSL range between $4 to $9 million for a 40 year old male (Viscusi 1993, Viscusi and Aldy 2003). Cordoba and Ripoll (2012) estimate a willingness to pay for an extra year of life as fraction of consumption, $\frac{dc/dT}{c}$, of around 2.5% in the US, a value that is consistent with a VSL of around $4.8 million in 2005 prices.

3.2 Calibration

Benchmark Calibration

Manuelli and Seshadri (2010), MS henceforth, have recently calibrated the Barro-Becker model. We adopt MS's calibration as our benchmark. MS assume the following functional forms and parameter values: $u(c) = c^{\gamma}$, $\gamma = 0.38$, $\alpha = 0.8$, $\varepsilon = 0.35$, $\beta = 0.96$, and $F = 25$. MS estimate these and other parameters by matching targets for the U.S. and/or OECD countries. The crucial parameters α, ε and γ are identified as part of a larger system that includes as relevant targets a per-capita fertility rate of 1.05 (or a 2.1 fertility rate per women), a ratio of intergenerational transfers to GDP of 4.5%, and a capital-output ratio of 2.52. The parameter β is not estimated but set to a seemingly standard value.

MS defines n to be the total fertility rate divided by 2 but in our framework n is the total number of children[3]. To make the MS calibration consistent with our framework all what is needed is to re-scale α by the factor $2^{\epsilon-1}$ so that n is the total number of children. The resulting α is 0.5, instead of 0.8, and

[3]The relevant number of children in the Barro-Becker framework is the total fertility rate. This is because the utility of a representative woman depends on her per-capita consumption but also on her total number of children, not half of the children. In other words, altruism implies that the welfare of a child is a non-rival good for the parents. For example, if a couple is perfectly altruistic toward their only child then a one util increase in the welfare of the child increases the welfare of each parent in one util too.

the maximum number of children per women, $n_{\max}$, is 13.4, which uses (2).[4] In summary, our baseline calibration uses MS's parameters but with two changes: $\alpha = 0.5$ and n is defined as the total fertility rate.

Given the assumed parameter values and country specific consumption and fertility rates, equations (5) and (6) can be used to calculate the implied value of life. Consider the U.S. Consumption per capita in 2010 was $\$33,038$, according to the Bureau of Economic Analysis, while the total fertility rate is around 2.1. The implied Value of Statistical Life is $\$940,416$ which is well-below the $\$4 - 9$ millions range of existing estimates. This value implies that the representative household would be willing to give only 0.47% of their annual consumption every year in exchange for an additional year of life, a rate significantly below the 2.5% estimated by Cordoba and Ripoll (2012). In the other hand, the value of a child implied by the model is $\$760,567$ while the cost of raising a child estimated above is in the order of $\$320,000$. In conclusion, the baseline model seems to undervalue gains in life expectancy and overvalue changes in fertility.

Alternative Calibration

We consider an alternative calibration that seeks to match evidence on the value of life as follows. First, we pick the curvature of the utility function, γ, in order to obtain a value of statistical life of \$5 million in 2010 dollars. This target turns out to be similar to requiring a willingness to pay of 2.5% of annual consumption permanently for an extra year of life. Second, we reduce the interest rate to 2% which is more in line with the evidence about riskless interest rates in the U.S. This lower interest rate also increases the cost of raising a child, which in present value translates to around $\$370,000$. Finally, we pick α so that the willingness to pay for a child is also $\$370,000$. Other parameters are left unchanged.

The resulting parameters are $\gamma = 0.2106$ and $\alpha = 0.105$. Compare with the benchmark values of 0.38 and 0.5: the curvature of the utility function increases and the weight of children in the utility of the parents decreases significantly. The curvature of the utility function is similar to the one used by Becker et al. (2005) and within the range of plausible values documented by Browning et al. (1999, pg. 614).

The following section reports welfare measures for both calibrations.

4 Results

4.1 Welfare Across Time

This section assess how standard results of economic growth are affected by changes in life span and fertility for the period 1970-2005. During such period

[4] All results are identical if n is reinterpreted in our model as the total fertility rate divided by 2 and α is set to 0.8.

there was significant consumption growth in many countries as well as large gains in life expectancy but also major declines in fertility rates.

Baseline model

Table 2 summarizes the overall results regarding economic and welfare growth for the period 1970-2005 for 144 countries and for the benchmark calibration. During that period, consumption multiplied by a factor of 2.96 on average, weighted by population, across the world for an annual growth rate 3.1%. During the same period the total fertility rate dropped in 2.64 children on average while average life expectancy increased in around 12 years.

According to the baseline model, the sole effect of longer life expectancy is equivalent to a 13% additional consumption growth during the whole period ($\lambda^T = 1.13$), or 0.3% higher annual consumption growth. In the other hand, the reduction in fertility is equivalent to a consumption drop of 58% during the whole period ($\lambda^n = 0.42$), for annual growth rate of -2.4%! As a result, according to the benchmark model, while consumption multiplied by a factor of 2.96 during the period 1970-2005, welfare multiplied only by a factor of 1.21 for an annual growth rate of 0.5%, well below the 3.1% rate of consumption growth. The result is even more striking for the median country for which welfare actually shrunk 14% during the period ($\lambda = 0.86$).

The results in Table 2 are probably too strong for fertility and too weak for longevity, as the alternative calibration will make clear. However, these results illustrate the potential significant effect of taking fertility into consideration in welfare calculations as increasing consumption growth through fertility reduction is not a free lunch. It is important to stress that the results in Table 2 are based on parameters values that have been deemed plausible.

