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DEMOGRAPHIC CHANGES IN DEVELOPED AND DEVELOPING COUNTRIES

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DEMOGRAPHIC CHANGES IN DEVELOPED AND DEVELOPING COUNTRIES

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
Economics

by
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August 2013

Accepted by:
Dr. Robert Tamura, Committee Chair
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Dr. Michal Jerzmanowski

ABSTRACT

I will be observing demographic changes across both developed and developing countries and noting whether or not some developing countries follow the same trends as developed countries. This information can provide insight as to why some countries are so poor and help determine where to focus their attention in order to improve their standards of living. I will be performing a regional and country-specific analysis in order to determine which trends each developing country follows in accordance with the developed countries. I will suggest some policy solutions, which impoverished countries can use in order to improve their circumstances.

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CHAPTER ONE: INTRODUCTION

A fundamental question in economics is “Why are some countries so rich and others so poor?” We have observed countries, such as Great Britain and France, who have had high living standards comparable to each other for years. In contrast, a country like Argentina, which was one of the wealthiest countries circa the 20th century, has no longer kept up with wealthier countries. Other countries, like Japan, have always been behind the world’s leaders but now exhibit a surge of growth, catching up to the richer countries. Many factors contribute to huge gaps between developed and developing countries. In *Guns, Germs, & Steel: The Fates of Human Societies*, Jared Diamond offers the hypothesis that differences in geography and access to specific plants and animals allowed for the development of agriculture and society in developed countries. “The history of interactions among disparate peoples is what shaped the modern world through conquest, epidemics, and genocide. Those collisions created reverberations that have still not died down after many centuries, and that are actively continuing in some of the world’s most troubled areas” (Diamond). From this excerpt, Diamond suggests how some countries attained their poor conditions and why they cannot seem to help themselves improve their situations.

Macroeconomists now measure economic growth as the percent rate increase in GDP per capita, which is a strong indicator of standard of living in a society. We observe trends in factors that contribute to growth, such as fertility rates, infant mortality rates, output per worker, and schooling of the young to determine how less-developed countries

can improve their standards of living. I will use panel data in order to observe demographic changes in developed and developing countries in an attempt to answer the following question: do less-developed regions of the world follow the same pattern as developed Western Countries? I will use variables that are strong determinants of economic growth in still-developing countries and identify relationships between those determinants and compare them with those countries that are more developed. This analysis is important in generating solutions that will aid impoverished countries become more developed societies.

CHAPTER TWO: METHODOLOGY AND DATA

This study is important because it can be applied from a policy standpoint in assisting those countries that are impoverished. I examine panel data from Tamura, Devereux, Dwyer, and Baier, which comprises 168 countries, divided into 9 regions. The data includes measures of the countries' population, human capital, physical capital, and other measures taken over a minimum period of 50 years. The factors I focus on from this data set are the measurements of schooling of the young and of output per worker. Schooling of the young is the amount of school completed by a young person within a country. Output per worker is a measure of living standard. Both are key variables in measuring economic growth within a country.

I later add data from various sources to include total fertility rates and infant mortality rates over time for each country. Total fertility rates are the number of children that a woman would have if she lived through all her childbearing years and experienced the current age-specific fertility rates at each age. The rates are the number of live births per woman. Infant mortality rates are the number of infants that die before reaching one year of age. These rates are taken per 1,000 live births in a given year. We have observed that many developed countries once had total fertility rates as high as those rates in many lesser-developed countries today. We also observe that those countries with the highest present fertility rates tend to be some of the poorest countries. This fact could lead to some policy suggestions for birth-control programs in order to correct this outcome. These two measures are also very important trends to observe, along with

young schooling and output per worker, in order to determine why some countries have fallen off the Western trend.

Becker, Murphy, and Tamura model economic growth with human capital investments at the center in their paper: “Human Capital, Fertility, and Economic Growth”. They suggest that higher fertility discourages investments into human and physical capital also higher stocks of capital reduce the demand for children because that raises the cost of the time spent on child care. This results with the observation that societies with limited human capital choose to have large families and invest little amounts of human capital into each member while societies with abundant human capital will choose to have small families and invest large amounts of human capital into each member. Also, Murphy, Simon, and Tamura found when they observed the convergence in fertility, child schooling, parental schooling, and survival probabilities in the United States. “We present suggestive evidence that falling mortality risk is strongly positively correlated with falling fertility, a rising education level of parents is strongly negatively related to fertility, and that population density is negatively related to fertility. Finally we show the robust negative correlation of mortality risk on child schooling attainment, and positive correlation of population density and child schooling attainment” (Murphy, Simon, Tamura). Based on the findings from both papers, I would expect to see that an increase in total fertility rates would correspond to a decrease in young schooling and output per worker in each country. I also expect to find a decrease in total fertility rates is associated with a decrease in infant mortality rates which would imply that an increase

in infant mortality rates would correspond to a decrease in young schooling and output per worker.

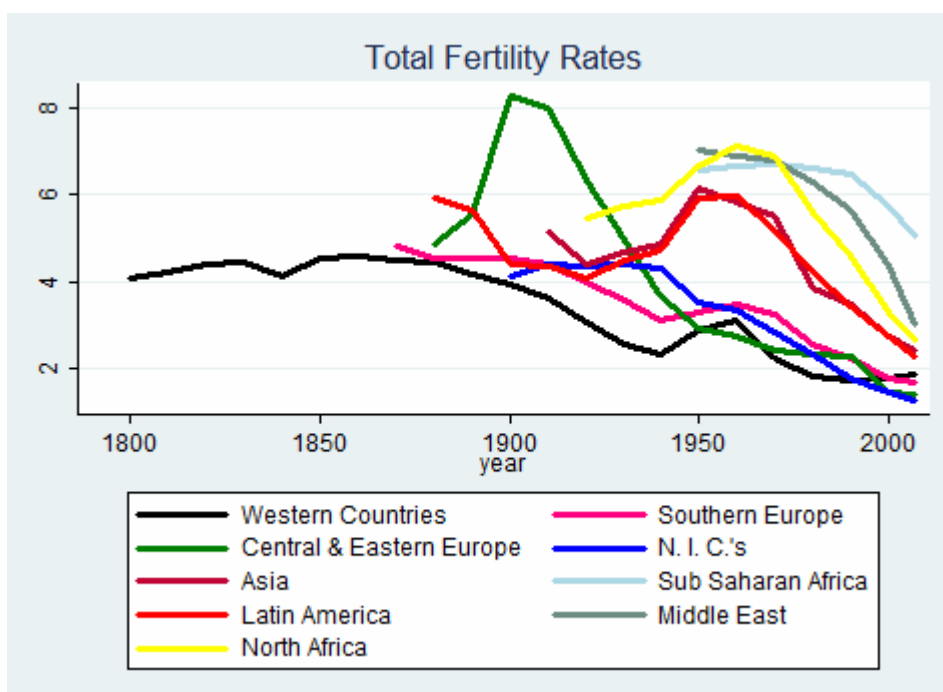
Measures of human and physical capital can be great determinants of growth and are neglected in this research. It would also be useful if we had more observations for more years for the countries we have in order to get a clearer idea as to what is happening in each country. Also some countries could experience natural disasters or civil war, which could greatly impact productivity and could prevent a country from following the Western trends. We can try to identify these outliers by doing a country specific analysis in order to determine why certain countries have fallen off the Western Countries' trend and what these countries can do to align with the Western standard of living. This study is somewhat limited considering the many other possible factors that can contribute to growth, which are not represented here.

CHAPTER THREE: EMPIRICAL ANALYSIS

- *Regional Analysis*

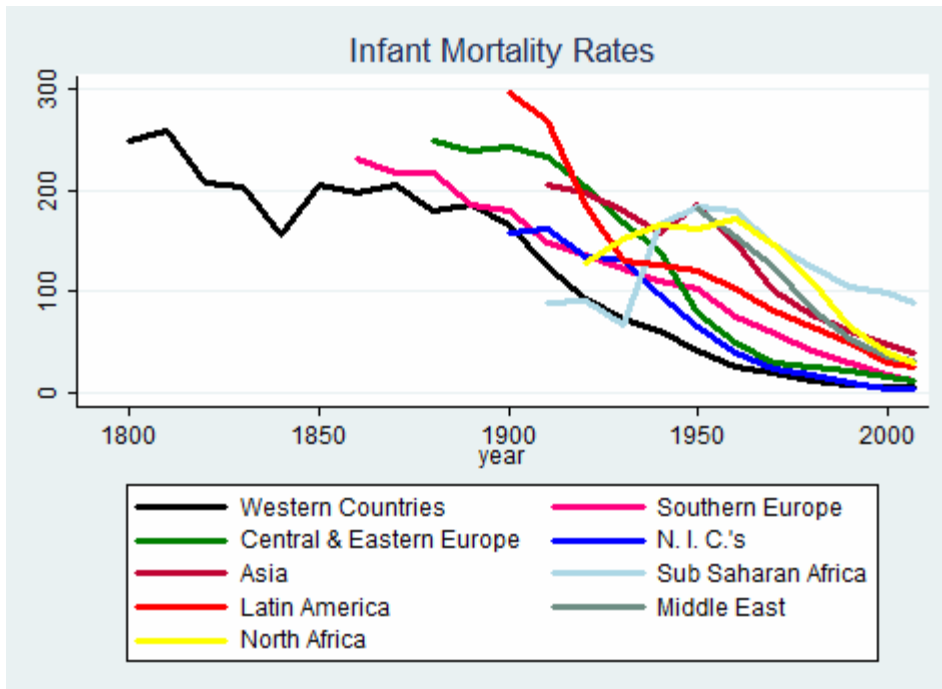
We want to observe the trends in total fertility rates, infant mortality rates, young schooling, and output per worker for the Western Countries and to see if other regions follow similar patterns. These are weighted averages of the variables in which we are interested. These variables have all been weighted by the population with the exception of output per worker, which is weighted by the labor force. I will discuss each region's trend for each variable and determine how far off the regions that include impoverished countries are from the Western standard.

Figure 3.1



Here we observe that the Western Countries begin in the 1800s with a fertility rate at about 4.0 that remains fairly constant until the 1900s, when it begins to drop to about 2.0. Fertility picks up again during the post-World War II baby boom and drops off to about 2.0 in the 2000s. Central and Eastern Europe begin with a fertility rate of 5.0 around 1870, which climbs to over 8.0 by 1900. The fertility rate continuously decreases afterwards, ultimately obtaining fertility rates similar to the Western Countries in the 2000s. Asia has a fertility rate of about 5.0 around the 1920s that drops down to 4.0 for a short period but then continuously increases to 6.0 by the 1950s. The fertility rate then continuously decreases by a little more than 2.0 by the 2000s. Latin America begins with a fertility rate of 6.0 in 1880, which continuously declines until reaching a fertility rate of 4.0 around the 1920s. Latin America then follows a trend almost identical to Asia by increasing to 6.0 by the 1950s. This trend then decreases to little more than 2.0 by the 2000s. North Africa begins with a fertility rate of about 5.8 around the 1930s, which continuously increases to 7.0 around 1960. Then it continuously decreases to about 2.9 in the 2000s. Southern Europe follows a trend most similar to the Western Countries with a fertility rate of 5.0 in 1870 that drops to 3.0 before the baby boom and decreases to about 2.0 in the 2000s. The Newly Industrialized Countries have a steady fertility rate of 4.0 starting in 1900, then dropping off around 1940, and ultimately attaining a fertility rate of 1.0 in the 2000s. Sub-Saharan Africa begins with a fertility rate greater than 6.0 in 1950 and then decreases to 5.0 in the 2000s. The Middle East has a fertility rate of 7.0 in 1950, which drops down to 3.0 in the 2000s.

