

The Demography of the Labor Force in Emerging Markets

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I. Introduction

This paper discusses how demographic changes are affecting the labor force in emerging markets. As will be shown below, the demographic situation in emerging markets is rapidly changing. After several decades of rapid population growth, with most of the growth coming at the youngest ages, population growth rates have declined substantially and growth is now concentrated in the older age groups. These changes are important to the U.S. economy for several reasons. First, these countries will be some of the United States' most important trading partners in the decades to come. Changes in the size and composition of the labor force in these countries could have important implications for the kinds of goods they produce and how they compete in the world economy. Second, the demographic changes in emerging markets have potentially important impacts on the demand for U.S. goods in these economies. Third, the changing demographics of the labor force in emerging markets may have important implications for the way these workers compete with U.S. workers. The change from rapid growth of youth cohorts with low skills to slower growth of youth cohorts with higher skills is potentially an important change in the global labor market that could have both positive and negative effects on the relative position of U.S. workers.

I begin by reviewing some of the dramatic demographic changes in the world in the last 60 years. I then discuss how the rapid population growth that reached a peak in the 1960s continues to affect the dynamics of the labor force in developing countries today and will continue to have effects for many more decades. An important theme will be the slowdown in the growth rate of the working-age population and the shift toward an older labor force. I also discuss the dramatic increase in education in developing countries, including a narrowing of the gender gap in schooling. In the final section of the paper I look at the extent to which rapid population growth has led to high youth unemployment in developing countries.

An important theme throughout the paper is the large differences in demographic trends across regions. While Latin America and East Asia have had rapid fertility declines that have led to substantial reductions in the growth rate of the working-age population, sub-Saharan Africa continues to have high fertility and high rates of population growth. These regional differences will greatly affect the dynamics of the labor force in emerging markets in coming decades.

Throughout the paper I use the population estimates and projections of the United Nations Population Division, as updated in their *World Population Prospects: The 2012 Revision* (U.N. Population Division 2013). I use the U.N.'s Medium Variant projections for projections beyond 2012. I focus mainly on projections to 2030. This means that assumptions about fertility, the most difficult component in projecting long-term population trends, have little impact, since the vast majority of the working-age population in 2030 was already born in 2012. Assumptions about mortality also play a fairly minor role in projecting the working-age population, since mortality rates in the 15-64 age group are relatively low.

II. Background: The Rise and Fall of Rapid Population Growth

In order to understand the current demographics of the labor force in emerging markets, it is important to look at world demographic history of the last 60 years. This is one of the most remarkable periods of demographic change the world has ever seen. As I argued in

my presidential address to the Population Association of America in 2011, the dire predictions made in the 1960s that rapid population growth would lead to mass starvation and increasing poverty in low-income countries were strongly contradicted by actual experience (Lam 2011). This period of unprecedented population growth arguably saw the most rapid improvements in standards of living the world has ever seen. Food production grew faster than population in the world as a whole and in most regions of the world, while the proportion of the population in poverty declined almost everywhere (Lam 2011).

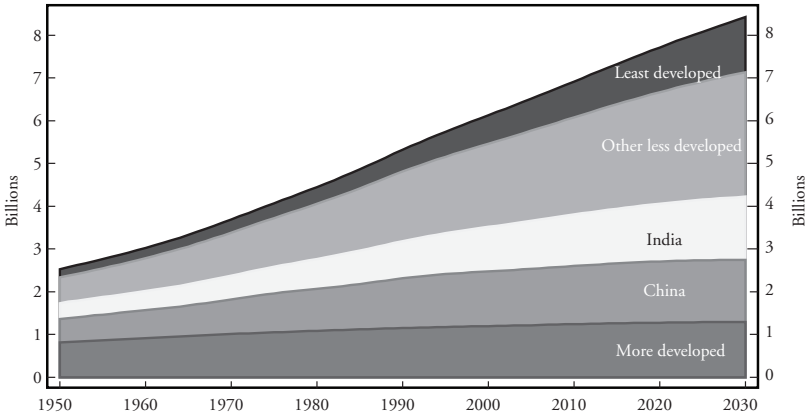
The exceptional demography of recent decades continues to have an important impact on the size and composition of the world's population, and it is essential to understand this history in order to understand what is currently happening to the labor force in emerging markets. Chart 1 shows world population from 1950 to 2030, broken into regions. The world population reached 7 billion in 2011, and is headed toward 8 billion around 2024. One of the most noteworthy features of Chart 1 is the doubling of world population from 3 billion in 1960 to 6 billion in 1999. This is by far the fastest doubling time the world has ever seen, and is almost surely the fastest doubling time the world will ever see (Lam 2011).

Chart 1 shows the dramatic changes that have taken place in the distribution of population across regions. In 1950, 32 percent of the world lived in the countries the U.N. classifies as "more developed." This proportion is currently about 17 percent and will continue to fall in coming decades. The fastest population growth is in the countries the U.N. classifies as "least developed." These countries had 8 percent of the world population in 1950, growing to 15 percent today. While the population of more developed countries will only increase by 3 percent between 2015 and 2030, the population of the least developed countries will increase by 36 percent. China and India, which are in the U.N.'s intermediate "less developed" category, currently have populations of 1.4 billion and 1.3 billion, respectively, with India's population projected to pass China's around 2030.

Chart 2 shows the annual growth rate of population for the world and major regions. The growth rate of world population peaked

Chart 1

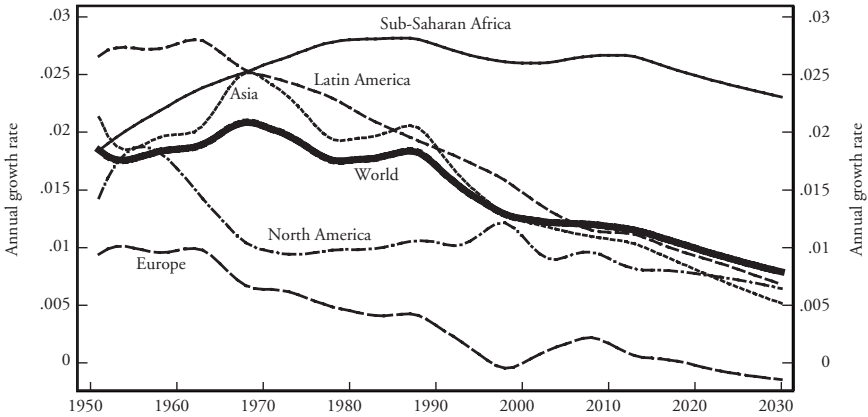
Size of the World's Population, 1950-2030



Source: U.N. *World Population Prospects: 2012 Revision*, Medium Variant.