Table 3 shows more detailed results for the 45 most populated countries for the period 1970-2005. The overall results for this reduced sample are similar to the ones obtained for the 144 countries. Individual cases, however, are particularly telling. Consider the case of China for example. According to standard national accounts, consumption multiplied by a factor of 5.77 during the period, or 5.1% annually, life expectancy increased by 10.6 years while total fertility felt in 3.75 children. According to the baseline model, gains in life expectancy increases welfare in 8% while the fall in fertility decreases welfare in almost 74%! As a result, welfare has multiplied by a factor of 1.63, or 1.4% annually, which is significantly lower that the growth rate of consumption. Similar results are obtained for other Asian miracles such as South Korea, Indonesia, Malaysia and Thailand: taking into account the negative effect of falling fertility, welfare growth is not particularly high in those countries.

Alternative model

Table 4 summarizes the overall results for the alternative model. Under the alternative calibration changes in longevity are more valuable while changes in fertility less valuable than under the baseline. As a results, the model predicts that the sole effect of longer life expectancy is equivalent to a 65% additional consumption growth during the whole period ($\lambda^T = 1.65$), or 1.4% higher annual consumption growth, while the reduction in fertility is equivalent to a consumption drop of 31% during the whole period ($\lambda^n = 0.69$), or 1.1% lower annual consumption growth. Overall, the baseline model suggests that negative effect of lower fertility mostly cancels out the positive effect of higher longevity so that the growth rate of consumption per capita is a good proxy for the growth rate of individual welfare. In the alternative model, average effective life span, one that adjusts for fertility, did not change significantly during the 1970-2005 period.

Table 5 shows more detailed results for the 45 most populated countries for the period 1970-2005. Again, the overall results for the reduced sample are similar to the ones obtained for the whole sample, but some individual cases show significant differences. While consumption growth describes well welfare growth in South Korea and Malaysia, welfare growth in China is below consumption growth by about 0.6% per year. The most significant upward revisions are for Nepal, Indonesia, and Mozambique, places with particularly significant gains in life expectancy. Morocco exemplifies an extreme case in which the effect on welfare of a significant increase in life expectancy, of almost 19 years, is counter acted almost perfectly by a major decline in fertility, of 4.64 children.

4.2 Welfare Across Countries

This section assess how standard results about income differences across countries are affected by differences in life span and fertility for 2005. The evidence here indicates that poorer countries have significantly lower income, lower longevity but also higher fertility. The implied adjustment for cross country welfare are not as strong as the ones for growth because demographic differences across countries in 2005 are not as large as the demographic changes that took place during the 1970-2005 period.

Baseline model

Table 6 shows the overall results for the 144 countries under the baseline calibration. Compared to the U.S., the average country, weighted by population, has 0.6 more children, 9.2 fewer years of longevity and consumes 19% of U.S. consumption. According to baseline calibration, welfare relative to the U.S. is on average 27% higher than what is suggested by consumption per capita ($\lambda/\lambda^c = 1.27$). Table 7 shows more detailed results for the 45 most populated countries. Major upward reassessments, equivalent to multiplying consumption per capita by more than 3 times, are obtained for countries that are particularly poor and have high fertility rates such as Uganda, Afghanistan, Congo, Nigeria and Mozambique (see last column, λ/λ^c). Significant downward reassessments, equivalent to more than 20% reduction in per-capita consumption, are obtained for countries with low fertility rates such as South Korea, Poland, Romania, Japan or Germany.

Alternative model

Table 8 shows the overall results for the 144 countries for the alternative calibration. According to the alternative model, welfare relative to the U.S. is on average 28% lower than what is suggested by consumption per capita ($\lambda/\lambda^c = 0.82$). The main driving force in this result is the lower life expectancy which is partly offset by higher fertility. Table 9 shows more detailed results for the 45 most populated countries. Contrary to the benchmark, there are no major upward reassessments but only significant downward reassessments, according to the last column in the table. The most significant ones are those of South Africa, Afghanistan, Mozambique, Nigeria, Congo and Kenya, mostly due to their shorter life span. Looking at column for λ^n it is also clear that the higher fertility in those same countries prevented a much deeper reassessment.

5 Conclusion

[to be written]

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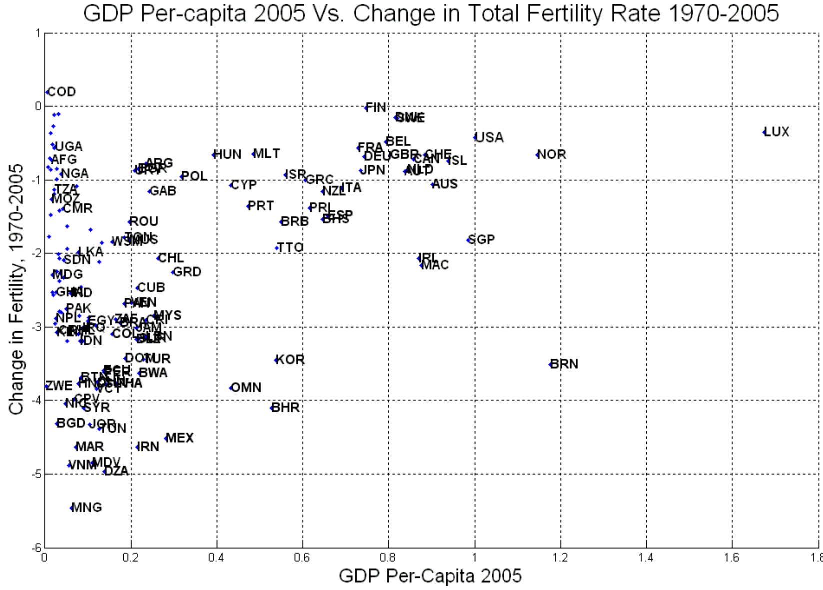
GDP Per-capita 2005 Vs. Change in Total Fertility Rate 1970-2005



