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India's Rising Labour Force

- India will likely provide the largest *increase* to the global labour force over the next decade—we estimate an additional 110 million by 2020.
- Key demographic trends driving the labour force are urbanization, more women in the work-force, and a large increase in the 30-49 age group.
- Demographics alone may contribute about 4 percentage points of annual GDP growth over the next decade.
- Demographics will affect consumer spending patterns. Spending on services such as health and education may increase five-fold by 2020.
- The age structure of the population is favourable for flows into equities and bonds, and less favourable for bank deposits.
- India's manufacturing sector has the potential to create the necessary jobs due to recent policy changes, low unit labour costs, infrastructure build-out, prospective lowering of effective tax rates, and rising productivity trends.
- For potential to meet reality, however, India would need to reform its archaic labour laws and invest heavily in education and skills training.

Important disclosures appear at the back of this document.

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Summary

- **India will likely provide the largest *increase* to the global labour force over the next few decades.** Our projections suggest that its labour force may rise by 110 million this decade.
- **Three demographic forces will shape India's labour force—two are well-known—more women in the work force and urbanisation. The third is less well-known—an increase in the population of Indians who are in their 30s and 40s ('thorties').** Nearly half of the increase in the labour force over the next two decades will likely come from this age group, which tend to be peak years for earnings, savings, and productivity.
- **Our analysis suggests demographics alone may contribute about 4 percentage points (ppt) of annual GDP growth** for the next two decades, from increases in labour force, higher productivity due to urbanisation and having the right age structure.
- If India gets its policies towards demographics wrong it could potentially lose annually about 1.5 ppt from our base case of +8% GDP growth till 2020. On the other hand, 'good' policies could push potential annual GDP growth to well above 9% over the next decade.
- **Demographics also has implications for consumption patterns, savings behavior, and financial flows.** Even though all spending categories will likely increase, our analysis suggests that demand for services may grow faster than demand for goods. Spending on health and education services may increase five-fold by 2020, compared to a 2.5 times increase in food and beverages. Demand for autos and transportation, and housing and appliances may also increase by more than the overall increase in spending.
- **An important implication of falling dependency ratios will be rising household savings rates in India.** Savings are being augmented with a rapid change in information and communication technology. A more connected population, with India's age profile may put a greater share of household savings into the financial sector.
- **Economic growth and the age structure could increase household demand for risky assets.** Our analysis suggests that the share of equities in household savings could double from around 5% today to over 10% in 2020. This, coupled with the overall growth in financial savings would mean that annual inflows into equities could rise nearly 6 times by 2020, compared to a 2.5 fold increase in bank deposits.
- **Can India absorb such a large increase in its labour force?** In particular, the biggest challenge is to employ the surplus labour coming out of agriculture into industry and services. According to our projections industry would need to create some 40 million jobs over the next 10 years to absorb this labour—which is about 40% of the total jobs created.
- **Our analysis suggests that industry can potentially generate the required number of jobs** due to low unit labour costs, infrastructure build-out, the reduction of effective tax rates on industry due to the forthcoming implementation of the Goods & Services Tax (GST), and recent trends indicating increased investment and productivity in the sector.
- **For potential to meet reality, however, would require a massive overhaul of India's archaic labour laws and heavy investment in education and skills training.** Labour restrictions on hiring and firing increases costs, reduces incentives to invest in skill development, discourages economies of scale, and inhibits competitiveness. Unless India reforms its labour laws, the industrial growth that is needed to absorb labour will remain in the realm of potential.

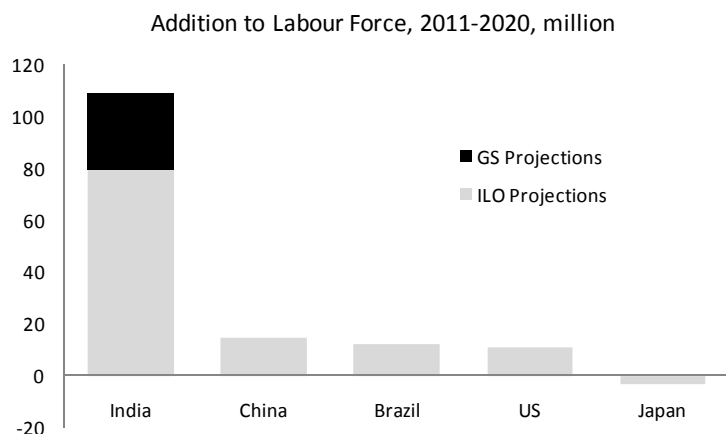
India's Rising Labour Force

India will likely provide the largest increase to the global labour force over the next few decades. For an issue of such importance, surprisingly little quantitative analysis has been done about how big this labour force could be, what is driving its growth, how will it affect India's growth rates, consumption patterns and financial markets, and can it be absorbed by the economy.

Three demographic trends are driving the increase in labour force. First, nearly half of the increase in the labour force over the next two decades will likely come from the age group of people in their 30s and 40s, which tend to be peak years for earnings, savings, and productivity. Second, a large number of women can potentially enter the workforce. Third, we estimate that an additional 290 million Indians may urbanise by 2030, and a staggering 640 million by 2050.

Our projections for India's labour force suggest that it may rise by about 110 million over the next ten years alone. To put this in perspective, the International Labour Organization (ILO) projects China's labour force to increase by 15 million, and Japan's to decline by 3 million over the same period. Our projections take into account increases to the labour force participation rate, due to a favourable age structure. Thus, our labour force projections are higher than those of the ILO.

Exhibit 1: India to provide the largest *increase* to global labour force



Source: UN, ILO, WDI, GS Global ECS Research projections.

In our past research we have analyzed India's growth potential,¹ with demographics being a key component. In this paper, we dissect that pillar of India's growth story, break it up into its constituent elements, assess risks to our projections, and quantify its implications for the economy.

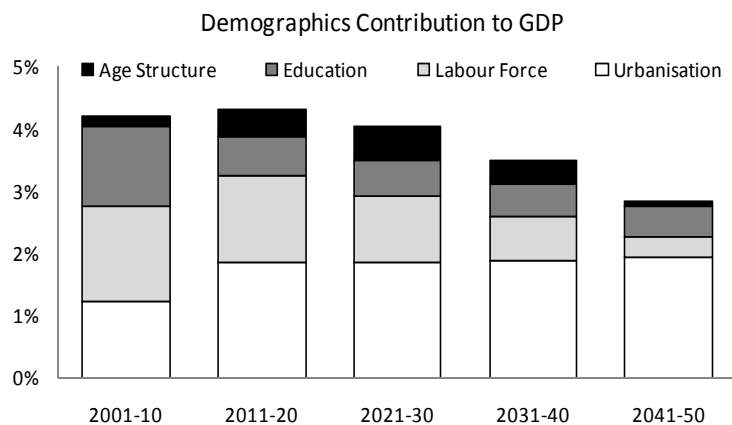
Compared to East Asia, India's demographic transition is happening more gradually and over a longer period. This is primarily due to a more gradual decline in death and birth rates in the 1960s and 1970s. The implication is that India will continue to see a rise in its working age population till 2040, a rather long phase, compared to East Asia which saw larger changes in a more concentrated period.