Chart 2

Annual Population Growth Rate for World and Major Regions



Source: U.N. *World Population Prospects: 2012 Revision*, Medium Variant.

in the 1960s at about 2 percent per year, almost surely the highest growth rate in human history. The growth rate has fallen substantially since that peak. It is now about 1 percent per year and falling.

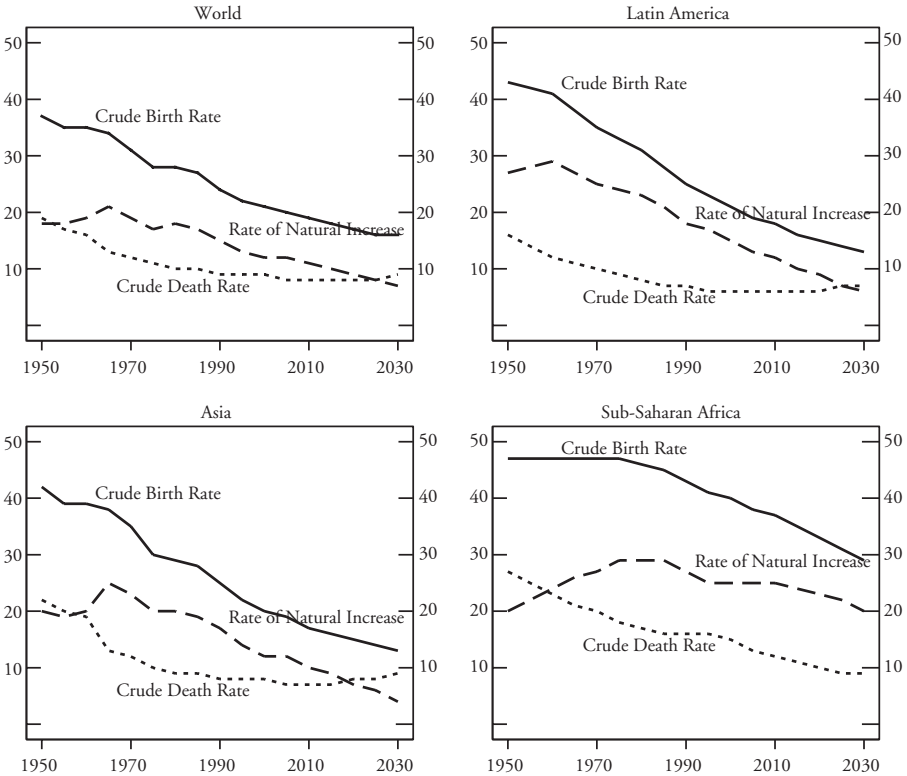
Asia and Latin America grew at around 2.5 percent per year at their peak in the 1960s. Their population growth rate is now about 1 percent per year and falling. Sub-Saharan Africa had a peak growth rate similar to that in Latin America, about 2.8 percent per year, but reached that peak almost 20 years after Latin America. The growth rate has declined at a much slower pace in Africa than it did in Asia and Latin America, and the growth rate is still close to 2.5 percent per year.

III. The Demographic Transition and Rapid Fertility Decline

The reason that developing countries began to experience high rates of population growth in the 1950s and 1960 is because of rapid declines in death rates (Lee 2003; Lam 2011). These declines in mortality, which were heavily concentrated in declining infant and child mortality, had dramatic demographic consequences that will be felt throughout the 21st century. The demographic transition refers to the move from a regime of high birth and death rates to a world of low birth and death rates. When the death rate first declines there is a period of population growth until the birth rate falls to offset it. The birth rate then declines, eventually offsetting the decline in the death rate. The final stage of the transition is a regime of zero or low population growth supported by a combination of a low birth rate and a low death rate.

Chart 3 shows the demographic transition for the world and different regions, beginning in 1950 when the U.N. population estimates begin. The chart shows crude death rates and crude birth rates, which are simply the number of births or deaths divided by the total population (traditionally expressed, as in Chart 3, per 1,000 population). The rate of natural increase is simply the difference between the birth rate and the death rate. The crude birth rate for the world was 38 per 1,000 in 1950. The crude death rate was about 20 per 1,000 (2 percent of the world died every year), creating a population

Chart 3
Crude Birth Rate, Crude Death Rate, and Rate of Natural Increase, 1950-2030
(Rates per 1,000 Population)



Source: U.N. *World Population Prospects: 2012 Revision*, Medium Variant Projections.

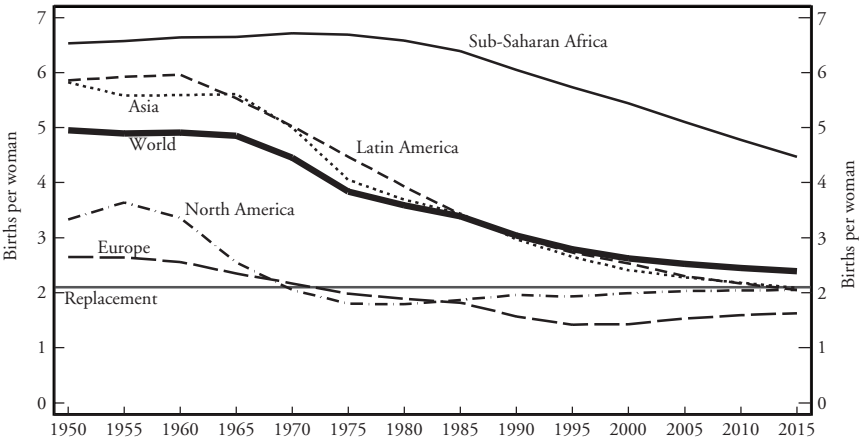
growth rate of 1.8 percent per year. The death rate fell faster than the birth rate in the 1950s, causing the growth rate to increase to over 2 percent per year in the 1960s.

Chart 3 helps us understand why we are unlikely to see growth rates of over 2 percent again. The world's death rate is already very low, so there is a little more room for increased population growth due to falling death rates. Death rates are actually leveling off and are projected to increase slightly in future decades, the result of population aging (life expectancy continues to increase for the world as a whole and for most regions of the world, but population aging causes an increase in the proportion of the population that dies each year). The crude birth rate for the world will almost surely continue to decline, in part because the current concentrations of population in childbearing ages will transition into older populations. While we cannot rule out an increase in birth rates, a population growth rate of 2 percent per year at today's crude death rate would require the unlikely scenario of a return to the high birth rates of the 1960s.

As seen in Chart 3, the demographic transition has followed fairly similar trajectories in Latin America and Asia, with both having had rapid declines in birth rates since the 1960s. Sub-Saharan Africa, on the other hand, has a considerably different trajectory. It has had a substantially slower decline in birth rates, and still has population growth rates of around 2 percent per year.