Total Fertility Rate Versus GDP Per-Capita, 2005

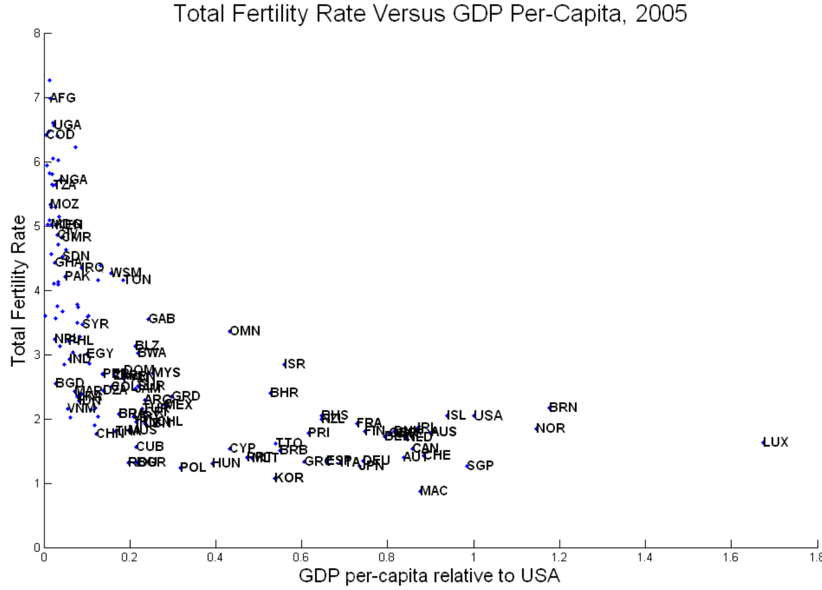


Table 1
Costs of raising a child
Middle income wife-husband family with 2 children

age	year	$(1+r)^{-age}$	Basic Costs (1)	Time cost (2)	College costs (3)	Total
0	2010	1.00	11,950	41,600	-	53,550
1	2011	0.98	11,950	41,600	-	53,550
2	2012	0.96	11,950	41,600	-	53,550
3	2013	0.94	11,980	41,600	-	53,580
4	2014	0.92	11,980	41,600	-	53,580
5	2015	0.91	11,980	41,600	-	53,580
6	2016	0.89	11,880	41,600	-	53,480
7	2017	0.87	11,880	41,600	-	53,480
8	2018	0.85	11,880	41,600	-	53,480
9	2019	0.84	12,660	41,600	-	54,260
10	2020	0.82	12,660	41,600	-	54,260
11	2021	0.80	12,660	41,600	-	54,260
12	2022	0.79	13,340	13,867	-	27,207
13	2023	0.77	13,340	13,867	-	27,207
14	2024	0.76	13,340	13,867	-	27,207
15	2025	0.74	13,830	13,867	-	27,697
16	2026	0.73	13,830	13,867	-	27,697
17	2027	0.71	13,830	13,867	-	27,697
18	2028	0.70	-	-	14,903	14,903
19	2029	0.69	-	-	14,903	14,903
20	2030	0.67	-	-	14,903	14,903
21	2031	0.66	-	-	14,903	14,903
total PV			$ 191,719	$ 511,203	$ 40,525	$ 743,446

(1) Source: USDA "Expenditures on Children by Family", 2010, Table 1. Costs of raising a second child for a middle income family with 2 children. Costs includes housing, food, transportation, health care, clothing, child care, education and miscellaneous goods and services.
(2) Source: Folbre (2008) and author's calculations. Assumes a time investment of 40 hours per week until age 11 and 40/3 hours from ages 12-17 for both parents, and an hourly wage of $16.27
(3) Source: College Board (2011). Colleges costs are average in a four-year institution and includes tuition, fees, room and board minus grant aid from all sources, federal education tax credits and other deductions.

Table 2
Welfare Growth Calculations: 1970-2005
Statistics for a sample of 144 countries
Benchmark calibration

	POP 2005 (000)	1970			2005			Δn	ΔT	λ^c	λ^n	λ^T	λ	λ/λ^c
		n	c	T	n	c	T							
Average, unweigted	40,983	5.35	3,530	57	3.18	7,034	67	-2.16	10.3	2.00	0.50	1.12	1.04	0.55
average, pop-weighted		5.30	2,740	57	2.65	6,025	69	-2.64	11.9	2.96	0.42	1.13	1.21	0.47
median	9,159	5.98	1,645	56	2.69	3,706	71	-2.07	9.8	1.74	0.46	1.09	0.86	0.51

n=total fertility rate, c=consumption per-capita in 2005 dollars, T=life expectancy

Table 3
Welfare Growth Calculations: 1970-2005
45 Most Populated Countries
Benchmark Calibration