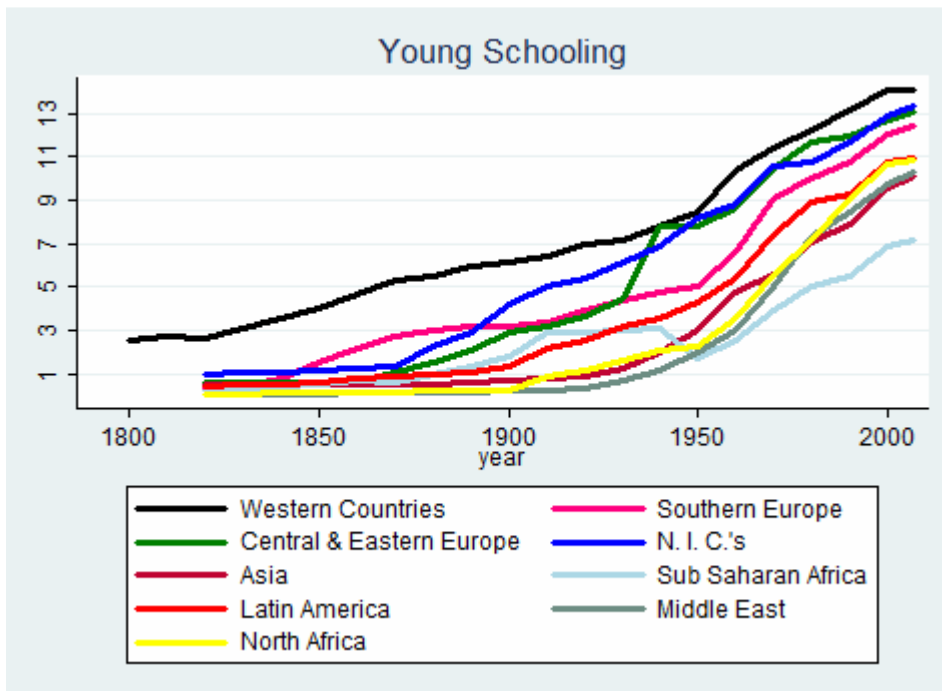
Figure 3.2



The Western Countries' observations begin in 1800 with an infant mortality rate of about 250, which decreases to 150 in 1840, then spike to 200 in 1850, and then decreases continuously to close to 0 in the 2000s. Central and Eastern Europe begin with an infant mortality rate of 250 in 1880, which continuously decreases to close to 0 in the 2000s. Asia begins with an infant mortality rate of 200 in 1920 that decreases until 1940, spike to 200 in 1950, but then continuously decrease to about 50 in the 2000s. Latin America begins with an infant mortality rate of 300 in 1900 that continuously declines to less than 50 in the 2000s. North Africa begins with an infant mortality rate of about 120 in 1920 that increases to about 180 in 1960 and then steadily decreases to about 50 in the 2000s. Southern Europe begins with an infant mortality rate of about 230 in 1860 that steadily decreases to close to 0 in the 2000s. The Newly Industrialized Countries begin with an infant mortality rate of 150 in 1900 that steadily decreases to close to 0 in the

2000s. Sub-Saharan Africa begins with an infant mortality rate of 100 in 1920 that decreases and then begins to increase around 1930 to 180 in 1950, then steadily decreases to 100 in the 2000s. The Middle East begins with an infant mortality rate of about 190 in 1950, steadily decreasing to less than 50 in the 2000s.

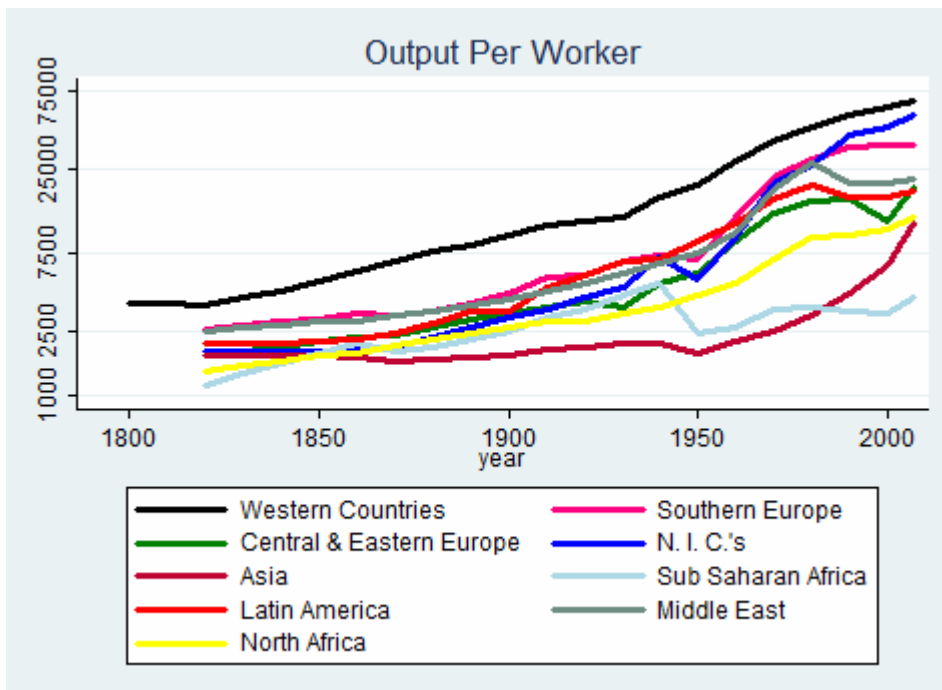
Figure 3.3



Western Countries begin with young schooling at 3.0 in 1800, which steadily increases to more than 13 in the 2000s. Central and Eastern Europe begins at 1.0 in 1820 and steadily increases to 13 in the 2000s, with the exception of a small decrease in 1940 that picks up again in 1950. Asia begins with young schooling at less than 1.0 in 1820, which steadily increases to a little more than 9 in the 2000s. Latin America begins with young schooling at less than 1.0 in 1820, which steadily increases to 10 in the 2000s.

North Africa follows a similar trend beginning with 1.0 in 1820, which increases to 10 in the 2000s. Southern Europe begins with young schooling at less than 1.0 in 1820, which increases to 12 in the 2000s. The Newly Industrialized Countries begin with young schooling at 1.0 in 1820, which increases to 13 in the 2000s. Sub-Saharan Africa begins with young schooling at less than 1.0 in 1820, which increases to 3.0 in 1940, but decreases to 2.0 in 1950, and then increases once more to 7.0 in the 2000s. The Middle East begins with young schooling less than 1.0 in 1820, which steadily increases to more than 9.0 in the 2000s.

Figure 3.4



Western Countries begin with output per worker at less than 5000 in 1800, which steadily increases to a little less than 75,000 in the 2000s. Central and Eastern Europe

begin with output per worker at a little less than 2,500 in 1820, increasing to 16,000 in 1990. It then drops briefly in 2000 before continuing to increase. Asia begins with the output per worker at less than 2,500 in 1820, which steadily increases to a little more than 7,500 in the 2000s. Latin America begins with output per worker at 2,500 in 1820, which steadily increases to 16,000 in 1980 and then drops briefly to increase again to 16,000 in 2000. North Africa begins with output per worker at less than 2,000 in 1820, which continuously increases to a little more than 7,500 in the 2000s. Southern Europe begins with output per worker at 2,500 in 1820 that steadily increases to more than 25,000 in 1990 and levels out in 2000. The Newly Industrialized Countries begin with output per worker at less than 2,500 in 1820, which steadily increases to less than 75,000 in 2000 while briefly dropping in 1950. Sub-Saharan Africa begins with output per worker at close to 1000 in 1820, which increases until 1940 and begins to drop to 2,500 in 1950. It then increases to a little more than 2,500 in 2000. The Middle East begins with output per worker at 2,500 in 1820, which increases to 25,000 in 1980 and drops down to less than 25,000 in 2000.

Table 3.1

Western Countries				
Year	Total Fertility Rate	Infant Mortality Rate	Young Schooling	Output per Worker
1820	4.4	206.69	2.647	3613
1830	4.42	203.99	3.117	4015
1840	4.112	155.151	3.587	4441
1850	4.539	206.277	4.04	5038
1861	4.596	197.434	4.625	5798
1871	4.484	206.193	5.319	6629
1881	4.434	179.357	5.492	7676
1891	4.152	185.233	5.916	8425
1901	3.932	165.026	6.116	9815
1911	3.591	125.306	6.363	11204
1921	3.046	91.953	6.996	11707
1933	2.543	73.778	7.136	12614
1940	2.313	60.693	7.835	16579
1954	2.879	41.379	8.428	19712
1961	3.113	24.899	10.344	28271
1971	2.225	19.338	11.429	37209
1981	1.803	12.034	12.191	44746

1991	1.734	8.247	13.126	53047
2000	1.768	5.825	14.033	59642
2007	1.869	5.111	14.037	65546

Over time, total fertility rates and infant mortality rates decrease while education and output per worker increase. Falling total fertility rates are associated with the rising of schooling in the young. Falling infant mortality rates are associated with falling total fertility rates. It is possible that rising schooling is leading to falling mortality.

Table 3.2

Southern Europe				
Year	Total Fertility Rate	Infant Mortality Rate	Young Schooling	Output per Worker
1820	.	.	.292	2544
1830	.	.	.427	2678
1840	.	.	.797	2817
1850	.	.	1.545	2960
1861	.	232	2.174	3239
1871	4.796	217.958	2.734	3133
1881	4.548	217.042	3.021	3268
1891	4.517	185.609	3.139	3702
1901	4.517	180.335	3.208	4306

1911	4.382	148.322	3.318	5377
1921	3.975	135.911	3.932	5565
1933	3.557	122.646	4.395	6781
1940	3.099	111.5	4.764	7418
1954	3.277	103.353	4.983	6872
1961	3.459	74.479	6.558	12626
1971	3.228	58.313	9.1	21940
1981	2.568	41.001	9.962	28831
1991	2.203	29.466	10.759	34029
2000	1.758	17.077	12.057	35121
2007	1.657	12.142	12.434	35527

Table 3.3

Central & Eastern Europe				
Year	Total Fertility Rate	Infant Mortality Rate	Young Schooling	Output per Worker
1820	.	.	.551	1745
1830	.	.	.554	1861
1840	.	.	.558	1985
1850	.	.	.59	2118
1861	.	.	.583	2246
1871	.	.	1.038	2356
1881	4.86	250	1.503	2639
1891	5.532	240.079	2.054	2935
1901	8.254	242.836	2.864	3227
1911	8.006	232.814	3.129	3531
1921	6.317	203.075	3.642	3770
1933	4.945	168.889	4.481	3468
1940	3.674	139.542	7.77	4929
1954	2.927	78.895	7.812	5654
1961	2.751	49.58	8.624	8870
1971	2.417	30.177	10.478	13251
1981	2.298	25.819	11.708	15571
1991	2.251	22.172	11.934	16281

2000	1.436	15.654	12.665	11799
2007	1.381	12.061	13.01	19528

Table 3.4

Newly Industrialized Countries				
Year	Total Fertility Rate	Infant Mortality Rate	Young Schooling	Output per Worker
1820	.	.	.979	1840
1830	.	.	1.028	1846
1840	.	.	1.077	1852
1850	.	.	1.127	1858
1861	.	.	1.216	1922
1871	.	.	1.36	1996
1881	.	.	2.262	2271
1891	.	.	2.93	2620
1901	4.096	157.665	4.148	3041
1911	4.372	161.91	4.974	3435
1921	4.327	133.685	5.344	4039
1933	4.392	131.819	6.149	4629
1940	4.308	96.312	6.862	7171
1954	3.512	65.551	8.2	5195
1961	3.337	39.644	8.833	9392
1971	2.834	22.644	10.575	20204
1981	2.32	17.747	10.746	26729
1991	1.743	9.28	11.644	40779

2000	1.422	4.266	12.883	44992
2007	1.262	3.54	13.358	53924

Table 3.5

Asia				
Year	Total Fertility Rate	Infant Mortality Rate	Young Schooling	Output per Worker
1820	.	.	.46	1754
1830	.	.	.461	1774
1840	.	.	.457	1770
1850	.	.	.458	1773
1861	.	.	.459	1705
1871	.	.	.474	1633
1881	.	.	.518	1669
1891	.	.	.612	1718
1901	.	.	.651	1769
1911	5.122	205	.75	1897
1921	4.379	197.729	.894	1960
1933	4.69	178.933	1.243	2110
1940	4.842	157.33	1.935	2114
1954	6.127	185.775	2.978	1815
1961	5.83	147.962	4.742	2152
1971	5.519	100.773	5.614	2445
1981	3.86	76.968	7.074	3087
1991	3.461	61.857	7.898	4202