Chart 4 shows the dramatic declines in the total fertility rate around the world, measured as the number of births to a woman over her lifetime. For the world as a whole, the total fertility rate was around five births per woman in the 1950s, and has now fallen to about 2.5 births per woman. Latin America and Asia have both dropped from levels of almost six births per woman in the 1950s to near replacement fertility of 2.1 births, almost identical to the total fertility rate in North America. Sub-Saharan African has also had substantial fertility decline, but fertility remains high at about 4.5 births per woman (Bongaarts and Casterline 2013). This continued high fertility in is the key factor explaining why sub-Saharan Africa looks different from other regions of the world in all of the demographic measures considered in this paper.

Chart 4
Total Fertility Rate for World and Major Regions



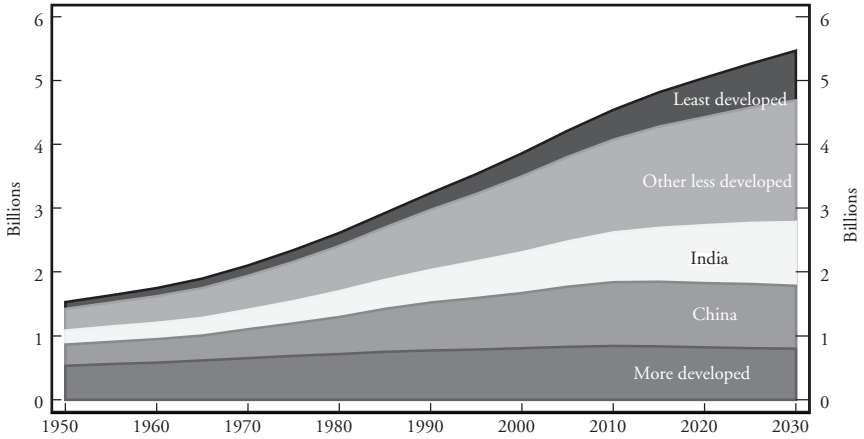
Source: U.N. *World Population Prospects: 2012 Revision*.

IV. The Demography of the Labor Force

I now analyze the implications of these demographic changes for the labor force. Chart 5 shows the growth of the working-age population using the International Labor Organization's (ILO) definition of ages 15-64. Not surprisingly, trends in the working-age population look similar to trends in the total population. There are some notable differences, however, between Chart 5, which shows the population aged 15-64, and Chart 1, which shows the population of all ages. While the total population in more developed countries is projected to increase between 2015 and 2030, the working-age population is projected to decline by over 4 percent over this period. The difference is due to removal of the 65 and older population, which is the fastest growing age group over this period.

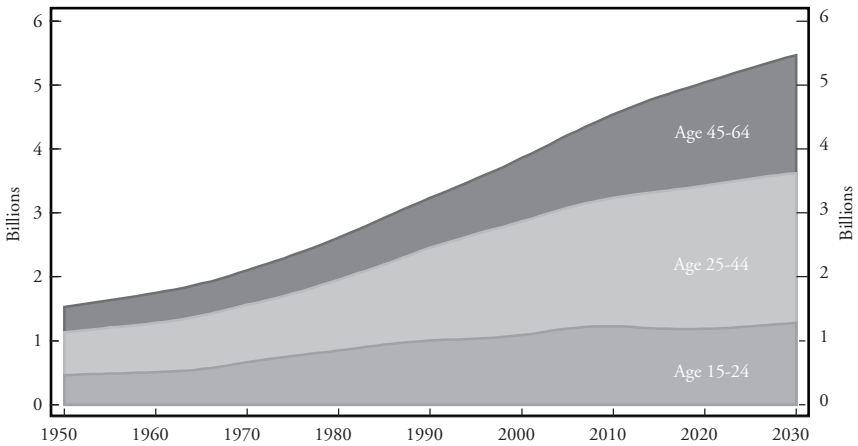
Chart 6 shows the breakdown of the working-age population by age groups. I have divided the working-age population into three groups: younger workers, ages 15-24 (this is the standard ILO definition of the youth population); middle-aged workers, ages 25-44; and older workers, ages 45-64. There have been dramatic changes in the growth rates of these three groups. While the youth population grew rapidly in the 1970s, this group has now leveled off and it is the

Chart 5
Size of the World's Working-age Population, 1950-2030



Source: U.N. *World Population Prospects: 2012 Revision*, Medium Variant.

Chart 6
Age Composition of the World's Working-age Population, 1950-2030



Source: U.N. *World Population Prospects: 2012 Revision*, Medium Variant.

older age group that is growing rapidly. This important change in the demography of the labor force will be discussed in more detail below.

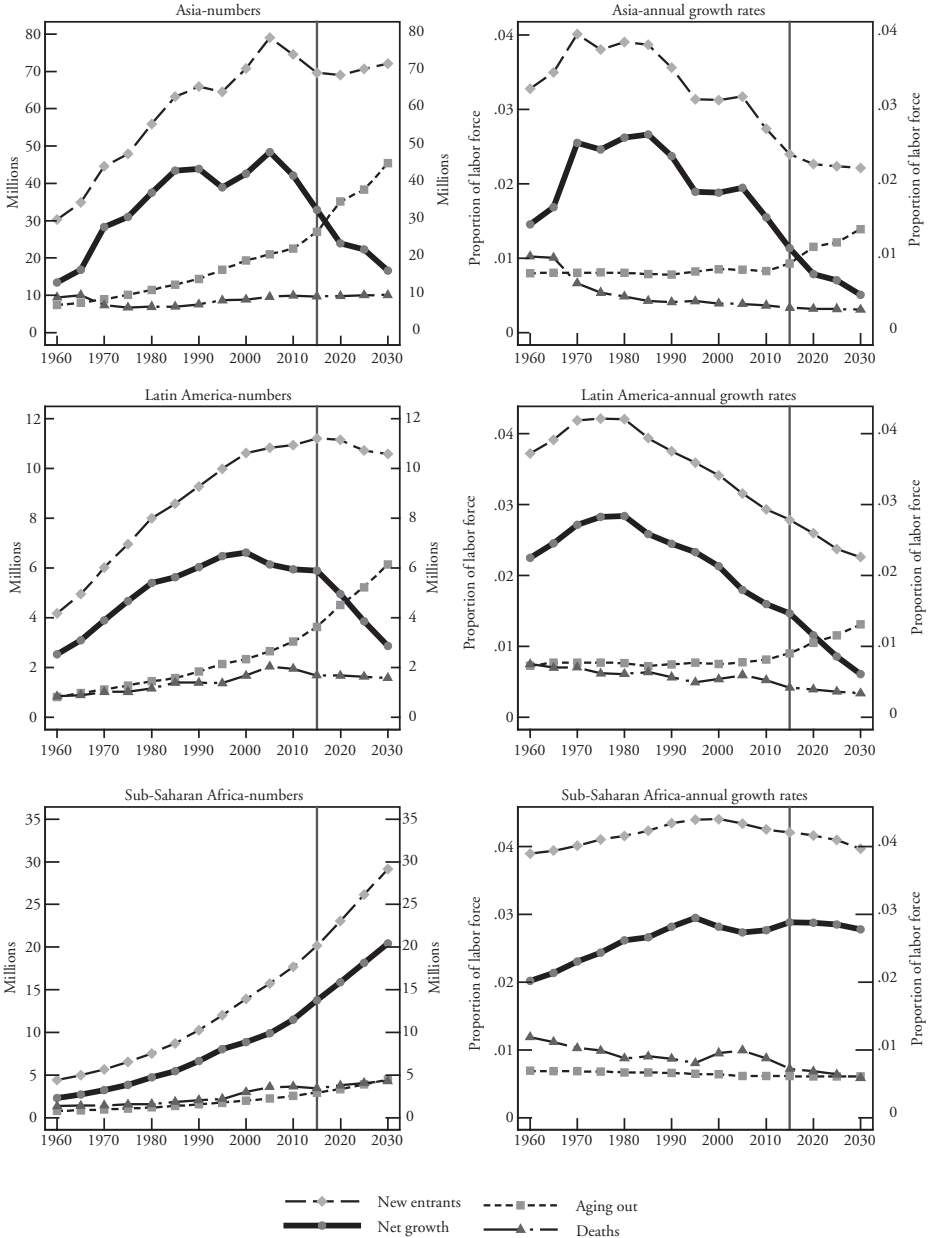
IV.i Entry, Exit and Net Increase of the Working-age Population