Country Name	POP 2005 (000)	1970 n	1970 c	1970 T	2005 n	2005 c	2005 T	Δn	ΔT	λ^c	λ^n	λ^T	λ	λ/λ^c
China	1,297,765	5.5	368	62	1.76	2,127	73	-3.75	10.6	5.77	0.26	1.08	1.63	0.28
India	1,090,973	5.5	652	49	2.93	1,569	63	-2.54	13.9	2.41	0.40	1.19	1.14	0.47
United States	295,753	2.5	15,209	71	2.05	32,231	78	-0.43	6.9	2.12	0.86	1.04	1.90	0.90
Indonesia	228,896	5.5	438	48	2.28	2,219	70	-3.19	22.1	5.07	0.32	1.28	2.06	0.41
Brazil	188,993	5.0	3,160	59	2.08	5,962	72	-2.95	13.1	1.89	0.35	1.11	0.74	0.39
Pakistan	169,279	7.0	928	54	4.21	1,659	66	-2.75	11.3	1.79	0.33	1.12	0.67	0.37
Bangladesh	144,139	6.9	814	44	2.55	882	65	-4.32	20.5	1.08	0.19	1.32	0.28	0.26
Nigeria	137,495	6.6	1,239	40	5.70	1,172	47	-0.92	6.9	0.95	0.68	1.16	0.75	0.79
Japan	127,537	2.1	8,601	72	1.26	20,421	82	-0.88	10.0	2.37	0.73	1.05	1.83	0.77
Mexico	106,203	6.7	4,990	61	2.21	9,152	74	-4.51	13.1	1.83	0.18	1.10	0.37	0.20
Philippines	90,436	6.3	1,278	57	3.22	2,047	71	-3.05	13.8	1.60	0.32	1.13	0.57	0.36
Vietnam	84,425	7.0	494	49	2.15	1,369	74	-4.88	24.8	2.77	0.16	1.28	0.56	0.20
Germany	82,439	2.0	10,204	70	1.34	20,643	79	-0.69	8.8	2.02	0.78	1.05	1.66	0.82
Turkey	72,674	5.6	3,698	56	2.16	7,618	71	-3.44	15.7	2.06	0.29	1.15	0.69	0.33
Egypt, Arab Rep.	72,544	5.9	1,312	50	3.01	3,265	70	-2.91	19.1	2.49	0.34	1.22	1.04	0.42
Iran, Islamic Rep.	72,283	6.6	2,192	54	1.95	4,790	71	-4.63	16.7	2.19	0.18	1.17	0.46	0.21
Thailand	64,235	5.6	1,201	59	1.80	4,463	68	-3.78	9.0	3.72	0.26	1.08	1.04	0.28
France	62,912	2.5	10,573	72	1.92	21,590	80	-0.56	8.2	2.04	0.82	1.04	1.75	0.86
Congo, Dem. Rep.	60,698	6.2	692	44	6.41	173	48	0.19	3.8	0.25	1.09	1.08	0.29	1.17
United Kingdom	60,487	2.4	11,467	72	1.78	26,644	79	-0.66	7.1	2.32	0.80	1.04	1.92	0.83
Italy	59,038	2.4	9,376	72	1.32	19,536	81	-1.11	9.2	2.08	0.68	1.05	1.48	0.71
Korea, Rep.	48,005	4.5	2,227	61	1.08	12,222	78	-3.45	17.2	5.49	0.30	1.12	1.82	0.33
South Africa	47,483	5.6	3,276	53	2.67	5,023	52	-2.90	-1.1	1.53	0.35	0.98	0.53	0.34
Spain	43,704	2.8	8,089	72	1.35	19,027	80	-1.49	8.2	2.35	0.59	1.04	1.46	0.62
Colombia	41,488	5.6	2,302	61	2.50	4,919	72	-3.10	11.4	2.14	0.33	1.09	0.76	0.36
Argentina	39,181	3.1	5,064	67	2.29	6,893	75	-0.79	8.2	1.36	0.76	1.05	1.09	0.80
Poland	38,558	2.2	4,441	70	1.24	10,016	75	-0.96	5.1	2.26	0.71	1.03	1.65	0.73
Sudan	38,363	6.6	1,100	46	4.52	1,540	57	-2.09	10.9	1.40	0.44	1.17	0.72	0.51
Tanzania	37,771	6.8	469	47	5.63	618	54	-1.14	6.9	1.32	0.62	1.12	0.91	0.69
Kenya	34,912	8.1	859	52	5.01	1,035	52	-3.08	0.2	1.21	0.26	1.00	0.31	0.26
Algeria	32,561	7.4	1,314	53	2.43	2,011	72	-4.97	18.7	1.53	0.15	1.19	0.27	0.17
Canada	32,386	2.3	12,355	73	1.54	23,564	80	-0.72	7.6	1.91	0.78	1.04	1.54	0.81
Afghanistan	29,929	7.7	751	35	6.97	667	43	-0.73	7.9	0.89	0.70	1.24	0.77	0.87
Morocco	29,901	7.1	1,121	52	2.42	1,953	70	-4.64	18.8	1.74	0.17	1.21	0.36	0.21
Uganda	28,199	7.1	613	50	6.56	800	50	-0.56	0.4	1.30	0.78	1.01	1.02	0.78
Peru	27,442	6.3	4,186	53	2.69	4,006	72	-3.61	19.0	0.96	0.26	1.19	0.30	0.31
Nepal	27,094	6.1	611	43	3.24	799	65	-2.88	22.5	1.31	0.34	1.37	0.61	0.47
Iraq	26,076	7.4	1,396	58	4.35	2,132	69	-3.02	10.5	1.53	0.29	1.10	0.48	0.32
Malaysia	25,968	5.6	1,260	61	2.72	5,053	74	-2.85	12.4	4.01	0.36	1.10	1.57	0.39
Venezuela, RB	25,641	5.3	3,395	65	2.65	4,871	73	-2.67	8.1	1.43	0.38	1.06	0.58	0.40
Romania	22,197	2.9	1,889	68	1.32	6,643	72	-1.57	3.6	3.52	0.58	1.02	2.08	0.59
Ghana	22,062	7.0	956	49	4.42	910	57	-2.53	7.6	0.95	0.36	1.11	0.38	0.40
Australia	20,232	2.9	11,729	71	1.79	24,283	81	-1.07	9.8	2.07	0.69	1.05	1.50	0.73
Mozambique	20,154	6.6	461	39	5.33	582	48	-1.26	8.4	1.26	0.60	1.20	0.90	0.71
Sri Lanka	20,103	4.3	862	63	2.35	2,508	74	-1.99	11.0	2.91	0.50	1.08	1.57	0.54
Average, unweigted	**118,414**	**5.27**	**3,547**	**57**	**2.91**	**7,369**	**68**	**-2.35**	**11.1**	**2.12**	**0.47**	**1.12**	**1.02**	**0.52**
Average, pop weighted		**5.26**	**2,686**	**57**	**2.54**	**6,019**	**69**	**-2.72**	**12.1**	**3.10**	**0.41**	**1.13**	**1.24**	**0.46**
median	**47,483**	**5.60**	**1,314**	**57**	**2.42**	**4,006**	**72**	**-2.67**	**14.4**	**1.91**	**0.36**	**1.10**	**0.90**	**0.42**

n=total fertility rate, c=consumption per-capita in 2005 dollars, T=life expectancy