2000	2.728	47.821	9.543	6372
2007	2.407	38.74	10.063	11418

Table 3.6

Sub-Saharan Africa				
Year	Total Fertility Rate	Infant Mortality Rate	Young Schooling	Output per Worker
1820	.	.	.222	1162
1830	.	.	.294	1344
1840	.	.	.391	1554
1850	.	.	.522	1797
1861	.	.	.701	2078
1871	.	.	.629	1877
1881	.	.	.948	1945
1891	.	.	1.31	2198
1901	.	.	1.82	2482
1911	.	89	2.862	3003
1921	.	90	2.9	3431
1933	.	67	2.971	4134
1940	.	166	3.077	4954
1954	6.564	184.636	1.693	2390
1961	6.662	179.719	2.542	2614
1971	6.693	146.44	3.951	3380
1981	6.612	124.262	5.059	3507

1991	6.489	104.055	5.463	3250
2000	5.725	99.317	6.865	3177
2007	5.037	89.56	7.166	4071

Table 3.7

Latin America				
Year	Total Fertility Rate	Infant Mortality Rate	Young Schooling	Output per Worker
1820	.	.	.394	2069
1830	.	.	.448	2062
1840	.	.	.466	2087
1850	.	.	.588	2144
1861	.	.	.804	2197
1871	.	.	.888	2413
1881	5.938	.	.946	2785
1891	5.62	.	1.071	3327
1901	4.394	296.295	1.299	3276
1911	4.351	268.6	2.195	4627
1921	4.066	186.255	2.509	5433
1933	4.471	130.437	3.181	6642
1940	4.707	125.818	3.498	6932
1954	5.917	121.007	4.312	8965
1961	5.981	102.303	5.392	11608
1971	5.185	81.738	7.438	16299
1981	4.222	64.635	8.861	19959
1991	3.412	49.797	9.3	16541

2000	2.744	28.385	10.7	16921
2007	2.276	25.021	10.922	18204

Table 3.8

Middle East				
Year	Total Fertility Rate	Infant Mortality Rate	Young Schooling	Output per Worker
1820	.	.	.05	2490
1830	.	.	.055	2597
1840	.	.	.06	2707
1850	.	.	.068	2823
1861	.	.	.08	2845
1871	.	.	.1	3069
1881	.	.	.121	3335
1891	.	.	.152	3625
1901	.	.	.196	3940
1911	.	.	.24	4391
1921	.	.	.345	4883
1933	.	.	.634	5635
1940	.	.	1.129	6490
1954	7.021	182.107	1.943	7484
1961	6.903	154.672	2.948	9944
1971	6.794	124.386	5.049	18855
1981	6.262	83.376	7.354	26852
1991	5.653	53.512	8.398	20136

2000	4.33	35.533	9.75	20645
2007	3.007	30.759	10.279	21734

Table 3.9

North Africa				
Year	Total Fertility Rate	Infant Mortality Rate	Young Schooling	Output per Worker
1820	.	.	.062	1417
1830	.	.	.07	1521
1840	.	.	.079	1633
1850	.	.	.117	1754
1861	.	.	.133	1830
1871	.	.	.151	2021
1881	.	.	.177	2196
1891	.	.	.207	2382
1901	.	.	.225	2589
1911	.	.	.817	2851
1921	5.439	128	1.157	2838
1933	5.721	152	1.575	3172
1940	5.857	166	2.096	3478
1954	6.641	161.487	2.251	4110
1961	7.128	171.542	3.512	4972
1971	6.901	145.587	5.576	6965
1981	5.606	111.3	7.182	9510
1991	4.566	65.178	9.088	9836

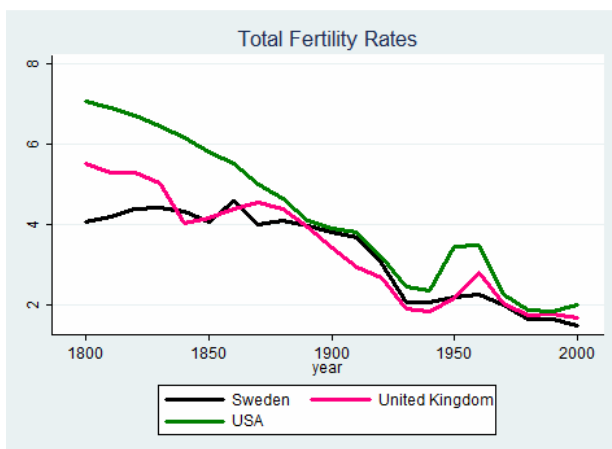
2000	3.297	39.602	10.661	10614
2007	2.624	30.005	10.833	12536

- *Country-Specific Analysis*

Here we want to focus on three Western Countries: Sweden, The United Kingdom, and The United States of America. We have the most data in these three countries and we will attempt to compare these countries to countries in different regions. We can easily identify outliers within each region that stand apart from the regional trends. These outliers may offer clues as to how the other regional countries can improve their standards if the outlier is doing considerably better than the other countries in the region.

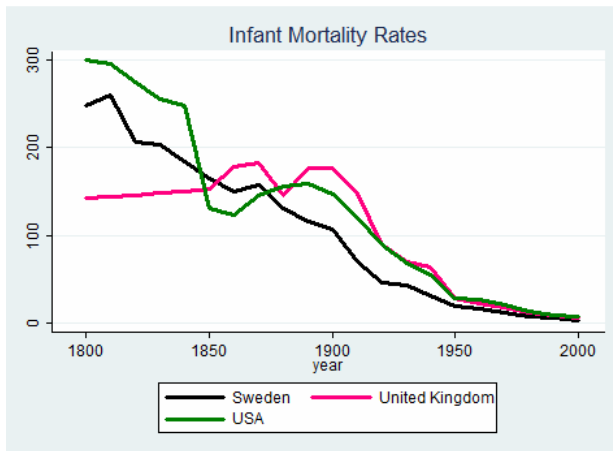
Western Countries

Figure 3.5



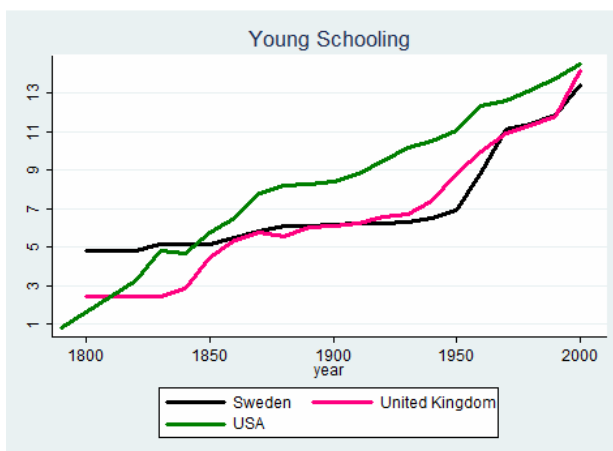
Here we have constantly decreasing fertility rates with the US having the highest fertility rates in 1850. We can see spikes in all countries during the baby boom of 1946-1964.

Figure 3.6



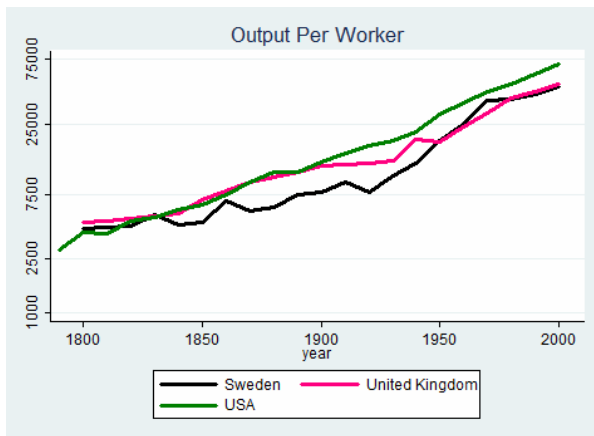
This diagram shows steadily decreasing infant mortality rates, with increases in the US and the UK shortly after 1850. As shown, the mortality rate drops off by 1900 in the US, with the UK also experiencing a short drop in the middle of this period.

Figure 3.7



Young schooling seems to continuously increase for all countries, with Sweden beginning at the higher level of schooling in 1800 and ending at the lowest level of schooling in 2000. The US begins in between Sweden and the UK but finishes above both by 2000. The UK begins at the lowest level of schooling and is in the middle of the US and Sweden by 2000.

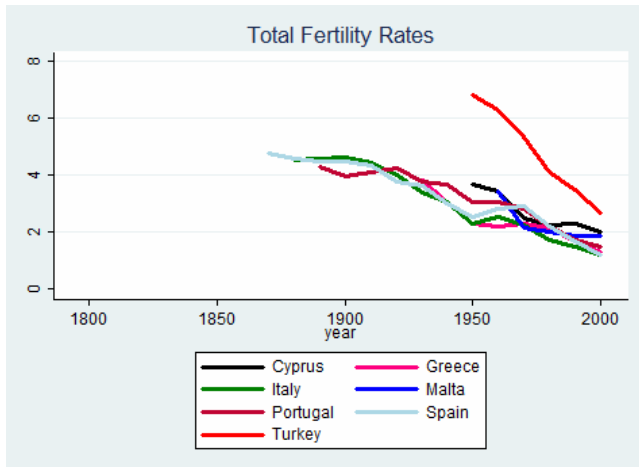
Figure 3.8



The output per worker trend seems steadily positive for both the UK and Sweden, beginning and ending very close with one another. The US, however, ends up at the highest value in 2000.

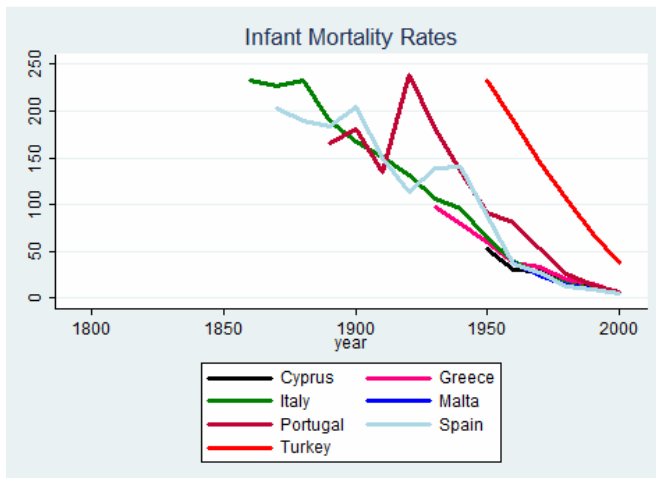
Southern Europe

Figure 3.9



Here the fertility rates of Southern Europe seem to closely follow the trend of Western Countries, but after 1900 the fertility rates seem to be higher in Southern Europe than in the Western Countries. Turkey is an outlier here, with much higher fertility rates in 1950, which drop off to 3.0 in 2000, still higher than the other countries in Southern Europe.