¹ See 'India's Rising Growth Potential', *Global Economics Paper No. 152*, January 22, 2007.

Our analysis suggests that demographics alone may contribute upwards of 4 percentage points (ppt) of annual GDP growth for the next two decades.

These come from, in order of contribution – productivity gains due to urbanization, increases in the labour force, educational improvements, and having the right age structure. Beyond 2030, the contribution of demographics is a little lower, as labour force growth and the age structure becomes less favourable, albeit still contributing positively.

Exhibit 2: How much can demographics contribute to India's GDP growth

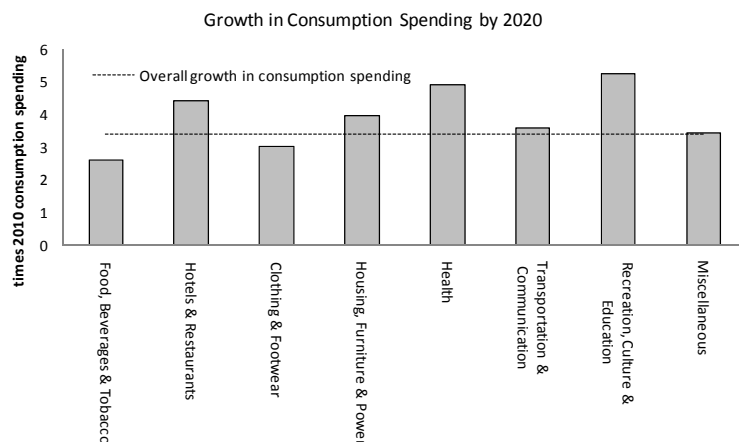


Source: GS Global ECS Research projections.

The contribution to GDP growth is considerably reduced if government policies inhibit the favorable demographic trends. We perform some sensitivity analysis to take into account slower urbanization rates, weaker progress on education, and no incentives for women to enter the work force. These scenarios help in quantifying foregone growth due to the lack of appropriate policies.

The impact of demographics is not confined to growth alone, but will affect consumption patterns, savings behaviour and financial flows. In East Asia, the favourable demographic trends have been accompanied by a rising savings rate, greater capital formation, and a rising share of industry in GDP. Trends suggest a similar evolution of macro variables is currently underway in India, albeit slower than the rest of East Asia.

We assess the implications of demographics on consumption patterns by looking at recent trends in India, and combining this with cross-country experiences in Asia. Our analysis suggests that demand for services may increase more rapidly than demand for goods.

Exhibit 3: 2020 projections of growth in consumption spending

Source: GS Global ECS Research projections.

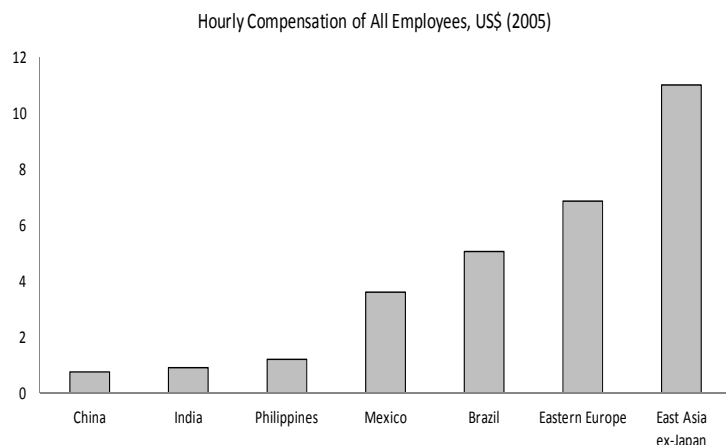
Rising household and gross savings rates is a highly robust implication of falling dependency ratios. Our projections suggest that India's savings rate may rise to 40% of GDP by 2016, and can potentially remain above 40% for over a decade.

Higher savings are also being augmented with a profound change in information and communication technology. With India having more than 600 million wireless subscribers and as a rising IT destination, access to financial products is continuously increasing. With a more connected population, a greater percentage of household savings will likely find their way into the financial sector. Given the age profile of the population, we expect a greater preference for housing, and stocks and bonds over bank deposits.

The critical question is—can India absorb such a large increase in its labour force? In particular, the biggest challenge is to employ the surplus labour coming out of agriculture into industry and services. Our analysis suggests that industry would need to create some 40 million jobs over the next 10 years to absorb this labour—which is about 40% of the total jobs created.

India's manufacturing sector appears to have the potential to grow rapidly. Recent trends suggest increased investment and productivity in the sector, lower import tariffs, the gradual infrastructure build-out, the likely reduction of effective tax rates on industry due to the coming on-stream of the GST, and the large number of potential workers helping to restrain unit labour costs suggests reasons for optimism.

Exhibit 4: India's unit labour costs are among the lowest in emerging markets



Source: US Department of Labor, GS Global ECS Research.

For potential to meet reality, however, would require a massive overhaul of India's archaic labour laws and heavy investment in education and skills training. Currently firms employing above 100 workers cannot retrench workers without government permission. In practice, firms tend to hire contract labour which itself is subject to numerous restrictions. These restrictions increase costs, reduce incentives to invest in skill development, discourage economies of scale, and inhibit competitiveness. Unless India reforms its labour laws, the industrial growth that is needed to absorb labour will remain in the realm of potential.

India's demographic dividend coming later than its East Asian neighbours confers unique advantages. First, access to global capital is arguably easier now than in the 1970s and 1980s. Second, the IT and communications revolutions are helping labour in enhancing its productivity. Third, India's labour force is expanding at precisely the time when many countries are facing ageing-related issues and a shrinking labour force. The disadvantage is that it will increase demand for commodities at a time when resources are stretched and environmental issues have become dominant.

Finally, our analysis has implications for other 'late demographic transitioners' in the region—Indonesia, Philippines, Bangladesh, and Pakistan. These countries also benefit from a demographic dividend, albeit differently. Of the four, Bangladesh appears to have the most favourable demographics, with low and declining dependency ratios similar to India's.