Table 4
Welfare Growth Calculations: 1970-2005
Statistics for a sample of 144 countries
Alternative calibration

Country Name	POP 2005 (000)	1970			2005			Δn	ΔT	λ^c	λ^n	λ^T	λ	λ/λ^c
		n	c	T	n	c	T							
Average, unweigted	40,983	5.35	3,530	57	3.18	7,034	67	-2.16	10.3	2.00	0.74	1.58	2.22	1.16
average, pop-weighted		5.30	2,740	57	2.65	6,025	69	-2.64	11.9	2.96	0.69	1.64	3.07	1.12
median	9,159	5.98	1,645	56	2.69	3,706	71	-2.07	9.8	1.74	0.74	1.44	1.93	1.07

n=total fertility rate, c=consumption per-capita in 2005 dollars, T=life expectancy

Table 5
Welfare Growth Calculations: 1970-2005
45 Most Populated Countries
Alternative Calibration

	POP 2005	**1970**			**2005**			Δ**n**	Δ**T**	λ^c	λ^n	λ^T	λ	λ/λ^c
Country Name	(000)	**n**	**c**	**T**	**n**	**c**	**T**							
China	1,297,765	5.5	368	62	1.76	2,127	73	-3.75	10.6	5.77	0.57	1.42	4.65	0.81
India	1,090,973	5.5	652	49	2.93	1,569	63	-2.54	13.9	2.41	0.69	1.89	3.16	1.31
United States	295,753	2.5	15,209	71	2.05	32,231	78	-0.43	6.9	2.12	0.93	1.21	2.39	1.13
Indonesia	228,896	5.5	438	48	2.28	2,219	70	-3.19	22.1	5.07	0.62	2.56	8.11	1.60
Brazil	188,993	5.0	3,160	59	2.08	5,962	72	-2.95	13.1	1.89	0.64	1.58	1.91	1.01
Pakistan	169,279	7.0	928	54	4.21	1,659	66	-2.75	11.3	1.79	0.69	1.57	1.94	1.09
Bangladesh	144,139	6.9	814	44	2.55	882	65	-4.32	20.5	1.08	0.54	2.69	1.58	1.46
Nigeria	137,495	6.6	1,239	40	5.70	1,172	47	-0.92	6.9	0.95	0.89	1.58	1.32	1.40
Japan	127,537	2.1	8,601	72	1.26	20,421	82	-0.88	10.0	2.37	0.85	1.29	2.62	1.10
Mexico	106,203	6.7	4,990	61	2.21	9,152	74	-4.51	13.1	1.83	0.52	1.53	1.47	0.80
Philippines	90,436	6.3	1,278	57	3.22	2,047	71	-3.05	13.8	1.60	0.65	1.64	1.72	1.07
Vietnam	84,425	7.0	494	49	2.15	1,369	74	-4.88	24.8	2.77	0.50	2.68	3.69	1.33
Germany	82,439	2.0	10,204	70	1.34	20,643	79	-0.69	8.8	2.02	0.88	1.27	2.27	1.12
Turkey	72,674	5.6	3,698	56	2.16	7,618	71	-3.44	15.7	2.06	0.60	1.78	2.21	1.07
Egypt, Arab Rep.	72,544	5.9	1,312	50	3.01	3,265	70	-2.91	19.1	2.49	0.66	2.18	3.58	1.44
Iran, Islamic Rep.	72,283	6.6	2,192	54	1.95	4,790	71	-4.63	16.7	2.19	0.51	1.89	2.11	0.96
Thailand	64,235	5.6	1,201	59	1.80	4,463	68	-3.78	9.0	3.72	0.57	1.38	2.92	0.79
France	62,912	2.5	10,573	72	1.92	21,590	80	-0.56	8.2	2.04	0.91	1.24	2.30	1.13
Congo, Dem. Rep.	60,698	6.2	692	44	6.41	173	48	0.19	3.8	0.25	1.03	1.27	0.33	1.30
United Kingdom	60,487	2.4	11,467	72	1.78	26,644	79	-0.66	7.1	2.32	0.89	1.21	2.51	1.08