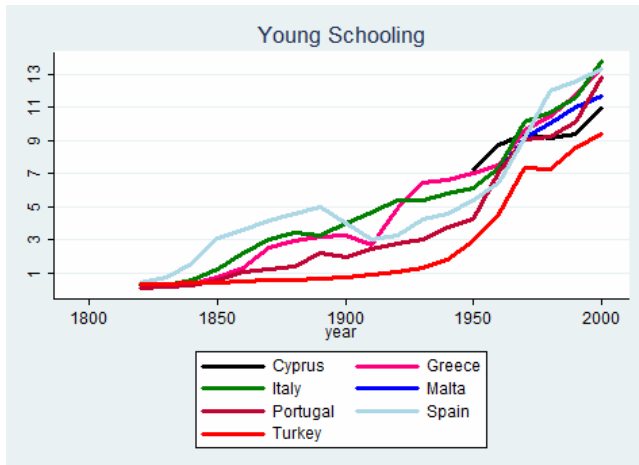
Figure 3.10



Every country here seems to have decreasing infant mortality trends, with Spain and Portugal following trends similar to the US and the UK with a spike in 1900. However,

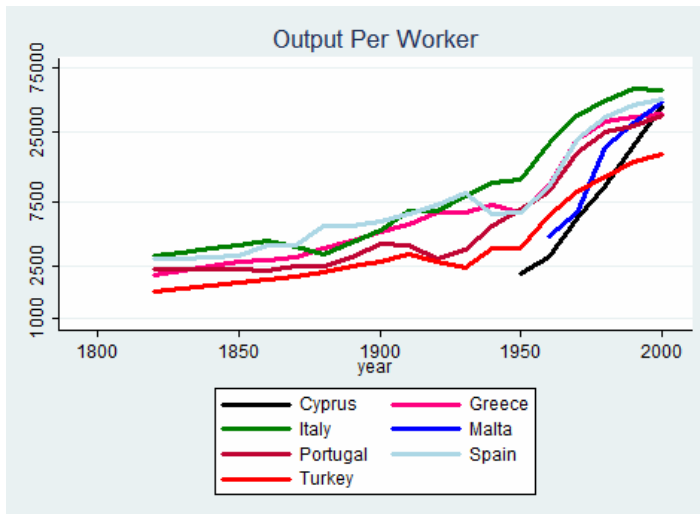
Portugal has a spike in infant mortality around 1930, which is abnormal compared with the Western Countries, and Spain has a slight climb in infant mortality around 1940 that is also abnormal. Turkey seems to be an outlier relative to other countries in Southern Europe with a much higher infant mortality rate in 1950 that drops off in 2000 but is still much higher than the rest of the countries.

Figure 3.11



This seems to closely follow the Western Country trend, but the level of schooling at which these countries begin is much lower than the level at which the Western Countries begin. By 2000 these less-developed countries still end up at a lower level of schooling than the Western Countries, with Turkey falling behind all other Southern countries.

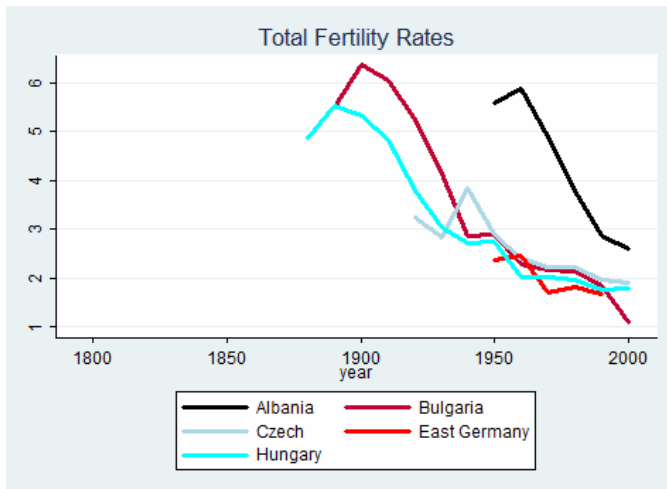
Figure 3.12



Here the Southern countries follow the trend line of the Western Countries but begin at lower levels of output in the 1800s and end with lower levels of output in 2000. Turkey continues to fall behind the other countries. Also, Malta and Cyprus seem to be outliers here, beginning at very low levels of output after 1950 but shooting up to catch the other Southern countries by 2000.

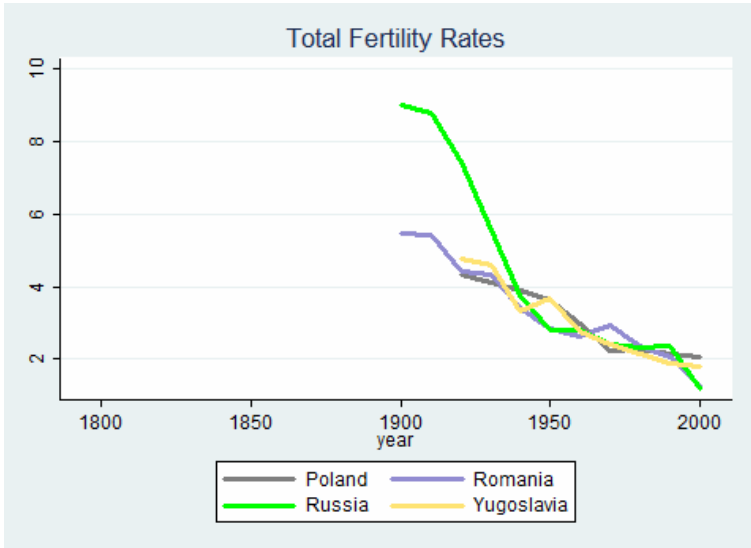
Central & Eastern Europe

Figure 3.13



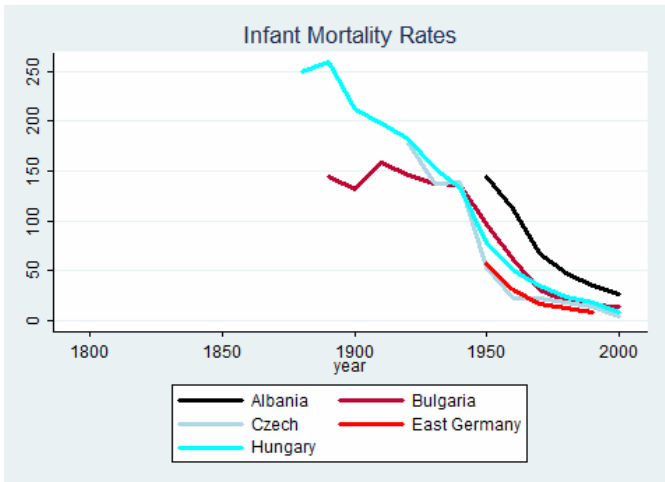
These Central & Eastern European countries begin at much higher fertility rates than the Western Countries in the late 1800s, but after peaking in 1900 the rates continue to fall to something closer to the Western Countries' fertility rates. The Czech Republic experiences a baby boom similar to what the Western Countries experienced in the 1940s. Albania is an outlier, having a high fertility rate of 6.0 in the 1960s, which drops off to a fertility rate of 3.0 in 2000 that is comparably greater to these other countries.

Figure 3.14



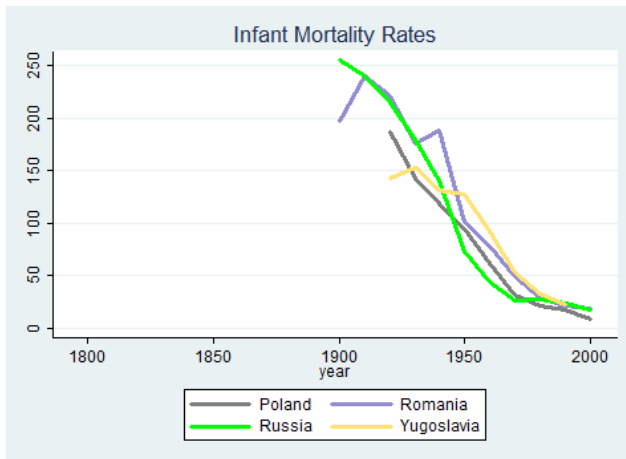
These Central & Eastern European countries begin in 1900 with much higher fertility rates than the Western Countries, with Russia having the highest fertility. Each country drops off to fertility rates of about 2.0 by 2000, which is equivalent to the Western Countries.

Figure 3.15



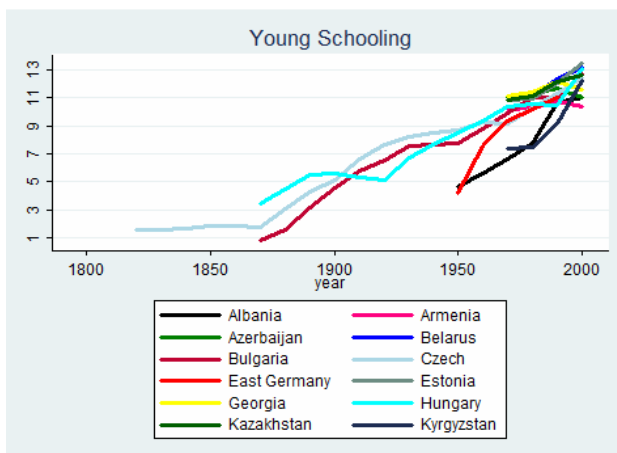
These countries seem to follow the Western Countries trend, except Hungary, which has a very high mortality rate in the late 1800s, and Albania, which has continuously higher mortality rates through 2000.

Figure 3.16



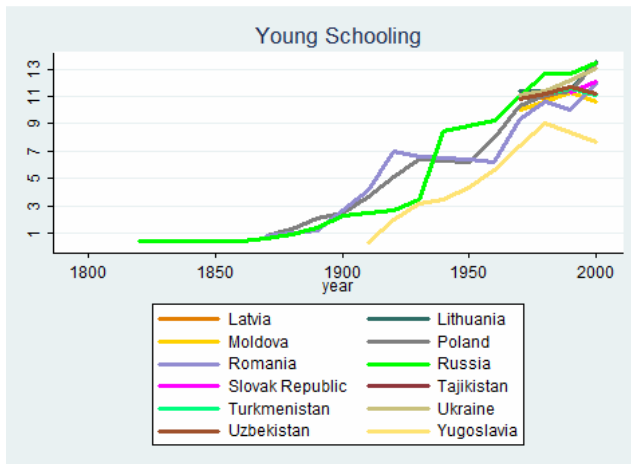
These countries follow a similar trend but the mortality rates are much higher in 1900, dropping off to fertility rates somewhat higher than in Western Countries in 2000.

Figure 3.17



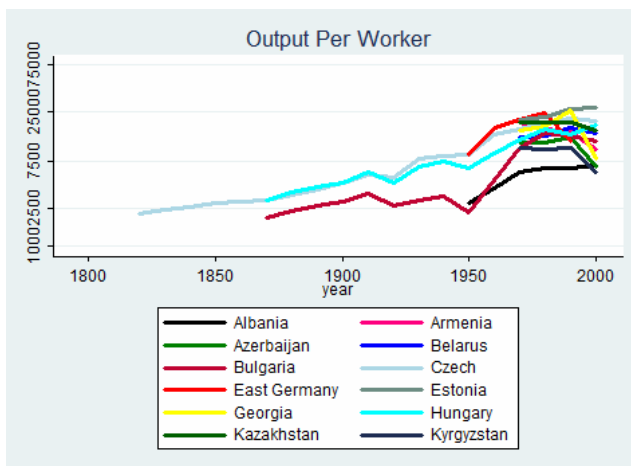
These countries seem to follow the Western trend but achieve lower levels of schooling up until 2000, when they get close to the Western Countries level of schooling.

Figure 3.18



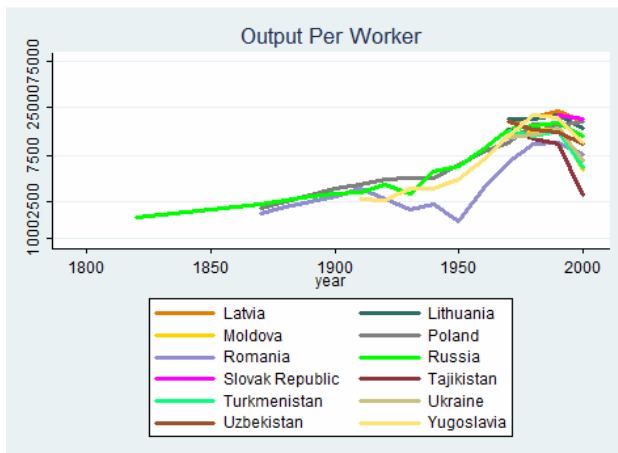
This follows a model similar to the Western Countries, only with lower levels of schooling for all years, with Yugoslavia attaining the lowest levels of schooling, thus, being an outlier.

Figure 3.19



These measurements follow similar trends but are much lower than the output per worker for the Western Countries, with Bulgaria having very consistent low levels of output until reuniting with the other countries in 2000. Albania is an outlier, here, with very low levels of output for all years.