In thinking about the growth of the labor force, it is interesting to look at the components, shown in Chart 7. Following the approach in Lam and Leibbrandt (2013), the growth of the working-age population is broken into three components. The number of new entrants is the number who turn age 15 in a given year. The number aging out of the working-age population is the number turning 66 in a given year. The third component is the number of deaths in the 15-64 age group.

We see in the top left panel of Chart 7 that Asia will have about 70 million people turn age 15 and enter the working-age population in 2015. This will be offset by 30 million who will age out (turn age 66) plus 10 million deaths, for a net increase of 30 million workers, or 2.5 million net additions per month. The right panel shows that this is a net growth rate of about 1 percent. This growth rate was over 2.5 percent in the 1980s and has been falling rapidly due to fertility decline. Looking at trends in the components, we see a big increase in the number of people aging out of the working-age population in Asia, while there is a leveling off in the number of people entering the working-age population. Both of these reflect population aging, resulting in the big decline in the growth of Asia's working-age population.

The pattern for Latin America looks very similar to Asia. There has been a sharp decline in both the absolute numbers and in the growth rate of the working-age population. Sub-Saharan Africa looks very different, however. The inflow of 20 million new young workers is only offset by 3 million deaths and 3 million aging out, both reflecting Africa's young age structure, which in turn reflects slow fertility decline. The result is a net increase of 14 million new workers per year, or over 1 million per month. While the number of net entrants is falling in Asia and Latin America, it is rising rapidly in sub-Saharan Africa. The growth of the working-age population will increase from 1.1 million per month in 2015 to 1.7 million per month in 2030.

Chart 7 Annual Growth of Working-age Population, by Components, 1960-2030



IV.ii How Many Million Workers Are Added to the Labor Force Each Year?

Turning from regions to specific countries, Chart 8 shows the net increase in the size of the working-age population (the number aging in minus the number dying and aging out) each year for a number of large countries representing key regions of the world. This is roughly the number of new jobs these countries need to generate each year to keep employment rates constant. I show the numbers for 1975 (representing roughly the peak population growth rate for many countries), 2015 and 2030.

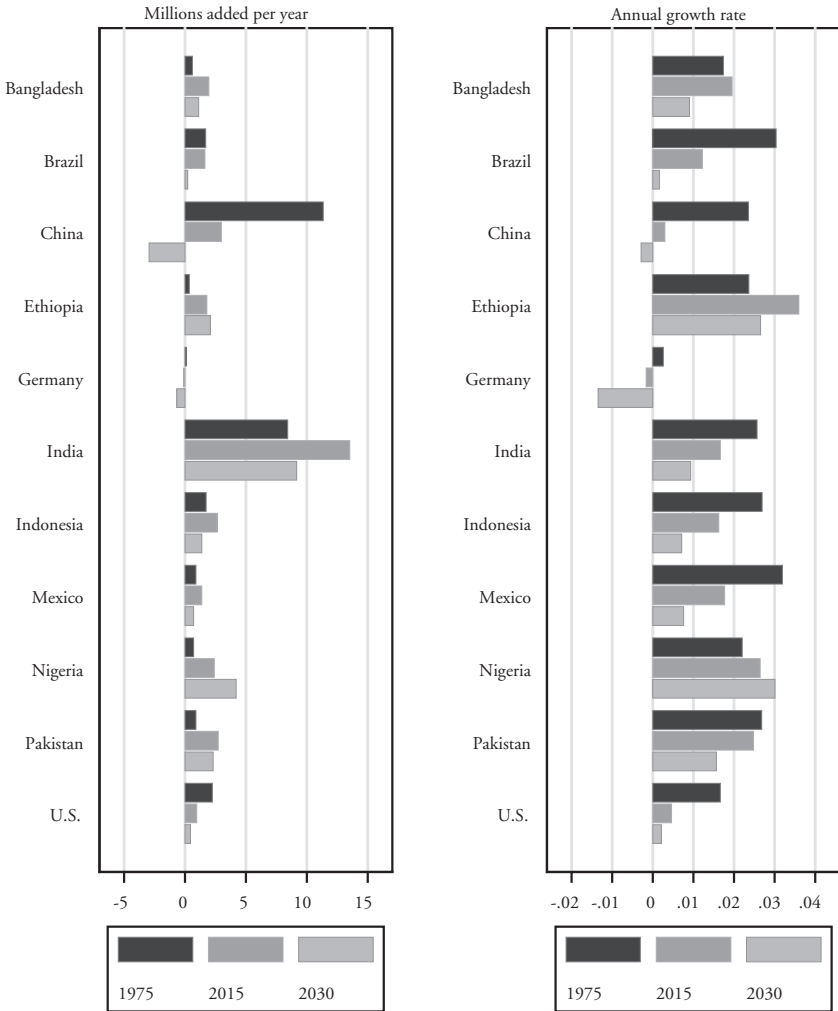
China was adding around 12 million workers per year—1 million per month—in 1975. That has fallen to under 3 million per year today, and will become a decrease of about 3 million workers per year in 2030. Expressed as a rate of growth, shown in the right panel of Chart 8, China's working-age population has gone from a growth rate of 2.4 percent per year in 1975 to 0.3 percent today, and is projected to fall to -0.3 percent in 2030.