Italy	59,038	2.4	9,376	72	1.32	19,536	81	-1.11	9.2	2.08	0.82	1.27	2.18	1.05
Korea, Rep.	48,005	4.5	2,227	61	1.08	12,222	78	-3.45	17.2	5.49	0.57	1.70	5.34	0.97
South Africa	47,483	5.6	3,276	53	2.67	5,023	52	-2.90	-1.1	1.53	0.66	0.95	0.95	0.62
Spain	43,704	2.8	8,089	72	1.35	19,027	80	-1.49	8.2	2.35	0.77	1.24	2.26	0.96
Colombia	41,488	5.6	2,302	61	2.50	4,919	72	-3.10	11.4	2.14	0.64	1.47	1.99	0.93
Argentina	39,181	3.1	5,064	67	2.29	6,893	75	-0.79	8.2	1.36	0.88	1.28	1.54	1.13
Poland	38,558	2.2	4,441	70	1.24	10,016	75	-0.96	5.1	2.26	0.84	1.16	2.19	0.97
Sudan	38,363	6.6	1,100	46	4.52	1,540	57	-2.09	10.9	1.40	0.75	1.75	1.85	1.32
Tanzania	37,771	6.8	469	47	5.63	618	54	-1.14	6.9	1.32	0.86	1.45	1.65	1.25
Kenya	34,912	8.1	859	52	5.01	1,035	52	-3.08	0.2	1.21	0.67	1.01	0.81	0.67
Algeria	32,561	7.4	1,314	53	2.43	2,011	72	-4.97	18.7	1.53	0.50	2.04	1.55	1.02
Canada	32,386	2.3	12,355	73	1.54	23,564	80	-0.72	7.6	1.91	0.88	1.22	2.05	1.07
Afghanistan	29,929	7.7	751	35	6.97	667	43	-0.73	7.9	0.89	0.91	1.85	1.50	1.68
Morocco	29,901	7.1	1,121	52	2.42	1,953	70	-4.64	18.8	1.74	0.52	2.10	1.90	1.09
Uganda	28,199	7.1	613	50	6.56	800	50	-0.56	0.4	1.30	0.93	1.02	1.24	0.95
Peru	27,442	6.3	4,186	53	2.69	4,006	72	-3.61	19.0	0.96	0.60	2.04	1.17	1.22
Nepal	27,094	6.1	611	43	3.24	799	65	-2.88	22.5	1.31	0.67	3.02	2.64	2.01
Iraq	26,076	7.4	1,396	58	4.35	2,132	69	-3.02	10.5	1.53	0.67	1.47	1.50	0.98
Malaysia	25,968	5.6	1,260	61	2.72	5,053	74	-2.85	12.4	4.01	0.66	1.50	3.99	1.00
Venezuela, RB	25,641	5.3	3,395	65	2.65	4,871	73	-2.67	8.1	1.43	0.68	1.29	1.25	0.87
Romania	22,197	2.9	1,889	68	1.32	6,643	72	-1.57	3.6	3.52	0.76	1.12	3.00	0.85
Ghana	22,062	7.0	956	49	4.42	910	57	-2.53	7.6	0.95	0.71	1.46	0.99	1.04
Australia	20,232	2.9	11,729	71	1.79	24,283	81	-1.07	9.8	2.07	0.84	1.29	2.24	1.08
Mozambique	20,154	6.6	461	39	5.33	582	48	-1.26	8.4	1.26	0.85	1.76	1.87	1.49
Sri Lanka	20,103	4.3	862	63	2.35	2,508	74	-1.99	11.0	2.91	0.74	1.42	3.06	1.05
Average, unweigted	**118,414**	**5.27**	**3,547**	**57**	**2.91**	**7,369**	**68**	**-2.35**	**11.1**	**2.12**	**0.72**	**1.59**	**2.30**	**1.12**
Average, pop weighted		**5.26**	**2,686**	**57**	**2.54**	**6,019**	**69**	**-2.72**	**12.1**	**3.10**	**0.68**	**1.65**	**3.20**	**1.10**
median	**47,483**	**5.60**	**1,314**	**57**	**2.42**	**4,006**	**72**	**-2.67**	**14.4**	**1.91**	**0.69**	**1.47**	**2.05**	**1.07**