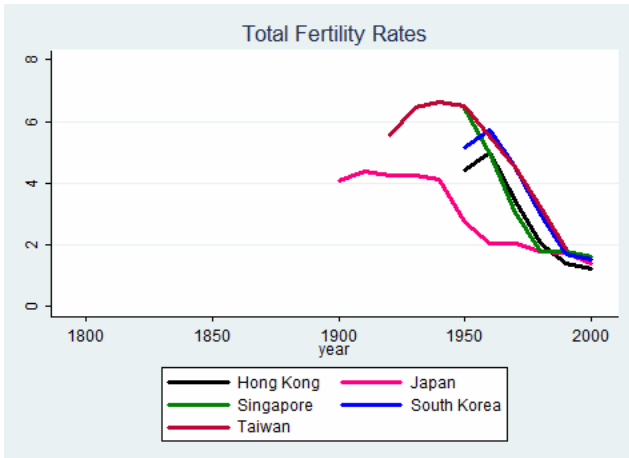
Figure 3.20



Shown here are low levels of output per worker compared with the Western Countries, with Romania and Tajikistan having very low levels of output per worker compared with the other countries.

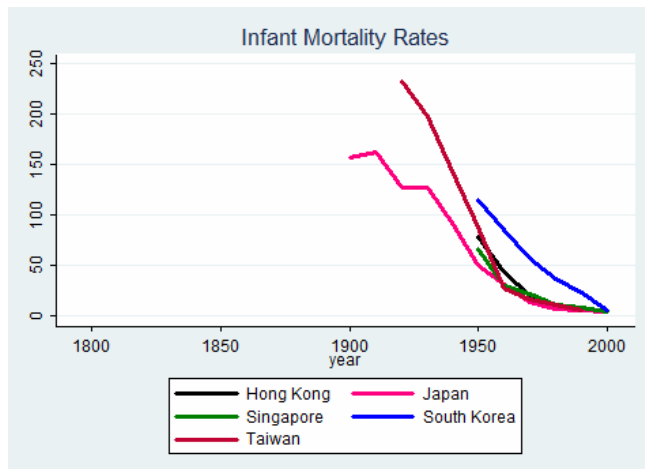
Newly Industrialized Countries

Figure 3.21



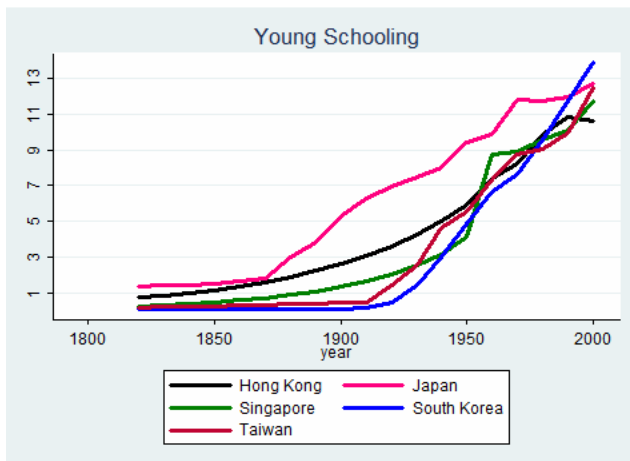
The trend of these countries seems to begin very high, around the 6.0 rate, before the 1950s, but the rate declines rapidly to equal the Western Countries' fertility rate of 2.0 by 2000. Japan is an outlier from the rest of these countries because it begins much lower, at a rate of 4.0 in 1900, which drops off more rapidly after 1950 and then eventually reaches a rate of 2.0 by 2000.

Figure 3.22



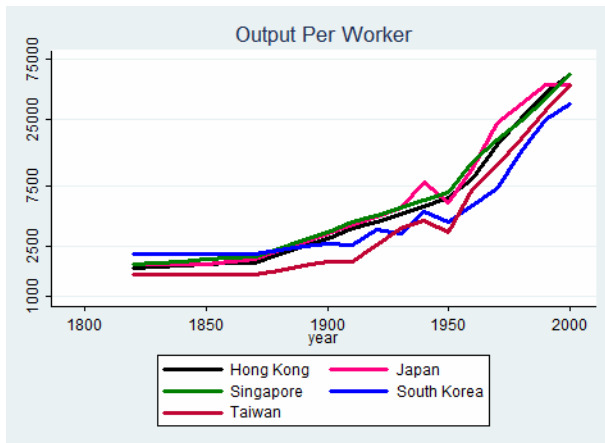
Japan also seems to be an outlier here with lower infant mortality in 1900, which declines rapidly, reaching a rate of close to 0 by 2000. These countries have a very high infant mortality rate in the 1930s compared with the Western Countries, but they all converge close to 0 by 2000.

Figure 3.23



These countries look very similar to the pattern of the Western Countries, but they all start out at lower schooling levels than the Western Countries, with only South Korea reaching schooling levels equivalent to the Western Countries' levels by 2000.

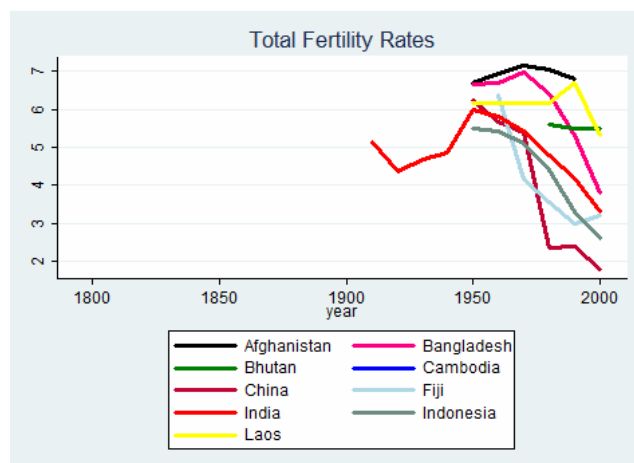
Figure 3.24



Output per worker starts out at lower levels in these countries than it does in the Western Countries. Ultimately, these countries reach output per worker levels very close to the Western Countries in 2000.

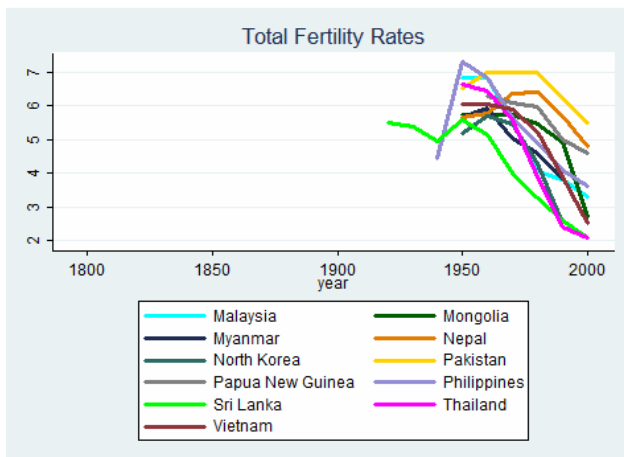
Asia

Figure 3.25



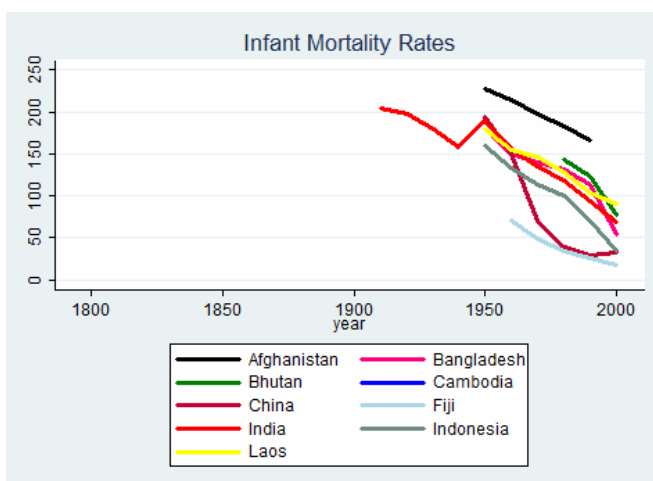
These countries' fertility rates seem to be much higher than the Western Countries in 1950 but then decrease very rapidly, such as China, which reaches levels equivalent to the Western Countries.

Figure 3.26



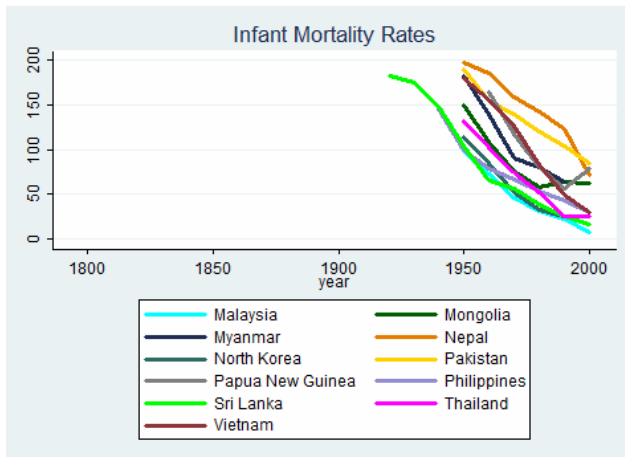
These countries have very high fertility rates, and only Thailand and Sri Lanka seem to meet the Western Country standard by 2000.

Figure 3.27



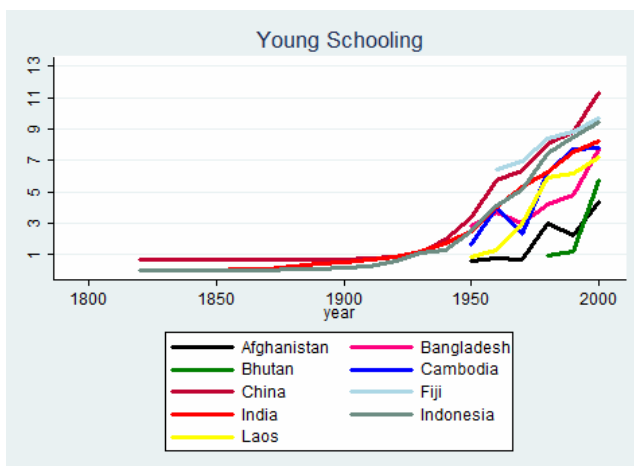
These countries have very high infant mortality rates in 1950, and none meet the Western Country standard by 2000. Afghanistan seems to have the highest infant mortality and doesn't follow the rest of these countries' trend.

Figure 3.28



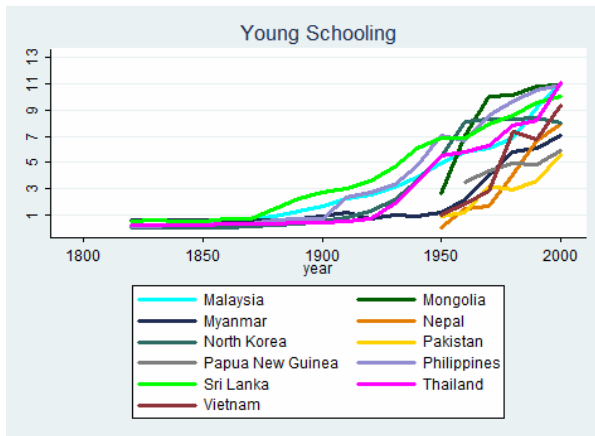
These countries have very high infant mortality rates in 1950. Though they all decline fairly rapidly, only a few countries come close to the Western Countries' rates in 2000.

Figure 3.29



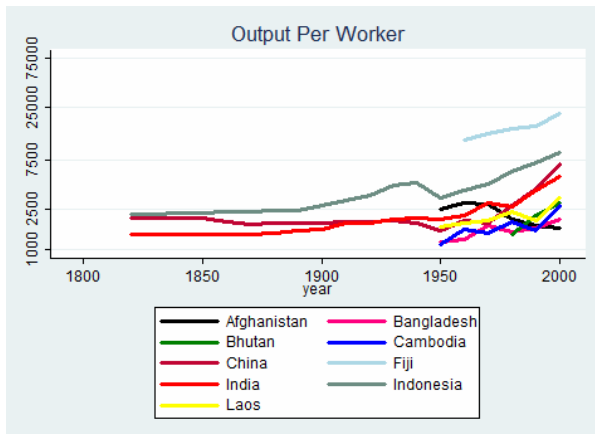
These countries have very low levels of young schooling, and none meet the Western standard by 2000. Afghanistan and Bhutan seem to have the lowest levels of schooling and do not come close to reflecting the Western country trend.