The rest of the paper is organized as follows. In section I, we identify demographic trends which are driving India's labour force growth. In the following section, we measure the impact of demographics on growth and perform some sensitivity analysis. In section III, we project how demographics will affect consumption patterns, and in the next section, we analyze its impact on the financial sector. In Section IV we assess whether India can generate enough jobs, and the outlook for its manufacturing sector. In Section V, we discuss policy priorities.

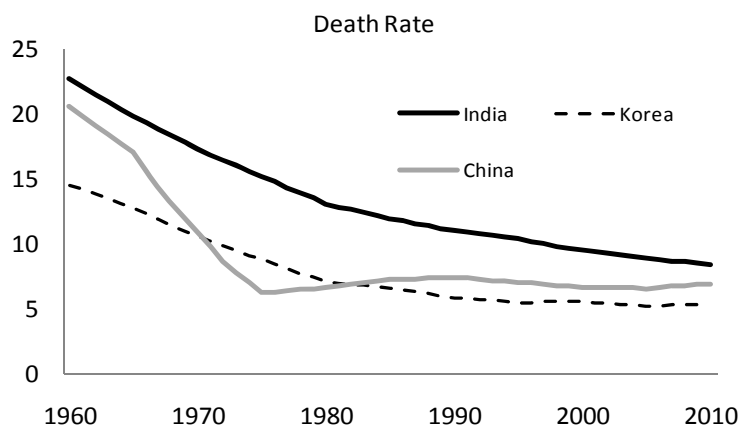
Section I: What is driving India's labour force?

Since we first wrote about India's demographic dividend in 2003,² the issue has received considerable attention. The demographic transition³ has been a key concept in understanding the evolution of important macro variables.

In India, this demographic transition is happening more gradually and over a longer time period than the rest of Asia. This is primarily due to a more gradual decline in death and birth rates than the rest of Asia, partly due to policy failures in the past. Improvements in health and education were not as rapid in the 1960s and 1970s as in the rest of Asia.

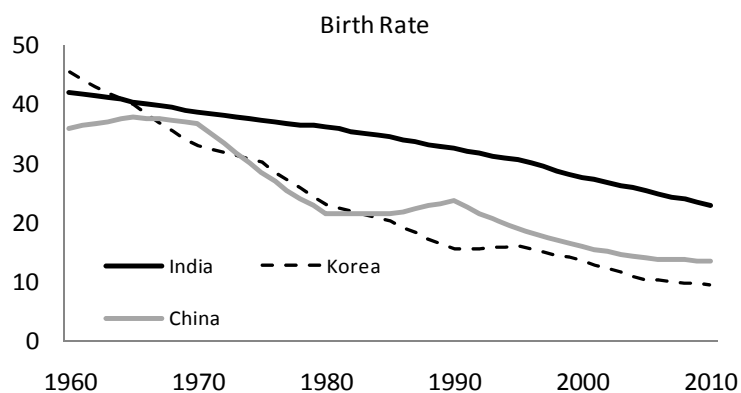
It is well known that India's dependency ratio will continue to fall over the next few decades as more Indians are in their working age years. Thus, the working age population relative to very young and old dependents will rise till about 2040. Here we identify three important trends which will shape the labour force.

Exhibit 5: India's death rates have come down more gradually...



Source: WDI, GS Global ECS Research projections.

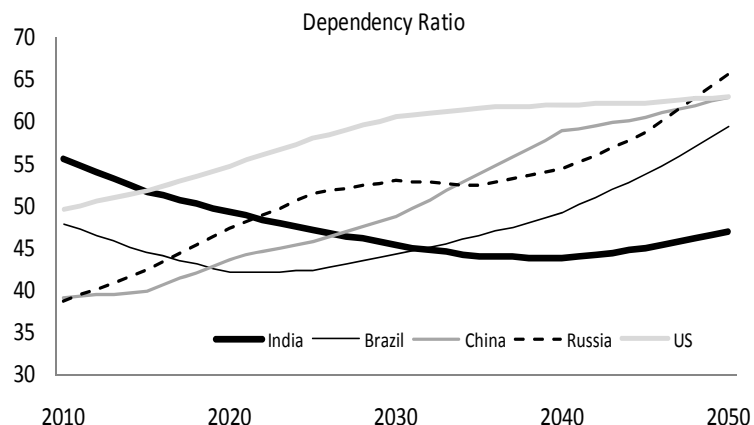
Exhibit 6: ...causing a slow decline in birth rates...



Source: WDI, GS Global ECS Research projections.

² See 'Dreaming With BRICs: The Path to 2050', *Global Economics Paper No. 99*, October 1, 2003.

³ The demographic transition occurs as death rates fall due to better nutrition, health care and living standards, often policy-induced. This in turn leads to a fall in the birth rate, but with a lag. This lag generates a bulge in the population, which when it enters the working age years increases the labour force.

Exhibit 7: ...and leading to a decline in dependency ratio till 2040

Source: UN, GS Global ECS Research projections.

1) The Rise of the ‘Thorties’

The big change over the next two decades is the rapid increase in the population in their thirties and forties—the ‘thorties’. This cohort will see the largest absolute increase in its size—may add more than 120 million to its ranks by 2030, and contribute nearly half of overall population growth. By contrast, the population aged 0-14 will actually decline by about 36 million.

Exhibit 8: Half the additions to India’s labour force are in the 30-49 age group till 2030

Age group	15-29	30-49	50+
2011-20	38	54	17
2021-30	21	59	20
2031-40	8	42	26
2041-50	-4	17	26

Source: UN, ILO, WDI, GS Global ECS Research projections.

The ‘thorties’ are in some sense equivalent to the baby boomers in the US, except that the process happened in a more gradual and natural manner. This demographic change will have large implications for labour force growth, productivity, consumption, savings behaviour and asset prices. As we show later in this paper, this age group tends to be more productive, has a higher savings rate and prefers more risky assets than other age groups.