n=total fertility rate, c=consumption per-capita in 2005 dollars, T=life expectancy

Table 6
WELFARE ACROSS THE WORLD, 2005
Averages and Median for 144 Countries
Benchmark calibration

Country Name	**POP (000)**	**n**	**c**	**T**	Δ**n**	Δ**T**	λ^c	λ^n	λ^T	λ	λ/λ^c
Average, unweighted	40983	3.18	7034	67	1.1	-10.7	0.22	1.80	0.92	0.22	1.56
Average, pop-weighted		2.65	6025	69	0.6	-9.2	0.19	1.41	0.94	0.18	1.27
median	9159	2.69	3706	71	0.6	-6.7	0.11	1.25	0.96	0.14	1.19

n=total fertility rate, c=consumption per-capita in 2005 dollars, T=life expectancy

Table 7
WELFARE ACROSS THE WORLD 2005
45 Most Populated Countries
Benchmark Calibration

Country Name	POP (000)	n	c	T	Δn	ΔT	λ^c	λ^n	λ^T	λ	λ/λ^c
China	1297765	1.8	2127	73	-0.3	-5.2	0.07	0.90	0.97	0.06	0.88
India	1090973	2.9	1569	63	0.9	-15.0	0.05	1.35	0.91	0.06	1.23
United States	295753	2.1	32231	78	0.0	0.0	1.00	1.00	1.00	1.00	1.00
Indonesia	228896	2.3	2219	70	0.2	-8.1	0.07	1.08	0.96	0.07	1.03
Brazil	188993	2.1	5962	72	0.0	-6.1	0.18	1.01	0.97	0.18	0.97
Pakistan	169279	4.2	1659	66	2.2	-12.2	0.05	2.12	0.93	0.10	1.96
Bangladesh	144139	2.6	882	65	0.5	-13.1	0.03	1.19	0.92	0.03	1.09
Nigeria	137495	5.7	1172	47	3.7	-30.5	0.04	3.72	0.74	0.10	2.77
Japan	127537	1.3	20421	82	-0.8	4.2	0.63	0.75	1.02	0.49	0.77
Mexico	106203	2.2	9152	74	0.2	-3.3	0.28	1.05	0.98	0.29	1.04
Philippines	90436	3.2	2047	71	1.2	-6.7	0.06	1.49	0.96	0.09	1.44
Vietnam	84425	2.2	1369	74	0.1	-4.0	0.04	1.04	0.98	0.04	1.01
Germany	82439	1.3	20643	79	-0.7	1.6	0.64	0.78	1.01	0.50	0.78
Turkey	72674	2.2	7618	71	0.1	-6.3	0.24	1.04	0.97	0.24	1.00
Egypt, Arab Rep.	72544	3.0	3265	70	1.0	-8.2	0.10	1.39	0.95	0.13	1.33
Iran, Islamic Rep.	72283	1.9	4790	71	-0.1	-7.1	0.15	0.96	0.96	0.14	0.93
Thailand	64235	1.8	4463	68	-0.3	-9.3	0.14	0.92	0.95	0.12	0.87
France	62912	1.9	21590	80	-0.1	2.5	0.67	0.95	1.01	0.65	0.97
Congo, Dem. Rep.	60698	6.4	173	48	4.4	-30.1	0.01	4.98	0.75	0.02	3.72
United Kingdom	60487	1.8	26644	79	-0.3	1.3	0.83	0.91	1.01	0.76	0.91
Italy	59038	1.3	19536	81	-0.7	3.0	0.61	0.77	1.01	0.47	0.78
Korea, Rep.	48005	1.1	12222	78	-1.0	0.7	0.38	0.70	1.00	0.27	0.71
South Africa	47483	2.7	5023	52	0.6	-26.0	0.16	1.24	0.80	0.15	0.99
Spain	43704	1.4	19027	80	-0.7	2.5	0.59	0.78	1.01	0.46	0.79
Colombia	41488	2.5	4919	72	0.4	-5.5	0.15	1.16	0.97	0.17	1.13
Argentina	39181	2.3	6893	75	0.2	-3.0	0.21	1.08	0.99	0.23	1.07
Poland	38558	1.2	10016	75	-0.8	-2.8	0.31	0.75	0.99	0.23	0.74
Sudan	38363	4.5	1540	57	2.5	-20.4	0.05	2.37	0.86	0.10	2.03
Tanzania	37771	5.6	618	54	3.6	-24.1	0.02	3.62	0.82	0.06	2.97
Kenya	34912	5.0	1035	52	3.0	-25.3	0.03	2.84	0.81	0.07	2.29
Algeria	32561	2.4	2011	72	0.4	-6.1	0.06	1.14	0.97	0.07	1.10
Canada	32386	1.5	23564	80	-0.5	2.6	0.73	0.83	1.01	0.62	0.84
Afghanistan	29929	7.0	667	43	4.9	-34.9	0.02	6.41	0.68	0.09	4.36
Morocco	29901	2.4	1953	70	0.4	-7.3	0.06	1.14	0.96	0.07	1.09
Uganda	28199	6.6	800	50	4.5	-27.6	0.02	5.33	0.78	0.10	4.15
Peru	27442	2.7	4006	72	0.6	-5.3	0.12	1.25	0.97	0.15	1.21
Nepal	27094	3.2	799	65	1.2	-12.5	0.02	1.50	0.93	0.03	1.39
Iraq	26076	4.3	2132	69	2.3	-9.2	0.07	2.22	0.95	0.14	2.11
Malaysia	25968	2.7	5053	74	0.7	-4.0	0.16	1.26	0.98	0.19	1.23
Venezuela, RB	25641	2.7	4871	73	0.6	-4.6	0.15	1.23	0.98	0.18	1.20
Romania	22197	1.3	6643	72	-0.7	-5.6	0.21	0.77	0.97	0.15	0.75
Ghana	22062	4.4	910	57	2.4	-21.2	0.03	2.29	0.85	0.05	1.94
Australia	20232	1.8	24283	81	-0.3	3.1	0.75	0.91	1.01	0.70	0.92
Mozambique	20154	5.3	582	48	3.3	-30.1	0.02	3.21	0.75	0.04	2.40
Sri Lanka	20103	2.4	2508	74	0.3	-4.0	0.08	1.11	0.98	0.08	1.09
Average, unweigted	**118414**	**2.91**	**7369**	**68**	**0.9**	**-9.4**	**0.23**	**1.66**	**0.93**	**0.22**	**1.44**
Average, pop-weighted		**2.54**	**6019**	**69**	**0.5**	**-8.8**	**0.19**	**1.33**	**0.94**	**0.18**	**1.20**
median	**47483**	**2.42**	**4006**	**72**	**0.4**	**-6.1**	**0.12**	**1.14**	**0.97**	**0.14**	**1.09**

n=total fertility rate, c=consumption per-capita in 2005 dollars, T=life expectancy

Table 8
WELFARE ACROSS THE WORLD, 2005
Averages and Median for 144 Countries
Alternative calibration

Country Name	POP (000)	n	c	T	Δn	ΔT	λ^c	λ^n	λ^T	λ	λ/λ^c
Average, unweighted	40983	3.18	7034	67	1.1	-10.7	0.22	1.22	0.75	0.20	0.84
Average, pop-weighted		2.65	6025	69	0.6	-9.2	0.19	1.12	0.78	0.17	0.82
median	9159	2.69	3706	71	0.6	-6.7	0.11	1.11	0.83	0.09	0.88

n=total fertility rate, c=consumption per-capita in 2005 dollars, T=life expectancy

Table 9
WELFARE ACROSS THE WORLD 2005
45 Most Populated Countries
Alternative Calibration