Figure 3.30



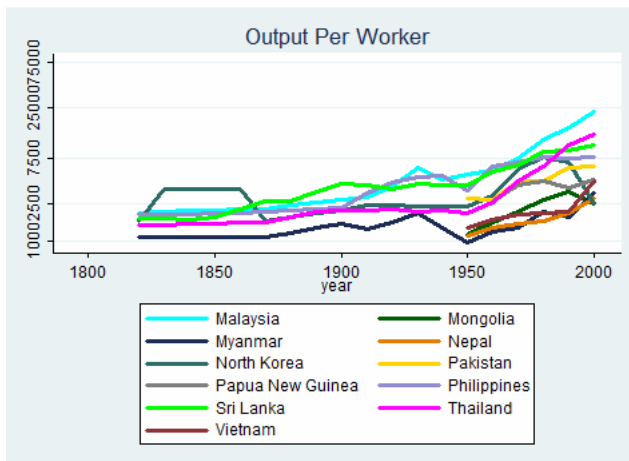
Young schooling is much lower than in the Western Countries, with Pakistan and Nepal having the lowest levels of schooling. None of these countries meet the Western country standard by 2000.

Figure 3.31



Output per worker is very low in these countries, and no country reaches levels remotely close to the Western Countries. Fiji is an outlier, with very high levels of output per worker. Also, Indonesia has higher levels of output per worker than the other countries over time.

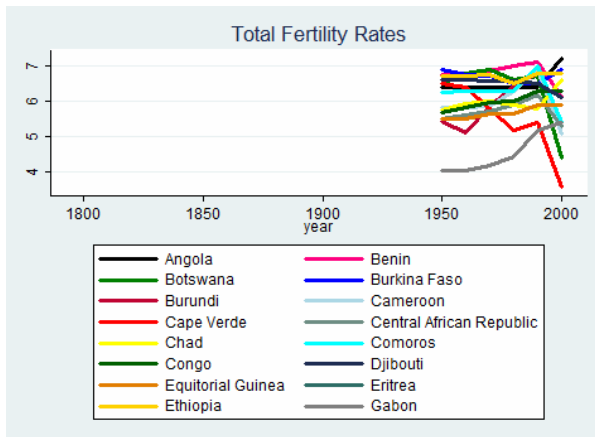
Figure 3.32



These countries have very low levels of output per worker, with no country coming close to meeting the trend of the Western Countries. Myanmar seems to consistently have the lowest levels of output per worker.

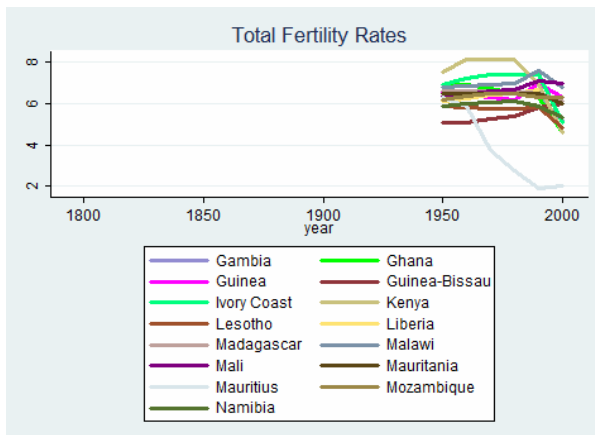
Sub-Saharan Africa

Figure 3.33



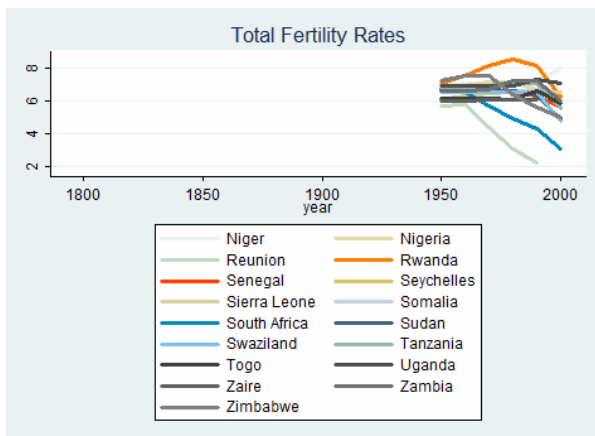
These countries seem to have very high levels of fertility in 1950, which all seem to either level off and remain constant or decrease dramatically. Gabon is an outlier here because it has the lowest level of fertility in 1950, which increases to reflect the level of other countries by 2000.

Figure 3.34



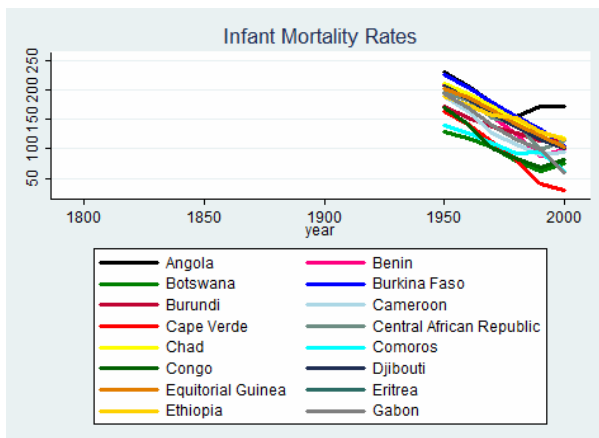
These fertility rates seem to stay constant or decrease only slightly, which is not consistent with the Western Countries trend. Mauritius is an outlier, dramatically dropping off to meet fertility rates that are consistent with the Western Countries in 2000.

Figure 3.35



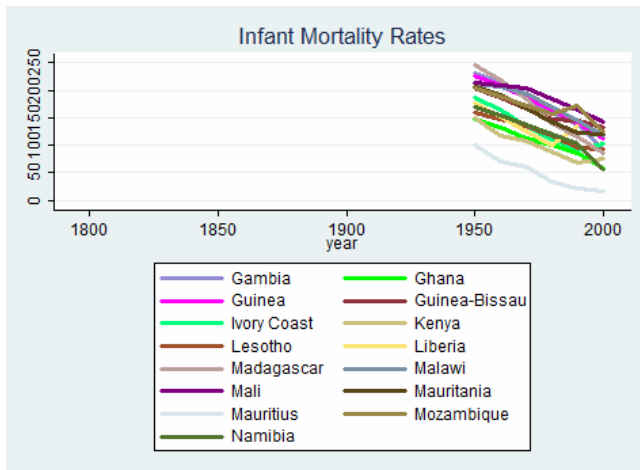
Reunion and South Africa are outliers here while most of the other countries have higher rates that don't seem to drop. These two countries drop to meet rates closer to those of the Western Countries by 2000.

Figure 3.36



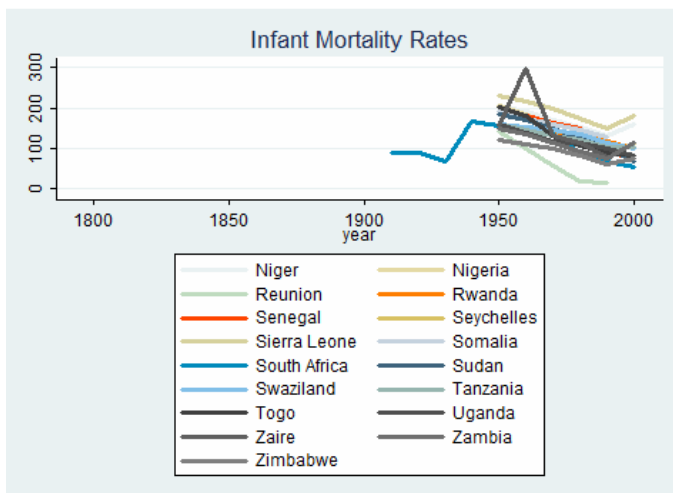
These infant mortality rates are much higher than the Western Countries in 1950, with only Cape Verde dropping in 2000 to meet the same standard as the Western Countries.

Figure 3.37



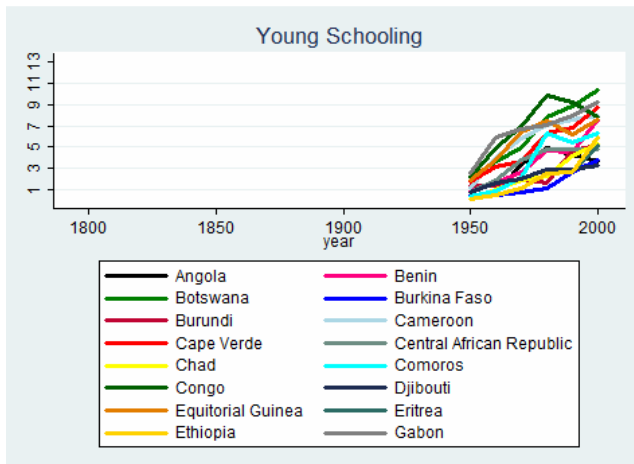
All infant mortality rates are much higher than the Western Countries, except Mauritius, which very closely follows the Western Countries trend.

Figure 3.38



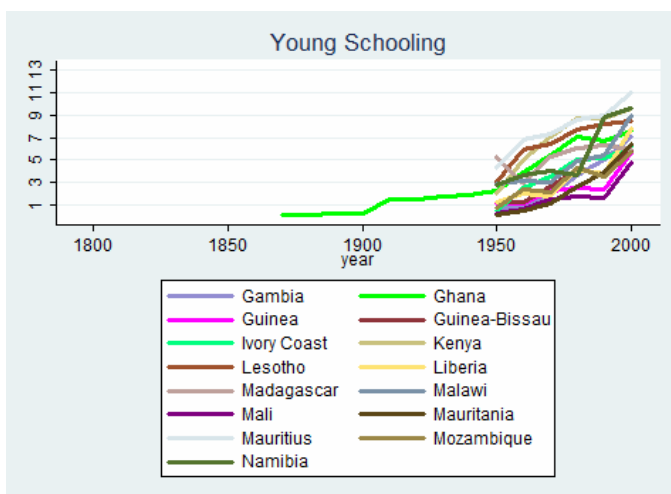
These infant mortality rates are much higher than the Western Countries trend. Zaire is an outlier because it closely follows the trend from 1950 to 2000.

Figure 3.39



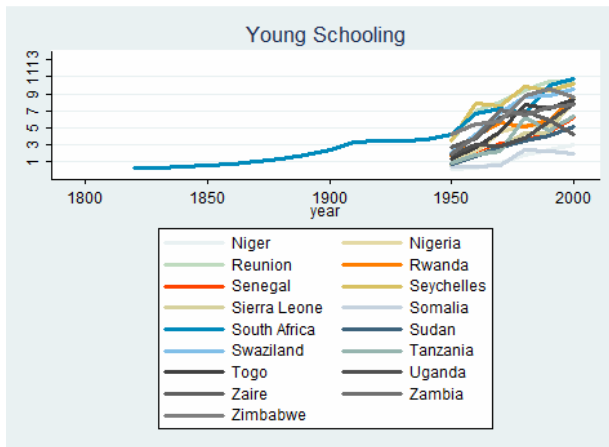
Young schooling is much lower from 1950 to 2000 in these countries compared to the Western Countries. No countries meet with the Western Countries' standards in 2000.