India is currently adding over 13.5 million people per year—over 1 million per month—to the working-age population. This absolute increase is up from 8.4 million per year in 1975, but the growth rate has fallen from 2.6 percent in 1975 to 1.7 percent today and will continue to decline in coming decades.

The growth rate of the working-age population is falling in most countries, but is increasing in Nigeria, rising from 2.6 percent per year in 2015 to 3 percent per year in 2030. Many other African countries show this same trend of an increase in the growth rate of the working-age population.

Table 1 summarizes some key features of the working-age population from 2000 to 2030. One important statistic, shown in the top row, is that the world's working-age population will increase by 654 million people between 2015 and 2030, a 13.6 percent increase. This is a big number, but the table also shows that this is considerably smaller than the 958 million added between 2000 and 2015, a 24.8 percent increase.

Chart 8
Annual Growth of Working-age Population,
1975, 2015 and 2030



Note: Population aged 15-64.

Source: U.N. *World Population Prospects: 2012 Revision*, Medium Variant Projections.

Table 1
Working-age Population for World and Subgroups, 2000-30
Population Aged 15-64 (Millions)

				Change	Percent Change	Change	Percent Change
	2000	2015	2030	2000-15	2000-30	2015-30	2015-30
A. World	3,858	4,817	5,471	958	24.8%	654	13.6%
B. Economic regions							
More Developed	804	832	795	27	3.4%	-37.1	-4.5%
Less Developed:							
China	865	1,015	988	150	17.3%	-26.9	-2.7%
India	640	849	1,005	208	32.6%	156.3	18.4%
Other Less Developed	1,192	1,586	1,906	394	33.0%	320.7	20.2%
Least Developed	357	536	777	179	50.2%	241.2	45.0%
C. Geographic regions							
Asia	2,369	2,986	3,300	617	26.1%	314.6	10.5%
Europe	494	497	459	4	0.8%	-38.4	-7.7%
Latin America	328	418	476	90	27.5%	58.4	14.0%
North America	210	239	246	29	13.8%	7.3	3.0%
Sub-Saharan Africa	338	514	786	176	52.0%	272.4	53.0%
D. Age groups							
Age 15-24	1,088	1,191	1,277	103	9.5%	86.4	7.3%
Age 25-44	1,778	2,145	2,346	368	20.7%	200.3	9.3%
Age 45-64	993	1,481	1,848	488	49.1%	367.4	24.8%
World minus Sub-Saharan Africa							
E. Age Groups							
Age 15-24	960	1,003	1,003	43	4.5%	-0.6	-0.1%
Age 25-44	1,633	1,916	1,994	283	17.3%	78.3	4.1%
Age 45-64	928	1,384	1,688	456	49.2%	303.9	22.0%
Total 15-64	3,520	4,303	4,685	783	22.2%	381.7	8.9%

Source: U.N. *World Population Prospects: 2012 Revision*, Medium Variant Projections Table.

The growth of the working-age population varies enormously by economic groupings. The working-age population will decline by 4.5 percent between 2015 and 2030 in the more developed countries and in China, while it will increase by 45 percent in the least developed countries. Looking at geographic regions, Europe, Latin America and North America contribute very little to growth in the next 15 years, with the additional workers coming mainly in Asia and Africa. Africa has by far the biggest percentage increase at 53 percent, although Asia will contribute slightly more than Africa in absolute numbers.

Panel D shows the breakdown by age groups, a key part of the story. Well over half of the 650 million new workers come from a 370 million increase in the number of workers ages 45-64, an increase of

24.8 percent. By contrast, the youth population will only increase by 7.3 percent.

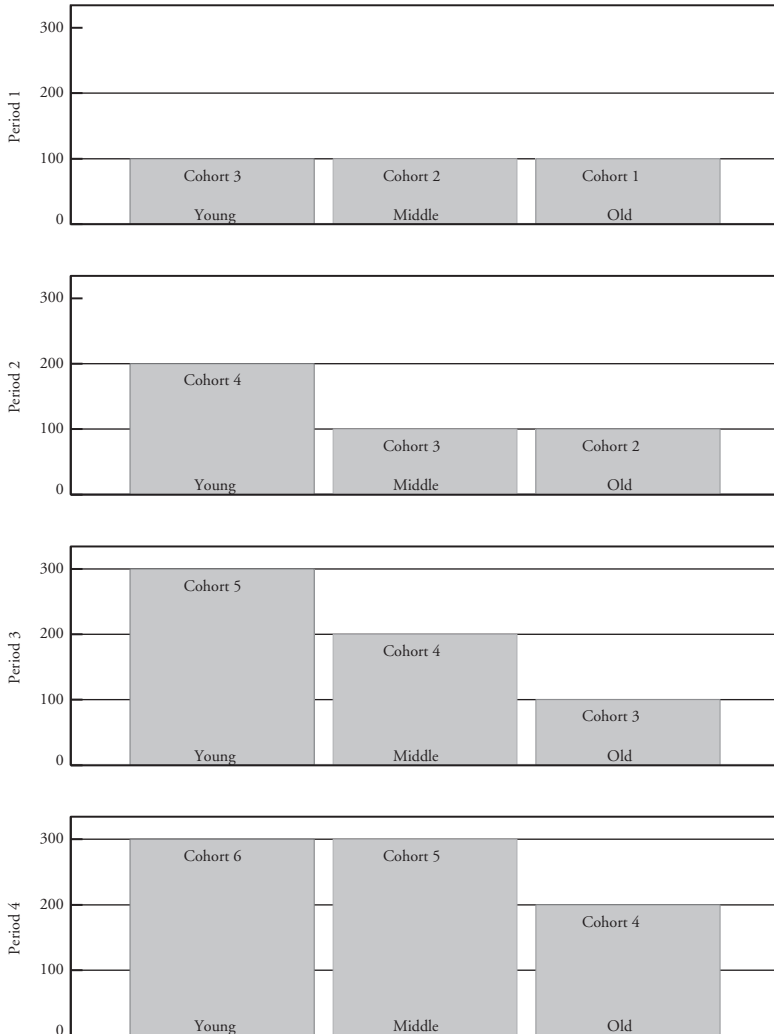
Panel E shows the age breakdown for the world outside of sub-Saharan Africa, 86 percent of the world's population. The world outside Africa will add 382 million people to the working-age population between 2015 and 2030. Remarkably, the number of young workers will actually decrease. Eighty percent of the increase will come from the 304 million additional workers ages 45-64.