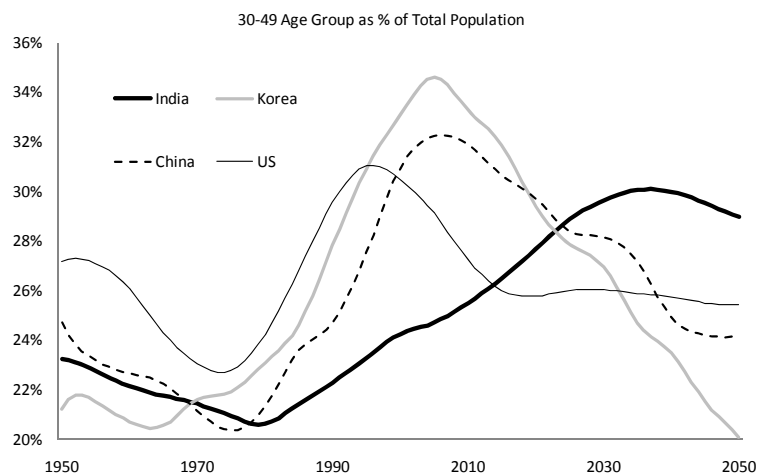
Of the people added to this age group, 80% will be urban. With education levels continuously increasing, this age group will be more urbanised and better educated than previous cohorts. By contrast, China’s 30-49 cohort will shrink by 20 million between 2011-2030, and the US will add only 10 million in this age group over the next two decades.

Exhibit 9: Additions to 30-49 group in India is behind China's by about two decades

people aged 30-49 added						
	India		China		US	
	mn	%	mn	%	mn	%
1971-1990	72	24%	107	35%	27	57%
1991-2010	112	33%	141	72%	9	15%
2011-2030	124	49%	-20	-20%	10	20%

Source: UN, GS Global ECS Research projections.

Exhibit 10: Rise of the critical 30-49 age group is more gradual in India



Source: UN, GS Global ECS Research projections.

2) More Female Workers

India's female labour force is set to increase from a very low base due to demographic and economic factors. Currently, the female workforce participation in India is one of the lowest in Asia at 33%, and resembles Latin America in the 1970s much more than Asia.

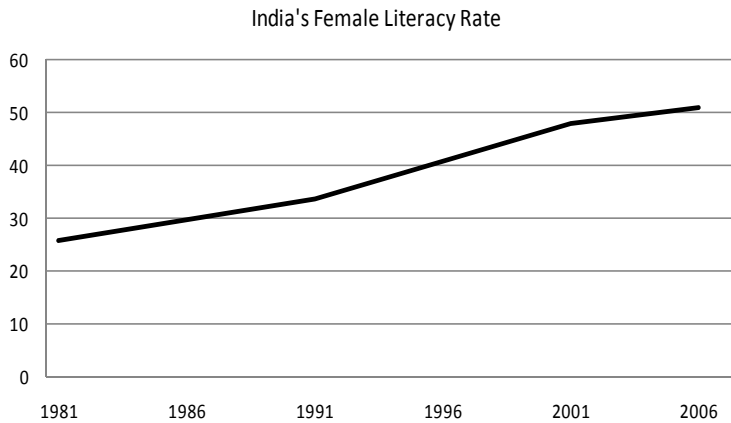
A number of demographic and economic factors suggest a rise in the number of women in the workforce: a) more education; b) job creation in areas which traditionally employ more women; c) improvements in health, later marriage and child-bearing.

More females are now attending primary and secondary school. Female primary school enrolment has gone up from around 72% in 2000 to over 88% in 2007. The corresponding figure for secondary school enrolment has increased from 38% to 52% over the same period. Overall female literacy rates of the entire population have also been steadily rising, albeit from a very low base (from 34% in 1991 to 51% in 2006), and with the Right to Education Act guaranteeing education between the age groups of 6-14, literacy rates will continue to rise.

With the rapid growth of the services sector in India, opportunities for female employment are opening up in areas such as retail, healthcare, education services, aviation, travel and hospitality, finance and insurance, and grooming and personal care.

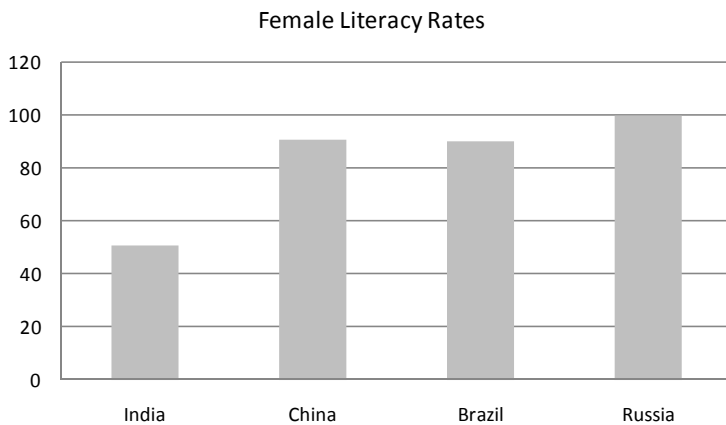
Improvements in health and the greater availability of contraceptives is gradually delaying child birth—a factor that has been critical in increasing the number of women that work in the rest of Asia. Evidence from the rest of Asia shows that with improvements in healthcare and education, the number of women working below 20 sees a decline, while those between 20-29 sees a large increase. Similar trends can be expected in India.

Exhibit 11: Female literacy rates in India have been gradually rising...

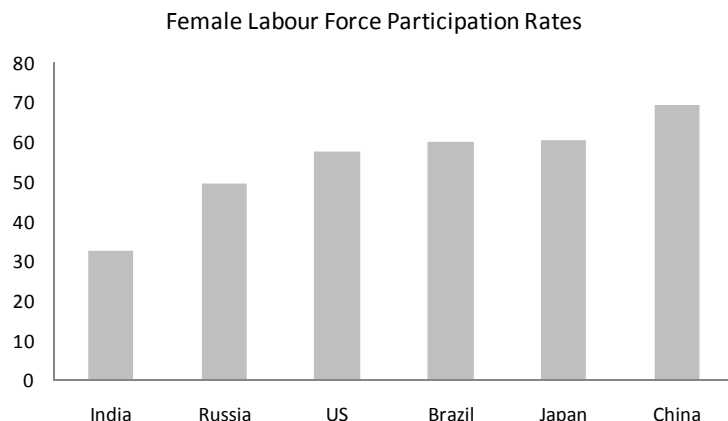


Source: WDI.

Exhibit 12: ...but remain very low relative to the BRICs



Source: WDI.

Exhibit 13: Large scope for catch-up in female workers

Source: WDI.