Figure 3.40



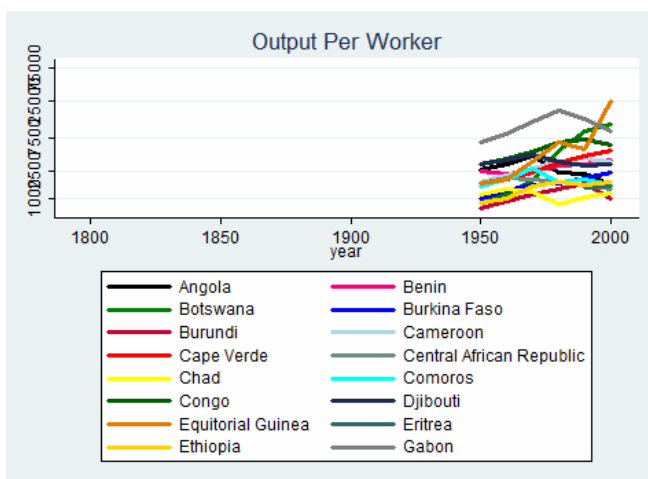
Young schooling is much lower here than in the Western Countries, with none of the countries meeting the Western Countries standards in 2000.

Figure 3.41



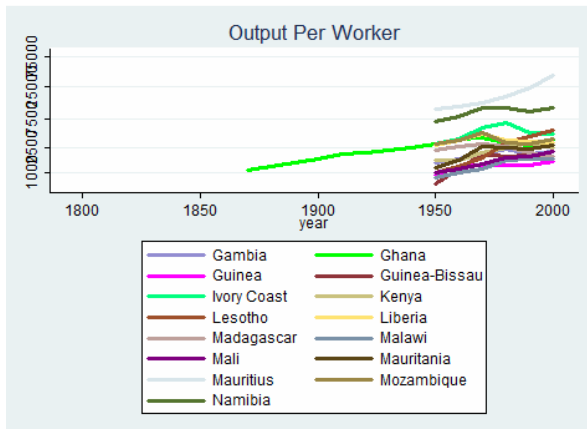
These are very low levels of schooling in which none of the countries meet the Western Countries standards in 2000.

Figure 3.42



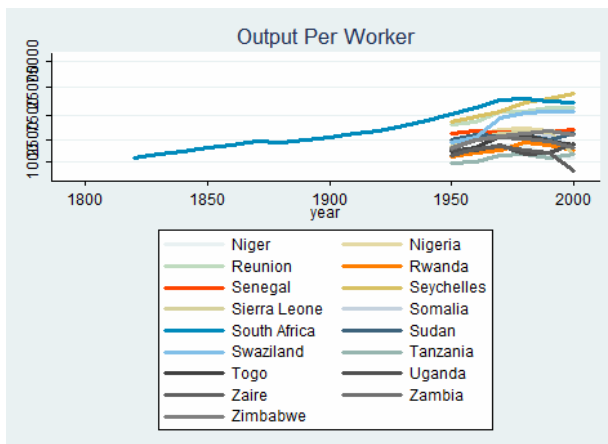
Output per worker is extremely low compared with the Western Countries with Gabon having the highest levels but then dropping off to join the rest of the countries. Equatorial Guinea seems to be at the best spot in 2000 for output per worker.

Figure 3.43



Output per worker seems very low in these countries compared with the Western Countries, with Mauritius and Namibia having the highest output that comes somewhat close to the Western Countries trend.

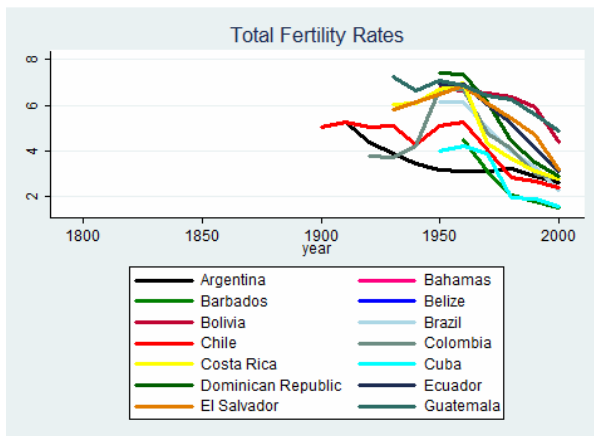
Figure 3.44



Output per worker seems very low in these countries compared with the Western Countries, with none of these countries coming close to the Western trend.

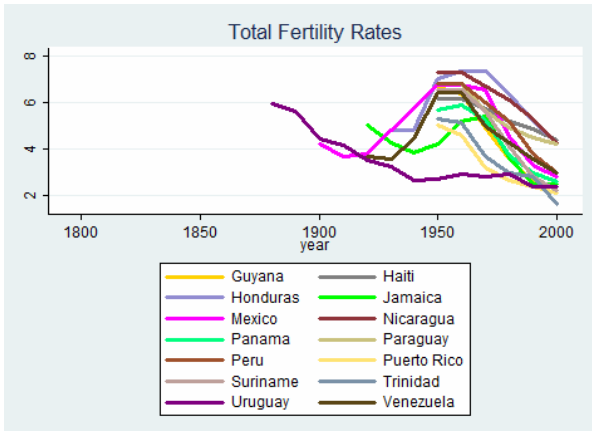
Latin America

Figure 3.45



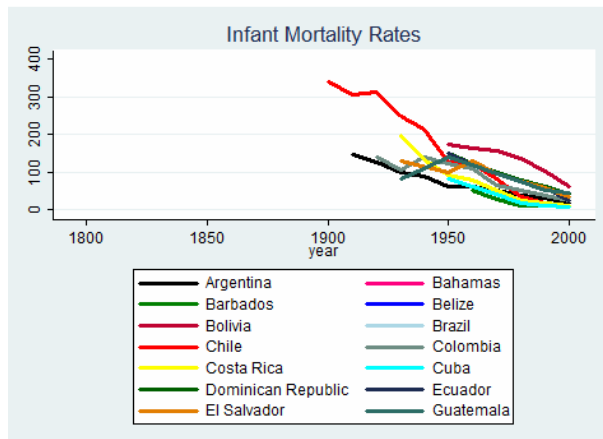
These fertility rates seem very high, with most countries following the same baby boom trend as in the Western Countries. Cuba and Barbados come close to following the Western country trend by 2000, with the other countries still maintaining higher fertility rates.

Figure 3.46



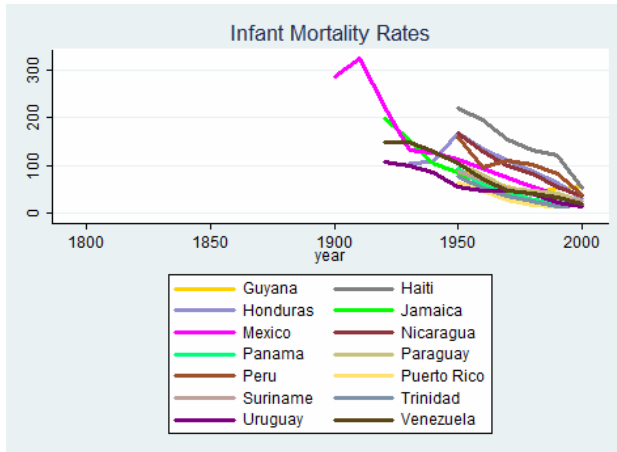
These countries have higher fertility rates than in the Western Countries, which drop off to where some countries meet the Western country trend in 2000. Uruguay seems to consistently have the lowest fertility rates of all the countries and does not experience any sort of baby boom.

Figure 3.47



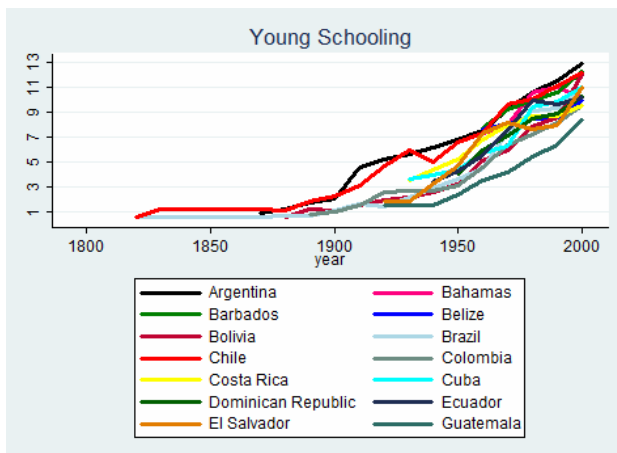
These infant mortality rates are fairly consistent with the Western Countries, with Chile and Bolivia having the highest infant mortality rates compared with the other countries.

Figure 3.48



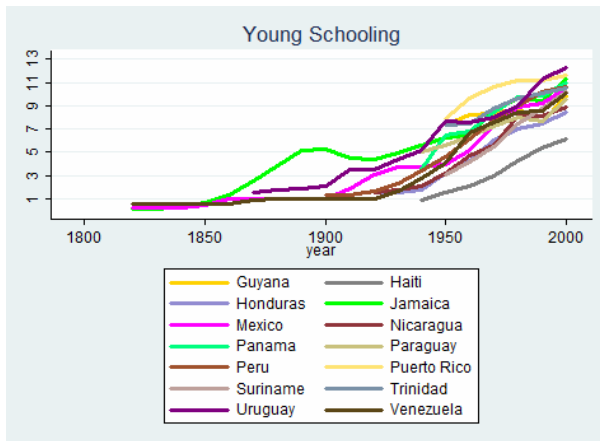
These infant mortality rates are higher than the Western Countries but eventually level off by 2000 to be consistent with Western Countries. Haiti seems to have the highest infant mortality rates of these countries.

Figure 3.49



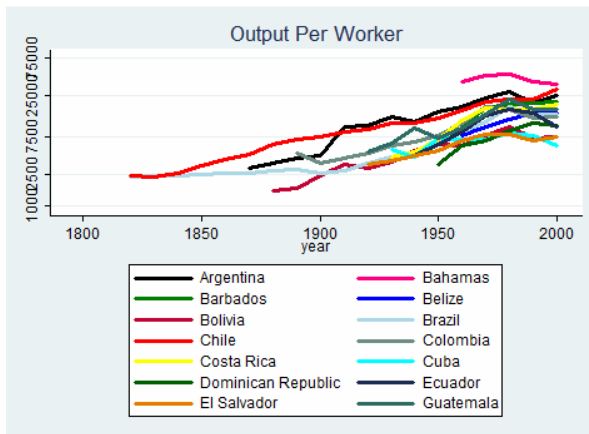
Young schooling begins much lower with these countries than in the Western Countries. Eventually some countries achieve schooling levels fairly close to the Western Countries by 2000. Guatemala seems to consistently have the lowest level of young schooling.

Figure 3.50



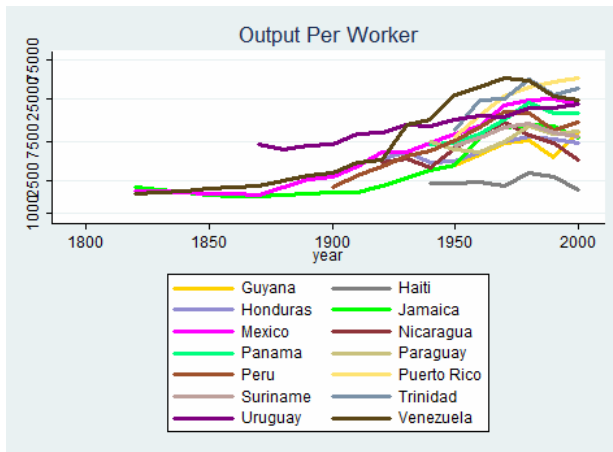
These levels of schooling are lower than the Western Countries. Uruguay seems to come close to meeting the Western standard in 2000, while Haiti consistently has the lowest level of young schooling.

Figure 3.51



Output per worker seems consistently lower than in the Western Countries, with the Bahamas having the highest level of output per worker of these countries.

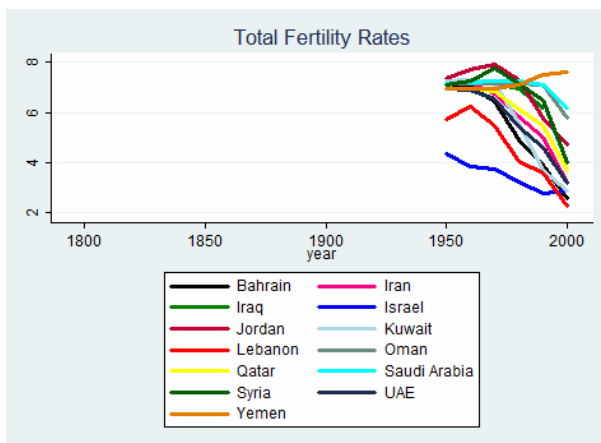
Figure 3.52



Output per worker seems consistently lower here than in the Western Countries, with Haiti consistently having the lowest levels of output per worker.