IV. iii How to Generate Population Growth While Decreasing the Number of Young People

The fact that by 2030 there will be over 380 million additional workers but fewer young workers in the world outside Africa is worth pondering. The working-age population is growing, but it is growing from the top rather than from the bottom. This is an interesting enough demographic puzzle that it merits a detailed explanation. Chart 9 provides a stylized demonstration of how this happens. In the top panel, imagine that the bar labeled "Cohort 1" represents the population born in a period such that they are the older part of the working-age population in Period 1. I assume that there are 100 million people in the cohort. Cohort 2 is the population born in the period that is in the middle-aged group in Period 1, while Cohort 3 is the population born in the period that is the young part of the working-age population in Period 1 (in contrast to the age breakdowns in Table 1, assume that these are equal-sized age groups, so that a cohort moves from one age group to the next between Period 1 and Period 2). Before the demographic transition, the size of each birth cohort is about the same, so I assume that in Period 1 there are equal numbers of young, middle age and older workers (I am ignoring any mortality during the working years).

The second panel of Chart 9 shows what happens when cohort size begins to increase. I assume that Cohort 4 experiences lower infant and child mortality, and therefore is larger than Cohorts 1, 2 and 3 when it enters the working-age population. In this stylized example, I assume that there are 100 million more surviving workers in Cohort 4 than in Cohort 3. Between Period 1 and Period 2 the

Chart 9 Stylized Representation of Cohort Size and Growth of Working-age Population



working-age population grows, with all of the increase coming from the growth in the number of young workers.

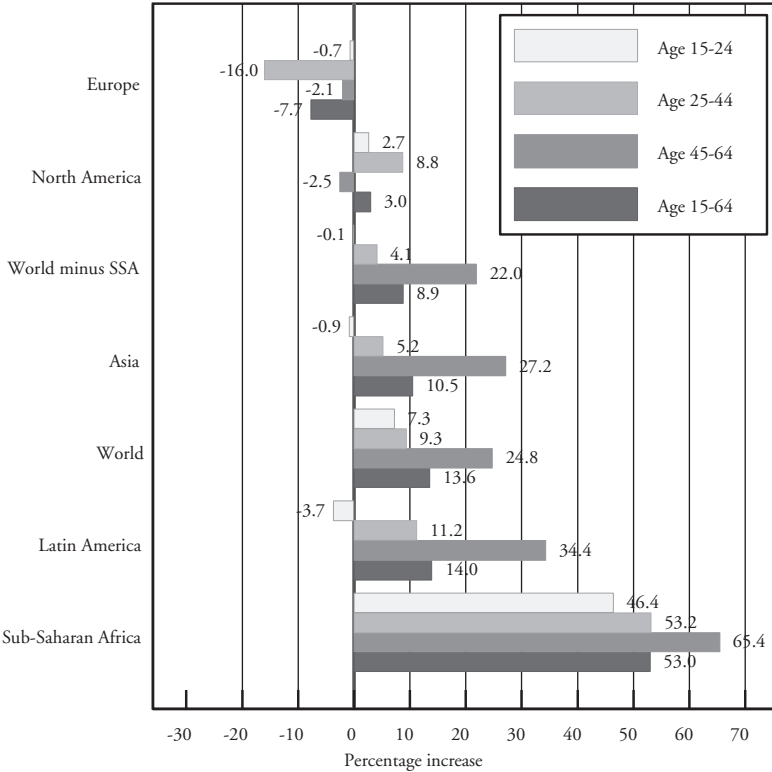
Infant and child mortality continue to decline and Cohort 5 is even larger than Cohort 4. In Period 3 we have an age structure typical of most developing countries in the 1970s and 1980s and of Africa today—high concentrations of young people and a relatively low proportion of older workers. The increasing size of the working-age population between Period 2 and 3 is associated with the population continuing to become younger.

Eventually, fertility declines and cohorts stop growing—this happened in Brazil, for example, in 1982, when the largest birth cohort was born (Lam and Marteleto 2008). So Cohort 6 enters the labor force at the same size as Cohort 5. The working-age population in Period 4 is 200 million people larger than the working-age population, but the number of young workers in Period 4 is the same as in Period 3. All of the increase in population takes place in the middle and older age groups.

We could also imagine a Cohort 7 that is the same size as Cohorts 5 and 6, creating a uniform age distribution with 300 million people in each age group in Period 5. This would imply another increase in the working-age population, with all of the increase coming in the oldest age group. This is a rough approximation of what will be happening in the next 15 years in countries like Brazil and China that are well through the demographic transition. The working-age population is continuing to grow, but the growth is concentrated in older ages and there is zero or negative growth in the number of young workers.

This roughly describes what is happening in most of the world outside of Africa. The large cohorts born in the 1960s and 1970s are working their way through the age distribution. Cohort size for new cohorts is no longer increasing, but these cohorts are larger than the cohorts that are leaving at the other end. So population growth, which was associated with rapid increases in the numbers of children and youth in the 1970s and 1980s, is now coming entirely from increases in the number in older ages.

Chart 10
Percentage Increase in Size of Age Groups in Working-age Population, 2015 to 2030



Source: U.N. *World Population Prospects: 2012 Revision, Medium Variant.*

Chart 10 shows how this phenomenon varies across regions. It shows the percentage increase in young, middle-aged, and older workers in the next 15 years. All three age groups will decline in Europe. For the world excluding sub-Saharan Africa, as we have seen, the youngest age group declines and the biggest increase is in the oldest age group, which grows by 22 percent. Asia and Latin America will have declines in the number of young workers, but increases in the overall size of the working-age population. Both are behaving like the stylized example in Chart 9, with most of the increase concentrated in older workers.

Sub-Saharan Africa will have big increases in all three age groups, including a 46 percent increase in the 15-24 age group. But the largest increase is still in the oldest group, which will increase 65 percent.

One important lesson, then, is that in Asia and Latin America the period of rapidly growing youth cohorts has ended. This may be important as we think about the impact of the interaction between labor markets in emerging markets and labor markets in the U.S.