3) Urbanisation

India is on the cusp of a massive increase in its city population. According to our projections, an estimated 290 million people can potentially move to cities by 2030, and a whopping 640 million may urbanise by 2050. The number of cities with populations above 1 million in size will nearly double by 2020, and may increase four-fold by 2050. Although urbanisation is occurring globally, the enormous scale of the phenomenon in India makes it imperative to understand the implications.⁴

Cities are centers of economic activity and wealth generators. Economic growth is pre-dominantly urban growth. Urbanisation in India is being driven by economic growth, a young population—as younger workers tend to migrate more than older workers, low initial stage of development and urbanisation, better transport—especially roads, and better communications and openness.⁵

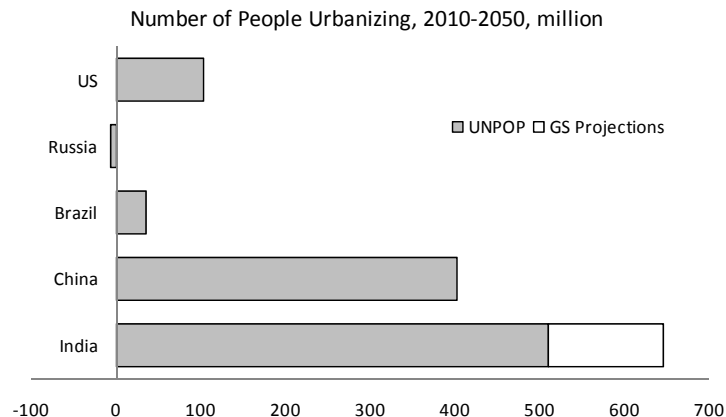
The most important impact of urbanisation is in affecting labour productivity. The rural population is predominantly in agriculture, while the urban population is in manufacturing and services. There are large productivity differences between the two. Therefore, as rural labour migrates from agriculture to industry and services due to better opportunities, it can have a large impact on productivity and growth. Our estimates show that labour is 3.5 times more productive in industry and 5 times more productive in services than in agriculture.⁶

India's urbanisation rate, however, is slower than that of China's as well as other Asian economies in part due to government policies and lack of investment in urban infrastructure. We discuss these in greater detail in Box 1 on page 17.

⁴ See 'India's urbanization: Emerging opportunities', *Asia Economics Analyst 07/13*, July 6, 2007.

⁵ Recent studies have looked at the phenomenon of urbanization in greater detail. See 'India's urban awakening: Building inclusive cities, sustaining economic growth', April 2010, McKinsey Global Institute.

⁶ See Appendix B.

Exhibit 14: Potential future urbanization in India is very large

Source: UN, GS Global ECS Research projections.

Advantages of being a ‘Late Demographic Transitioner’

India’s demographic dividend coming later than its East Asian neighbours confers unique advantages. First, access to global capital is arguably easier now than in the 1970s and 1980s. Second, the IT and communications revolution are helping labour connect globally and enhancing productivity to a greater extent. Third, India’s labour force is expanding at precisely the time when many countries are facing ageing-related issues and a shrinking labour force. The one disadvantage is that it will increase demand for commodities at a time when resources are stretched and environmental issues have become dominant.

India’s demographic transition can potentially be similar to that of Asia on macro trends—in terms of the behaviour of savings and investment, consumption is following the Asian pattern. Urbanisation is starting at a similar level, and a largely agrarian economy undergoing transformation into industry and services.

What is different is the pace and timing of the demographic change. India’s largest reductions in dependency ratios happen a full 20 years after China, and later than most other countries. India’s fall in its dependency ratio is also more gradual and will be felt over a longer period. Thus, India remains ‘younger’ for longer, but does not see as rapid an increase in its working-age population concentrated over a generation or so, as in other Asian economies.

This has implications for all macro variables as well. Accordingly, the rise in savings, investment, and the change in industry as a share of GDP should be more gradual as well.

We now turn to assessing the implications of India’s demographics on key macro variables – growth, consumption, savings, and financial flows.

Section II: How will demographics affect growth?

Favourable demographics is widely accepted as a key part of India's growth story. However, the quantification of its impact has been rare. Here, we have attempted to quantify the impact of key demographic variables on GDP growth, and especially the sensitivity to the trends identified in the previous section.

In our base case, India's labour force grows by some 210 million between now and 2030. Over the next decade itself, the labour force adds upwards of 110 million—equivalent to the current population of the UK and South Korea combined. The rise in the labour force comes not only from more of the population reaching working age, but also a greater number of women entering the labour force.

To measure the contribution of demographics to growth, we projected several demographic trends:

- The number of people in each age group.
- A rise in female participation rates.
- Urbanisation trends.
- Education trends.

Our projections of female participation in the work force, urbanisation, and education, improve upon existing ones because they are non-linear—increasing rapidly at first and then slowing down based on cross-country evidence. Female participation increases from 33% to 46% by 2050. Urbanisation increases from 30% currently to 62% by 2050. Education rises from 5 years of secondary schooling to 7.6 years by 2050.

The impact of demographics will also be felt in improvements in productivity, and not just due to growth in the number of people in the labour force. We have estimated contributions to productivity arising from two factors: i) urbanisation; and ii) due to the age group of the 30s and 40s being more productive than others.

Urbanisation is a large contributor to productivity gains. As people move from low productivity agriculture to higher productivity manufacturing and services, the aggregate productivity of the population increases significantly. Evidence from the rest of East Asia suggests that this phenomenon is a large contributor to overall productivity and growth.

We estimate that urbanisation can potentially contribute about 1.8 ppt to annual GDP growth till 2050. We estimate that some 290 million Indians may urbanise by 2030 and 640 million Indians by 2050.⁷ The productivity gains come from these urbanizing workers being 3.5 and 5 times more productive in industry and services respectively compared to in agriculture, a trend that we have seen develop over the past decade or so.

⁷ This compares to 250 million by 2030 estimated by McKinsey and our earlier estimate in 2006 of 700 million by 2050.

Productivity gains also come from having the right age group in the population. Cross-country evidence suggests that productivity is an increasing function of age, with the age group of 40-49 being the most productive. This is because of the impact of work experience on productivity. After that age, productivity tends to decline.⁸

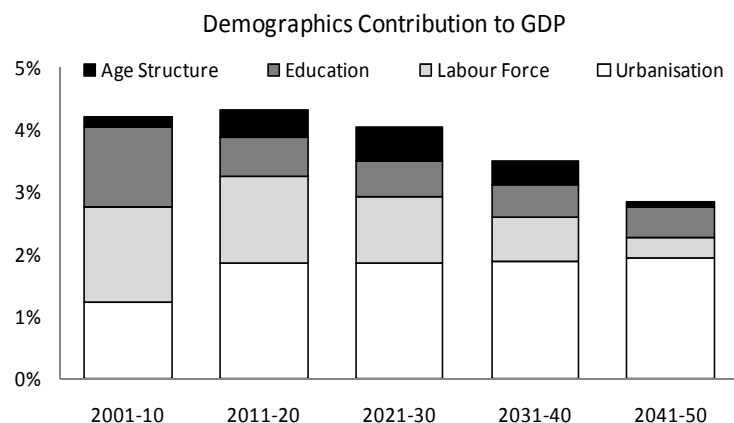
We have estimated the productivity contribution of the age profile of Indians through the next few decades. Our results suggest that productivity growth may rise over the next couple of decades due to having a larger proportion of 30-49 year olds in the population.