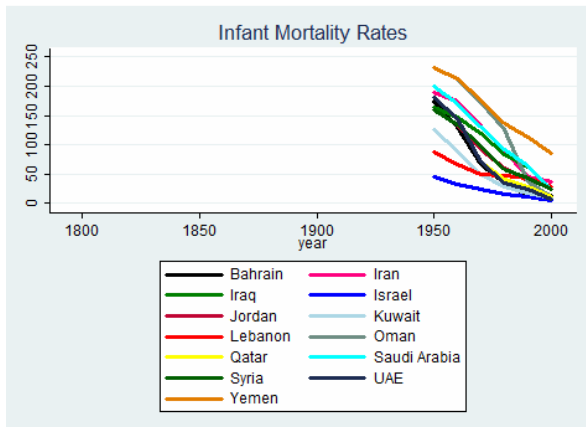
Middle East

Figure 3.53



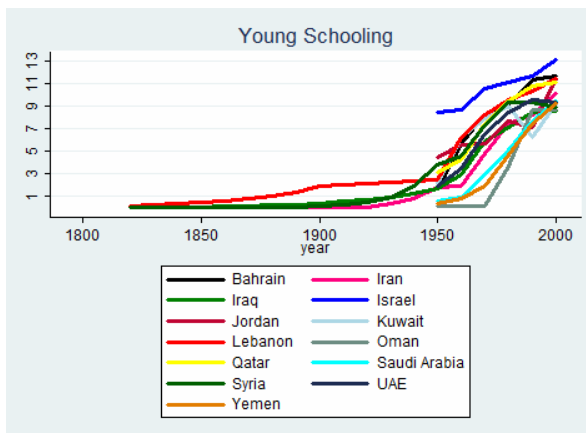
The fertility rates in these countries are much higher than those in the Western Countries, with some reaching levels fairly close to the Western Countries in 2000. Israel is an outlier by consistently having lower rates than any other country here.

Figure 3.54



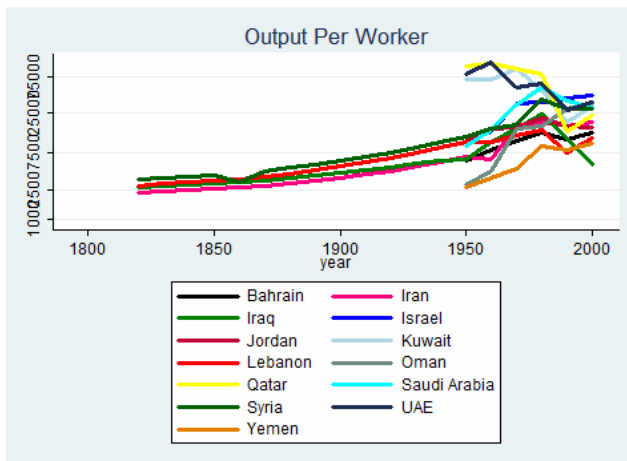
Here, infant mortality rates are much higher than in the Western Countries. Israel is the only one that is consistent with the Western Countries in 1950 and in 2000. Yemen has consistently higher infant mortality rates than the other countries.

Figure 3.55



Young schooling is much lower here than in the Western Countries. These countries never reach levels equivalent to the Western Countries. Israel seems to be an outlier here by having consistently higher levels of young schooling and reaching levels equivalent to the Western Countries by 2000.

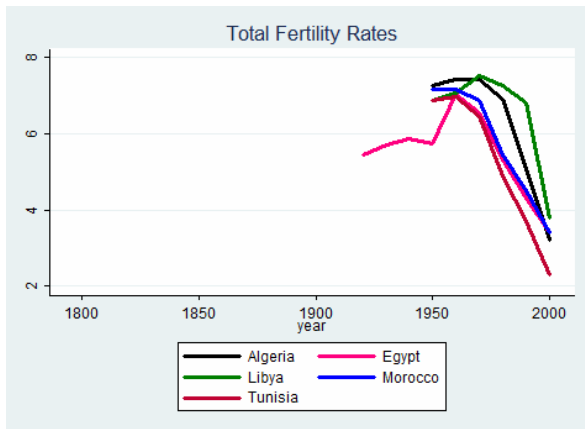
Figure 3.56



Output per worker is far lower here than it is in the Western Countries, with the exception of the UAE, Qatar, and Kuwait. These three countries have higher levels of output in 1950 but then decrease to become equivalent to the output of the rest of the countries. Yemen seems to consistently have the lowest level of output per worker.

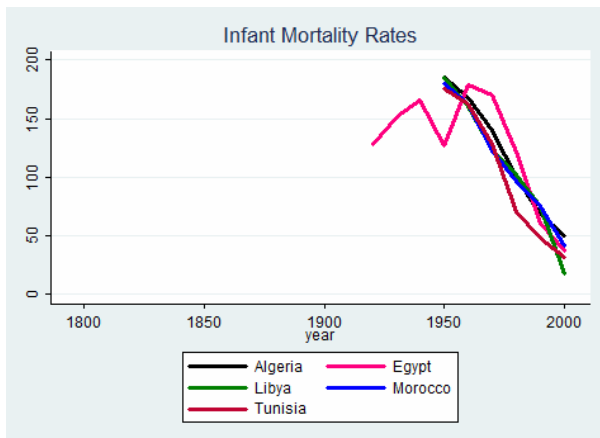
North Africa

Figure 3.57



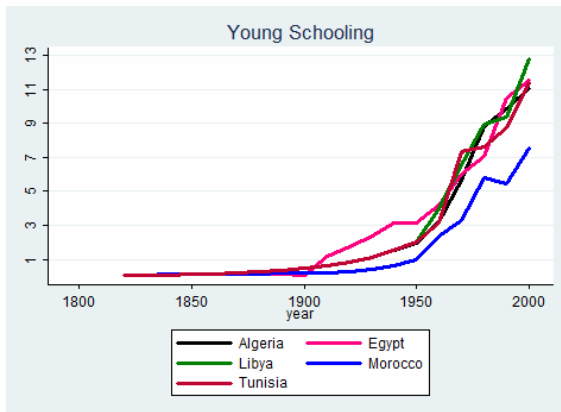
These countries have much higher fertility rates in 1950 that drop off dramatically, eventually reaching levels close to the Western Countries by 2000.

Figure 3.58



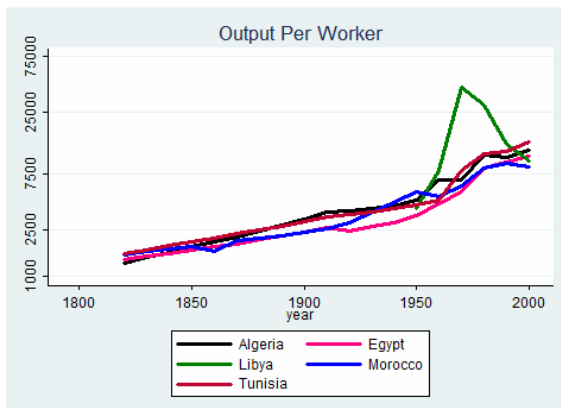
These countries have much higher infant mortality rates in 1950 than the Western Countries. Egypt does not follow the trend with a sharp decrease and then an increase in mortality in 1950. The mortality rates are still higher than the Western Countries by 2000.

Figure 3.59



Young schooling here is far lower than the Western Countries, with Morocco consistently having the lowest levels of schooling. Only Libya comes close to meeting the Western standard in 2000.

Figure 3.60



This shows low levels of output over time that fall short of meeting the Western standard by 2000. Libya is an outlier for having a huge surge of output per worker during the 1970s, which then drops back to meet the other countries' output per worker.

- *Results*

The general trend for all regions over time is total fertility rates and infant mortality rates decrease while young schooling and output per worker increase. When examining the Western Countries, I find an increase in young schooling corresponds to an increase in total fertility rates. This could suggest that, as more children complete higher levels of schooling, they could become more informed about ways to prevent pregnancy and thus fertility rates decline. The Western Countries trends also suggest that an increase in fertility rates leads to a decrease in infant mortality rates. This is obvious in that, if more infants survive past a year of birth, the number of children a woman would have in her lifetime would increase. These trends suggest that an increase in young schooling corresponds to an increase in output per worker. This makes sense in that, if a person is more educated he or she will be able to provide a higher level of output. Thus, if more people have a higher education, a country's output per worker will be greater.

The Western Countries, Southern Europe, and the Newly Industrialized Countries seem to have the most consistent total fertility rates that remain at lower rates over time. The other regions have very volatile and high rates of fertility over time, which could be corrected by investing more in young schooling. Asia, Sub-Saharan Africa, and North Africa seem to have the most volatile infant mortality rates. The Western Countries, Southern Europe, Central & Eastern Europe, and the Newly Industrialized Countries seem to have the highest levels of young schooling, while the other regions continuously fall short of these regions' expectations. The Western Countries, Southern Europe, the

Newly Industrialized Countries and the Middle East seem to have the highest levels of output per worker. The Middle East is a special case since they have continuously lower levels of schooling, high infant mortality rates, and high fertility rates, which make their output per worker measure questionable. This could be due in part to comparisons with the outliers from this region, which includes Israel, Kuwait, Qatar, and the UAE. A closer look at these countries could lead to protocols for what the other Middle Eastern countries could do in order to improve the region overall standard of living.

CONCLUSIONS AND DISCUSSION

In answering the question, why some countries are so rich and others so poor, it seems that lower fertility and infant mortality rates along with high amounts of young schooling and output per worker lead to a more prosperous society. I have thoroughly examined the trends in Western Countries and have compared those trends with other regions. Southern Europe seems consistently more aligned with the Western Countries than other regions; however, most of the other regions appear very far from the Western standard of living. These regions can improve their circumstances by making more efforts to promote young schooling, which could then in turn decrease fertility and increase output per worker. The lower fertility rates will then lead to lower infant mortality rates. These impoverished regions can try to promote methods of birth control in order to decrease fertility rates. The implementation of birth control education policies in harmony with educational incentives could greatly benefit these poor countries and could potentially put them on track to achieving the Western Countries' standard of living.

Recommendations for the impoverished regions would be to invest heavily in schooling to lower fertility and infant mortality rates while increasing output per worker. Some promotional educational policies could accomplish this by creating incentives for children to complete higher levels of schooling. Some recommendations for further research would be to look further into each country and examine which policies they have implemented and the outcomes of those policies. It would be useful to compare two

countries with similar geographic characteristics, population size, and levels of GDP, taking policies that worked in one country and implementing them in the other country which had previously not had a similar policy used. This would be useful in improving standards of living for many impoverished societies across the world. This analysis has generated stimulating results that leads to solutions for improving deprived countries' standards of living. These solutions can ensure more prosperous societies and a chance at a better life for their citizens.

APPENDIX

List of Regions

Western Countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, New Zealand, Norway, Sweden, Switzerland, UK, USA
Southern Europe: Cyprus, Greece, Italy, Malta, Portugal, Spain, Turkey
Central & Eastern Europe: Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Czech, East Germany, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Slovak Republic, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Yugoslavia
Newly Industrialized Countries: Hong Kong, Japan, Singapore, South Korea, Taiwan
Asia: Afghanistan, Bangladesh, Bhutan, Cambodia, China, Fiji, India, Indonesia, Laos, Malaysia, Mongolia, Myanmar, Nepal, North Korea, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam
Sub-Saharan Africa: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Reunion, Rwanda, Senegal, Seychelles, Sierra Leone, Somalia,

South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zaire, Zambia, Zimbabwe
Latin America: Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Suriname, Trinidad, Uruguay, Venezuela
Middle East: Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, UAE, Yemen
North Africa: Algeria, Egypt, Libya, Morocco, Tunisia

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