V. Did Rapid Population Growth Slow Down Accumulation of Human Capital?

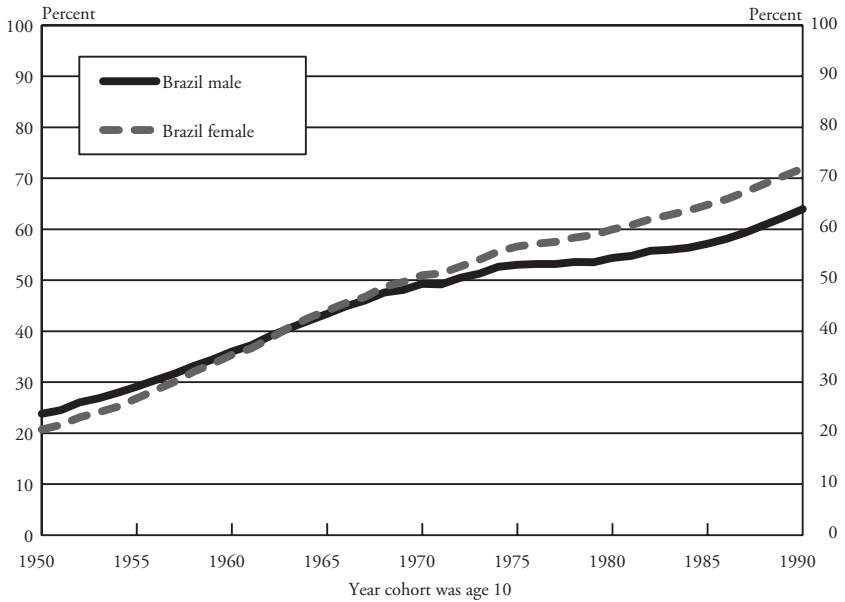
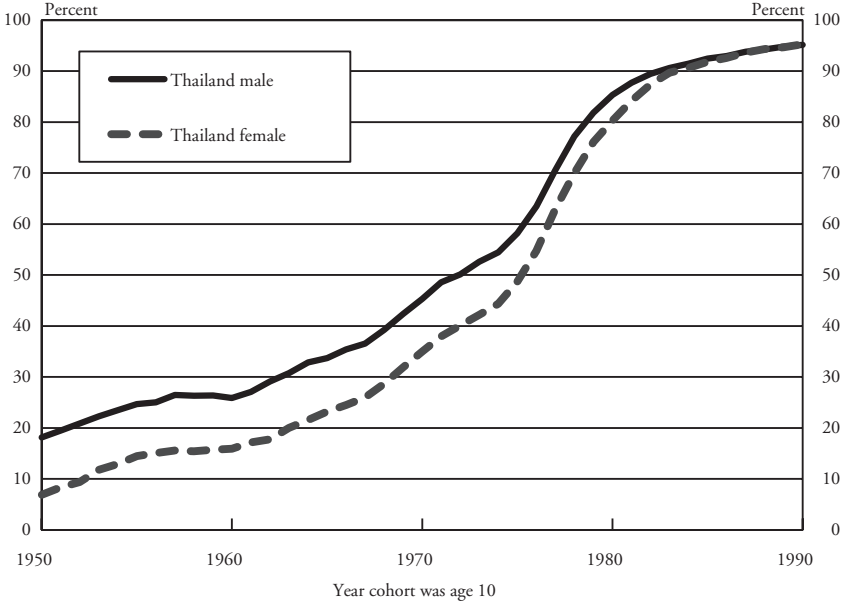
A key characteristic of young workers is their level of human capital. We might worry that rapid growth of cohorts in the 1970s and 1980s made it difficult for countries to increase education. In fact, and quite amazingly, the last 50 years have seen the largest improvements in schooling that the world has ever seen, even though it was a period of unprecedented growth in the number of school-aged children.

Chart 11 shows two examples, Thailand and Brazil, looking at the percentage of each cohort that finished primary school. Cohorts are shown in the year they are age 10, roughly representing when they attended school (see Lam 2011 for further discussion). In Thailand, the percentage of boys completing primary school increased from under 20 percent in the 1950s to 95 percent in the 1990s, in spite of the rapid growth in the size of the school-aged population during the period. The proportion of girls finishing primary school increased even faster, from under 10 percent to 95 percent, completely eliminating the gender gap in primary school completion.

As seen in the bottom panel of Chart 11, Brazil shows a similar, though slightly less impressive pattern. The proportion of boys completing primary school increased from about 22 percent in the 1950s to 62 percent in the 1990s, while the proportion of girls completing primary school increased from 10 percent to over 70 percent. Recent decades have seen rapid improvements in education and narrowing of the gender gap in most countries, including many countries in sub-Saharan Africa.

Chart 11

Percentage of Cohort With Primary Schooling, by Year Cohort was Age 10, Thailand and Brazil



So in addition to the fact that youth cohorts are no longer growing in most emerging markets, these cohorts are much better educated than cohorts of 20-30 years ago. This change in the growth rate and education level of youth cohorts helps explain why in countries like India, China and Brazil there are indications of a movement away from competing in global markets with massive amounts of low-wage labor and a movement toward competition in higher-skilled production.

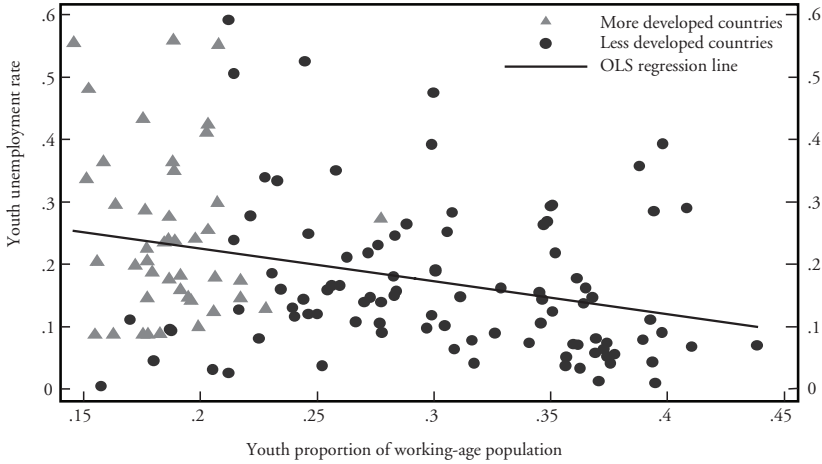
VI. Do Changes in Labor Force Growth Affect Youth Unemployment?

We have seen that youth cohorts grew at rates of over 3 percent per year in the 1970s and 1980s in many developing countries. This presumably put considerable pressure on labor markets as millions of young workers entered the labor market each year. This pressure is now easing in many countries, although we have seen that there is a great deal of variation in the growth rate of the youth population around the world. Do these differences in the growth rate of the youth population have an impact on youth unemployment in these countries? Will the slowdown in the growth rate of youth cohorts translate into improving labor market outcomes for youth in Asia and Latin America? In this section, I look at the relationship between youth demography and youth unemployment.

Many researchers working in this area have looked at the youth share of the working-age population as a predictor of youth unemployment. This share tends to increase when the growth rate of the youth population is higher, although the two measures—the youth share of the working-age population and the growth rate of youth population—are not perfectly correlated. There has been considerable attention to the impact of the “youth bulge” on unemployment and on social unrest in developing countries, most recently in conjunction with the “Arab Spring” in the Middle East and North Africa (Cincotta 2005; Urdal 2006; LaGraffe 2012).