Demographics along with improvements in education may contribute some 4.3 ppt to annual GDP growth over the next decade according to our estimates, and 4 ppt between 2021-2030. Of this, just over half of the contribution is due to productivity growth, and the rest due to labour force growth and education growth.

The next decade appears to be the most favourable one for India's demographics, although the decade of the 2020s will also see similar trends. Beyond that, the age structure is less favourable, even though the labour force has a positive contribution through 2050.

In many ways, the demographic changes are pre-determined. The size of the labour force in the next 20 years was determined over the last 20 years and before. We discuss sensitivities to our projections in Section V and in the appendix.

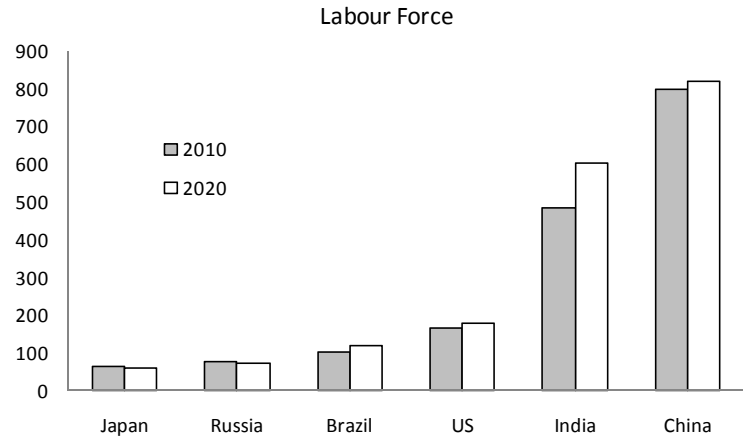
Exhibit 15: How much can demographics contribute to India's GDP growth



Source: GS Global ECS Research projections.

⁸ See Feyrer, James, February 2007, 'Demographics and Productivity', Review of Economics and Statistics, 89(1): for the relationship between age and productivity.

Exhibit 16: India’s total labour force begins to bridge the difference with China



Source: UN, ILO, GS Global ECS Research projections.

Box 1: Risks to our projections

Our demographic projections and its impact on the labour force and GDP growth is about what could potentially happen rather than a depiction of what ‘will’ happen.

What could go wrong?

- **Anti-urbanisation policies**, which would reduce the massive gains in productivity from such a shift. These include no taxation on agriculture, lack of progress on urban infrastructure, and further expansion of the National Rural Employment Guarantee Act which provides for compulsory employment to rural families and disincentivises urbanisation. More importantly, if India is unable to create the necessary jobs in manufacturing and services to absorb the labour coming out of agriculture, it would reduce incentives for urbanisation, slowing down its pace and leading to more un/underemployment in rural India.
- **The lack of labour market reforms**—an issue we discuss extensively in Box 2. Additionally, labour market distortions and internal disturbances can potentially reduce the labour force. For a large labour force and a democracy, periodic shifts to the Left and the Far Left could happen. If trade unionism were to lead to strikes, lockouts and loss of man-days, it could significantly reduce labour supply. Examples include the textile mills lock-out which effectively shut down the textile industry in Maharashtra in the 1980s, and the industrial decline of Bengal due to militant trade unionism. The current Maoist insurgency is an example of internal disturbance which can reduce labour force participation.
- **Decreases in female work participation** due to poor labour market policies which do not incentivize female labour. The latest data on female participation is not encouraging, suggesting a decline in participation rates from FY05 to FY08 of 4 ppt in rural areas and 3 ppt in urban areas reversing much of the gains in the earlier part of the decade. Admittedly, the data sample is thin and we need to wait for the decadal census currently underway to throw more light on participation trends, but a weaker scenario for female employment could easily play out in the absence of policy changes.
- **Weaker advances in education**, due to the lack of adequate government outlays, and regulatory constraints, an issue we discussed in detail in ‘Ten Things for India to Achieve its 2050 Potential’, *Global Economics Paper No. 169*, June 16, 2008.

We did some sensitivity analysis to our results. We looked at cases in which the labour force growth may be weaker than we expect due to the factors mentioned above. First, female work participation rates do not increase; second, a more gradual pace of urbanisation; third, education improvements being slower than we expect. These three cases would reduce the increase in labour force, and thereby lead to slower economic growth than otherwise.

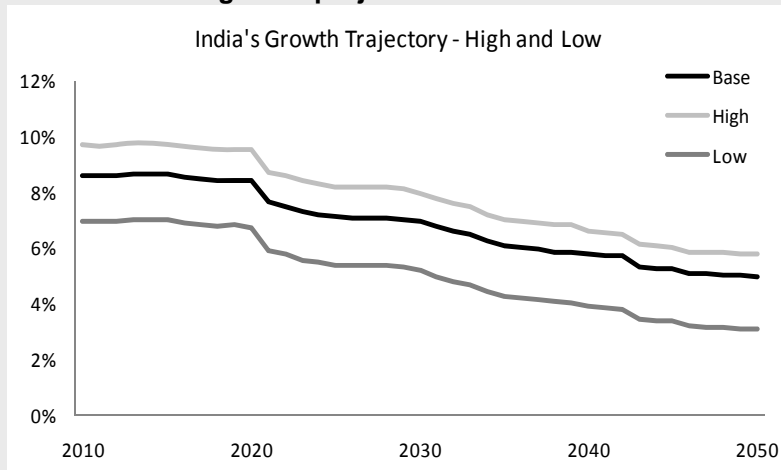
We found that each of these scenarios can have a substantial impact on growth. The largest impact would be if urbanisation is much slower than we expect. If urbanisation rate slows to 32% by 2020 instead of 37% in our base case, then GDP growth would be 0.7 ppt lower annually. If educational attainment were to not increase at all, then growth over the next decade would be 0.6 ppt lower. Finally, if female participation were to not increase, then GDP growth would be lower by 0.3 ppt annually.

We also looked at the upside to our projections. In our best case scenario, with higher female participation, more rapid urbanization, and significant improvements in education, the contribution to GDP growth goes up to nearly 5 ppt of GDP annually.