Country Name	POP (000)	n	c	T	Δn	ΔT	λ^c	λ^n	λ^T	λ	λ/λ^c
China	1297765	1.8	2127	73	-0.3	-5.2	0.07	0.95	0.87	0.05	0.83
India	1090973	2.9	1569	63	0.9	-15.0	0.05	1.15	0.63	0.04	0.73
United States	295753	2.1	32231	78	0.0	0.0	1.00	1.00	1.00	1.00	1.00
Indonesia	228896	2.3	2219	70	0.2	-8.1	0.07	1.04	0.80	0.06	0.83
Brazil	188993	2.1	5962	72	0.0	-6.1	0.18	1.00	0.85	0.16	0.85
Pakistan	169279	4.2	1659	66	2.2	-12.2	0.05	1.40	0.70	0.05	0.98
Bangladesh	144139	2.6	882	65	0.5	-13.1	0.03	1.09	0.68	0.02	0.73
Nigeria	137495	5.7	1172	47	3.7	-30.5	0.04	1.72	0.31	0.02	0.52
Japan	127537	1.3	20421	82	-0.8	4.2	0.63	0.86	1.10	0.61	0.96
Mexico	106203	2.2	9152	74	0.2	-3.3	0.28	1.03	0.92	0.27	0.94
Philippines	90436	3.2	2047	71	1.2	-6.7	0.06	1.21	0.83	0.06	1.00
Vietnam	84425	2.2	1369	74	0.1	-4.0	0.04	1.02	0.90	0.04	0.91
Germany	82439	1.3	20643	79	-0.7	1.6	0.64	0.88	1.04	0.58	0.91
Turkey	72674	2.2	7618	71	0.1	-6.3	0.24	1.02	0.84	0.20	0.86
Egypt, Arab Rep.	72544	3.0	3265	70	1.0	-8.2	0.10	1.17	0.80	0.09	0.93
Iran, Islamic Rep.	72283	1.9	4790	71	-0.1	-7.1	0.15	0.98	0.82	0.12	0.81
Thailand	64235	1.8	4463	68	-0.3	-9.3	0.14	0.96	0.77	0.10	0.74
France	62912	1.9	21590	80	-0.1	2.5	0.67	0.98	1.06	0.70	1.04
Congo, Dem. Rep.	60698	6.4	173	48	4.4	-30.1	0.01	1.88	0.31	0.00	0.59
United Kingdom	60487	1.8	26644	79	-0.3	1.3	0.83	0.95	1.03	0.81	0.99
Italy	59038	1.3	19536	81	-0.7	3.0	0.61	0.88	1.08	0.57	0.94
Korea, Rep.	48005	1.1	12222	78	-1.0	0.7	0.38	0.83	1.02	0.32	0.85
South Africa	47483	2.7	5023	52	0.6	-26.0	0.16	1.11	0.39	0.07	0.43
Spain	43704	1.4	19027	80	-0.7	2.5	0.59	0.88	1.06	0.55	0.94
Colombia	41488	2.5	4919	72	0.4	-5.5	0.15	1.08	0.86	0.14	0.93
Argentina	39181	2.3	6893	75	0.2	-3.0	0.21	1.04	0.93	0.21	0.96
Poland	38558	1.2	10016	75	-0.8	-2.8	0.31	0.86	0.93	0.25	0.80
Sudan	38363	4.5	1540	57	2.5	-20.4	0.05	1.46	0.51	0.04	0.74
Tanzania	37771	5.6	618	54	3.6	-24.1	0.02	1.70	0.43	0.01	0.73
Kenya	34912	5.0	1035	52	3.0	-25.3	0.03	1.56	0.40	0.02	0.63
Algeria	32561	2.4	2011	72	0.4	-6.1	0.06	1.07	0.85	0.06	0.90
Canada	32386	1.5	23564	80	-0.5	2.6	0.73	0.91	1.06	0.71	0.97
Afghanistan	29929	7.0	667	43	4.9	-34.9	0.02	2.03	0.23	0.01	0.47
Morocco	29901	2.4	1953	70	0.4	-7.3	0.06	1.06	0.82	0.05	0.87
Uganda	28199	6.6	800	50	4.5	-27.6	0.02	1.92	0.36	0.02	0.69
Peru	27442	2.7	4006	72	0.6	-5.3	0.12	1.11	0.87	0.12	0.97
Nepal	27094	3.2	799	65	1.2	-12.5	0.02	1.21	0.69	0.02	0.84
Iraq	26076	4.3	2132	69	2.3	-9.2	0.07	1.42	0.77	0.07	1.10
Malaysia	25968	2.7	5053	74	0.7	-4.0	0.16	1.12	0.90	0.16	1.00
Venezuela, RB	25641	2.7	4871	73	0.6	-4.6	0.15	1.10	0.89	0.15	0.98
Romania	22197	1.3	6643	72	-0.7	-5.6	0.21	0.88	0.86	0.15	0.75
Ghana	22062	4.4	910	57	2.4	-21.2	0.03	1.44	0.49	0.02	0.71
Australia	20232	1.8	24283	81	-0.3	3.1	0.75	0.96	1.08	0.78	1.03
Mozambique	20154	5.3	582	48	3.3	-30.1	0.02	1.63	0.31	0.01	0.51
Sri Lanka	20103	2.4	2508	74	0.3	-4.0	0.08	1.05	0.90	0.07	0.95
Average, unweigted	**118414**	**2.91**	**7369**	**68**	**0.9**	**-9.4**	**0.23**	**1.17**	**0.78**	**0.21**	**0.84**
Average, pop-weighted		**2.54**	**6019**	**69**	**0.5**	**-8.8**	**0.19**	**1.09**	**0.79**	**0.17**	**0.82**
median	**47483**	**2.42**	**4006**	**72**	**0.4**	**-6.1**	**0.12**	**1.06**	**0.85**	**0.09**	**0.87**

n=total fertility rate, c=consumption per-capita in 2005 dollars, T=life expectancy