Do countries with higher proportions of youth in the working-age population have higher youth unemployment? Chart 12 shows the relationship between these two variables for 91 countries that have recent measures of youth unemployment in the ILO’s Key Indicators

Chart 12
Youth Unemployment Rate by Youth Proportion of the Working-age Population

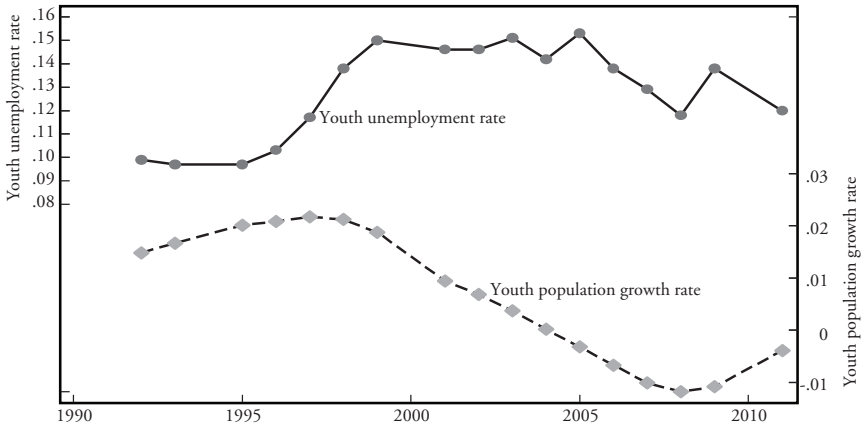


Source: ILO KILM data for most recent year.

of the Labour Market (2014). Surprisingly, the relationship actually goes in the opposite direction of what we might expect. The countries in which youth are a very high proportion of the working-age population—mostly low-income countries in Africa—have some of the lowest youth unemployment rates. The highest unemployment rates are in Europe, which has a relatively low share of youth in the labor force (see Lam and Leibbrandt 2014 for additional details).

Of course there is much more going on in explaining cross-sectional difference in youth unemployment than simply demography. One concern may be that our conventional measures of unemployment are not very meaningful in poor agricultural economies. Even in industrialized middle-income countries, however, the expected relationship is hard to find. Chart 13 shows trends in the growth rate of the youth population and the youth unemployment rate in Brazil from 1992 to 2011. We see that unemployment began to increase about the same time that the growth rate of the youth population began to decline, the opposite of what we might have predicted. Once again, there is much more going on here than demography, but it is interesting that Brazil

Chart 13
Youth Unemployment Rate and Growth Rate of Youth Population, Brazil



Source: ILO KILM data for most recent year.

did not get a big decline in youth unemployment from the substantial reduction in the growth rate of the youth population.

We can try to get a better picture of the relationship by pooling all of the data across time and across countries to estimate regressions that include country fixed effects and year fixed effects. The country fixed effects control for the fact that the level of youth unemployment tends to always be higher in, say, European countries, than it is in African countries, for a wide range of reasons. The year fixed effects control for the fact that some years tend to have higher youth unemployment everywhere in the world, as, for example, since the onset of the global financial crisis.

Table 2 shows two regressions out of a large number estimated in Lam and Leibbrandt (2014). The dependent variable is the log of the male youth unemployment rate, following the approach in literature such as Shimer (2001). Regression 1 roughly reproduces the relationship shown in Chart 12, although we have included both the youth ratio (the log of the ratio of the population 15-24 over the population 15-29) and the annual growth rate of the youth population, and we have included the annual growth rate of GDP to pick up macroeconomic effects. The regression uses the most recent observation for each of the 91 countries in the ILO KILM data, estimating the

Table 2
OLS Regressions: Dependent Variable Is Log of Male Youth
Unemployment Rate, Developing Countries, 1991-2010

	1	2
Log (Pop 15-24/Pop 15-59)	-0.398 (0.365)	-0.56 (0.290)
Annual growth rate of Population 15-24	-10.697 (1.556)***	4.772 (0.876)***
Annual growth rate of GDP	-1.821 (0.890)**	-0.921 (0.323)***
Country fixed effects		X
Year fixed effects		X
N	91	701
R ²	0.27	0.88
Years	Most recent	All years

Robust standard errors in parentheses

* significant at 10 percent

** significant at 5 percent

*** significant at 1 percent

simple cross-sectional relationship. As in Chart 12, we estimate the “wrong” sign on both of the demographic variables. Countries with faster growth of the youth population (such as African countries) have lower youth unemployment than countries with slower growth (such as European countries).

In regression 2 we include all 701 measures of unemployment from 1991-2010 in the KILM data. We include dummy variables for each year and for each country. We now get a strongly positive coefficient on the youth growth rate variable that is statistically significant at the .001 level. The coefficient of 4.772 on the annual growth rate of population 15-24 implies that increasing the growth rate by 1 percentage point would increase male youth unemployment by 4.8 percent. The mean youth unemployment rate is about 18 percent, so this would imply an increase of about 1 percentage point in male youth unemployment. Lam and Leibbrandt (2014) also estimate this regression for women and find that the coefficient is very similar to the coefficient for men.

Another way to put this result in context is to recognize that a number of developing countries have had declines in the annual

growth rate of the youth population from 4 percent to zero. The coefficient in regression 2 in Table 2 implies that this change would have caused roughly a 4-percentage-point decline in youth unemployment if nothing else had changed. This is a substantial decline in youth unemployment, although it is relatively modest compared to the large differences across countries and the large changes experienced over time in many countries. Since most countries in the world will have declining growth rates of the youth labor force in coming decades, these results suggest that the demography should contribute to reductions in youth unemployment.

VII. Summary

In summary, we are seeing important changes in the demography of the labor force in emerging markets. Decades of rapidly growing youth cohorts have come to an end in Asia and Latin America, the result of large declines in fertility. The size of youth cohorts is stabilizing, and today's youth cohorts are much better educated than the cohorts of 20 or 30 years ago. This is likely to have positive effects on youth employment outcomes in those countries and may have implications for U.S. labor markets as well. Countries like Brazil, China and India are already showing signs of a shift from competition based on large numbers of young unskilled workers to competition built around higher skilled production.

The working-age population will continue to grow in emerging markets for several more decades. Unlike earlier decades, however, this growth will take place almost entirely in the older age groups. Many countries will actually experience declines in the number of young workers at the same time that they experience growth of the overall working-age population. This creates a new set of challenges for these countries as the problem of labor absorption shifts toward older workers.

An important feature of the demography of the labor force in emerging markets is a high level of regional diversity. While the growth of youth cohorts is rapidly coming to an end in Asia and Latin America, sub-Saharan Africa continues to have rapid growth

of its youth population, the result of continuing high fertility in the region. The number of net new workers in sub-Saharan Africa will increase from 1.1 million per month in 2015 to 1.7 million per month in 2030, an important challenge for African policymakers.

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