The scenarios paint in some sense the lower and upper bounds to our projections and measure the impact of demographics on GDP growth. Good policies can make a difference of more than 2.5 ppt in annual GDP growth—the difference between our ‘high’ case and ‘low’ case. The scenarios show the sensitivity of growth from demographics alone. Variability of growth would be higher if physical capital sensitivities were to be included.

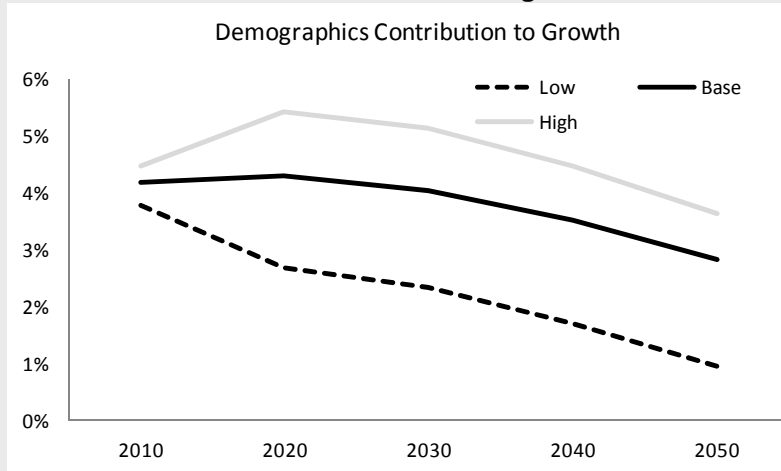
Box 1: Risks to our projections...continued

Exhibit B1: GDP growth projections



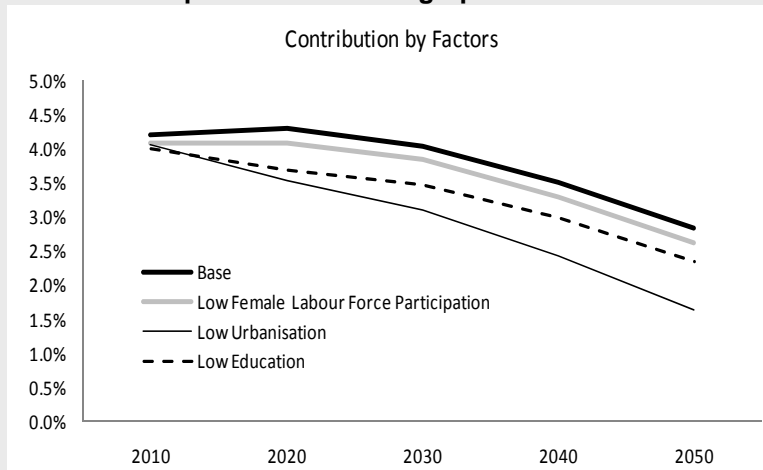
Source: GS Global ECS Research projections.

Exhibit B2: Growth contributions under 'good' and 'bad' demographic policies



Source: GS Global ECS Research projections.

Exhibit B3: Impact of each demographic trend on GDP



Source: GS Global ECS Research projections.

Section III: How will demographics affect consumption patterns?

Demographics can have a large impact on consumption patterns, and given the size of the changes in India, will certainly affect the demand for goods and services in the country.

Urbanisation will likely increase demand for discretionary goods versus non-discretionary goods. Evidence from other Asian economies suggests that urbanisation leads to a greater demand for services compared to goods. Since rural inhabitants live in geographically dispersed locations, the cost of providing services such as financial, healthcare, education, entertainment can be large. Concentrating services in urban areas brings down their costs and enhances their demand.

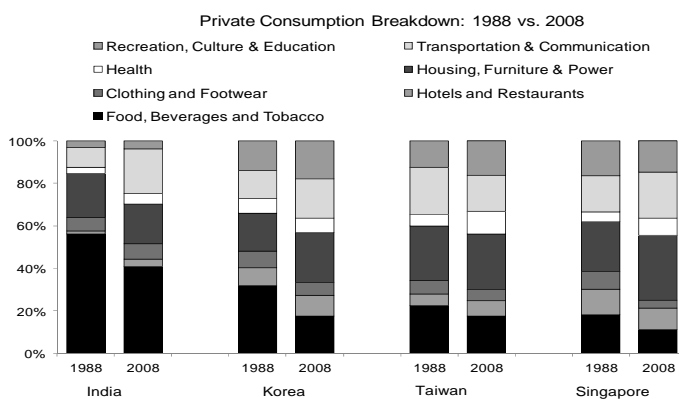
The rise in the number of people in their ‘thorties’ implies greater demand for housing, transportation, consumer durables, and services, especially education.

Our 2020 projections suggest that demand for health and education services, housing, furniture and appliances, and transportation will increase by more than the overall increase in consumption. Demand for food and clothing will, almost certainly decline as a share of total spending, as would clothing and footwear. Demand, of course, will be determined not only by demographics, but also by the evolution of incomes. Therefore, the consumption patterns we project are jointly determined by demographics and income. All spending categories will likely see an absolute increase in demand due to rising incomes, with some seeing greater increases than others.

To project consumption patterns in India in 2020, we considered both consumption trends over the past 10 years in India, and refined those trends by using the consumption profile of other countries in Asia at similar phases in their growth and demographic transitions. In Korea, Taiwan, Singapore, Malaysia—with falling dependency ratios, rapid urbanisation, and rising incomes, demand for food and clothing declined, in some places precipitously, while demand for services went up. Their experience enables us to quantify spending on key consumption categories.

Spending on education and healthcare may increase 5-fold in current terms, while that on housing and appliances by 4 times. In contrast, food and beverages may increase about 2.5 times and their share will likely decline from a third to a quarter over the next 10 years. Transport and communication, and hotels and restaurants also see a rise above the overall consumption.

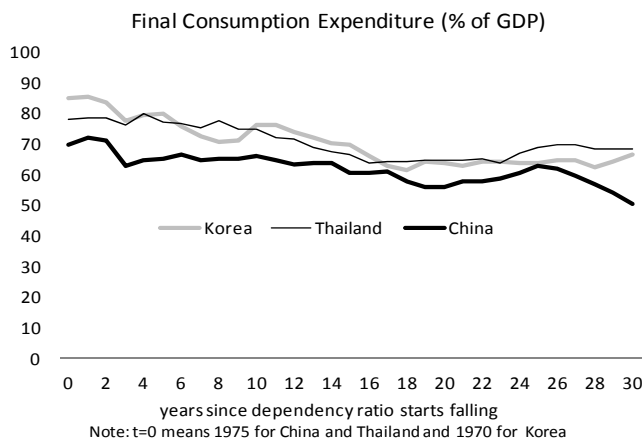
Exhibit 17: Evolution of major consumption categories across Asia have similarities



Source: CEIC, GS Global ECS Research.

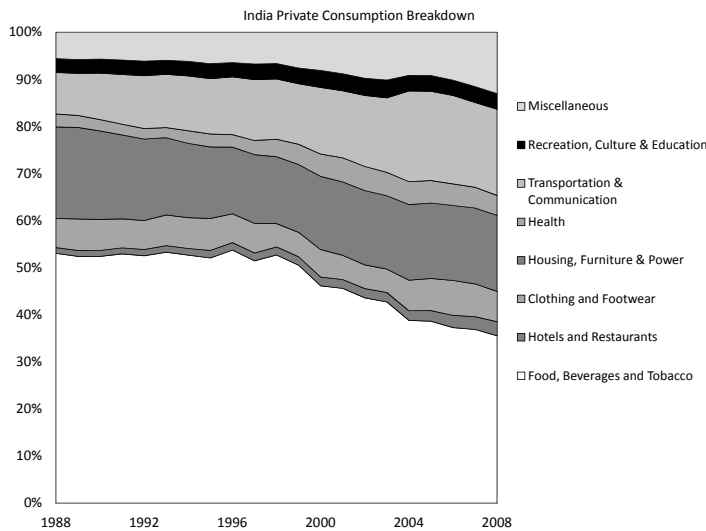
Our projections show that India’s consumption growth in nominal terms may grow nearly 3.5 times between 2010 and 2020, and yet decline as a share of GDP, as GDP grows faster. Evidence from demographic transitions in Asia suggests that consumption as a share of GDP gradually declined as dependency ratios fell. Consumption, however, continued to show strong growth rates, but lower than headline GDP. This was true both of household consumption expenditure and total final expenditure. This follows from the life-cycle hypothesis—as a larger part of the population goes through its prime working age and savings years, consumption as a share of GDP tends to decline, and investment as a share of GDP tends to go up.

Exhibit 18: Share of consumption in GDP tends to fall during demographic transitions



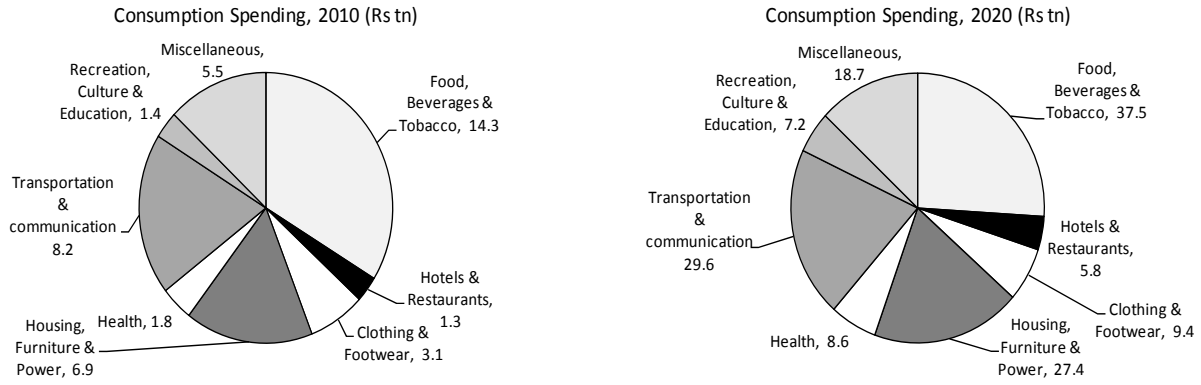
Source: WDI, GS Global ECS Research projections.

Exhibit 19: How have consumption categories evolved in India



Source: CEIC, GS Global ECS Research.

Exhibit 20: India consumption spending 2020 vs. 2010—services get larger share



Source: GS Global ECS Research projections.

Section IV: How will demographics impact the financial sector?

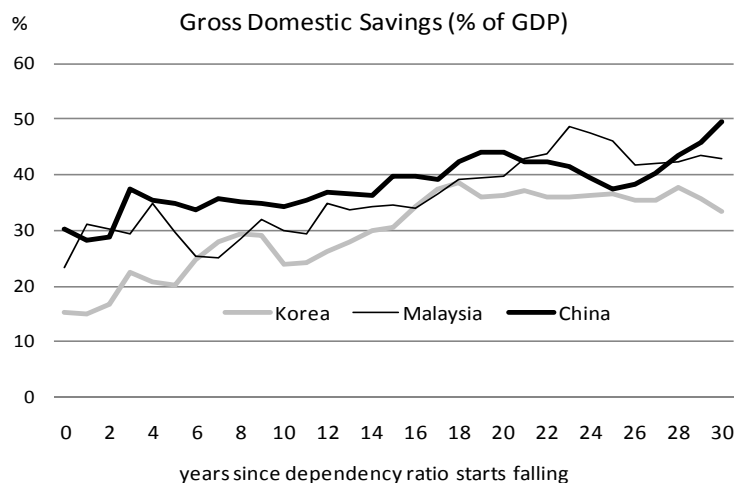
In nearly every country going through the demographic transition, domestic savings increased.⁹ Countries where dependency ratios have fallen the fastest have seen faster increases in their savings rates. Indonesia and Vietnam saw dependency ratios fall more gradually, and therefore a more measured increase in their savings rates.

India is also witnessing a rise in its savings rates. The household savings rates started rising in the 1980s, but really picked up around 2000. Based on current projections, India's dependency ratio would decline all the way till 2040, and would provide a boost to savings.

India's domestic savings rate can potentially continue to rise over the next two decades, and may reach 40% of GDP by 2016, according to our projections based on dependency rates.¹⁰ It can potentially remain above 40% of GDP for over a decade.

Several Asian economies have managed to sustain high savings rates for considerable periods. Barring a couple of years, China's savings rate has been above 40% of GDP since 1993, Malaysia's since 1996, and Singapore's since 1983—now in its third decade.

Exhibit 21: In Asia, savings rates have risen with falling dependency ratios



Note: t=0 means 1975 for China; 1970 for Korea; 1975 for Malaysia.
Source: WDI, GS Global ECS Research projections.

Higher savings are also being augmented with a profound change in information and communication technology. With India having more than 500 million mobile phone users and as a rising IT destination, access to financial products is continuously increasing. With a more literate and connected population, a greater percentage of household savings, we believe, will find their way into the financial sector.

⁹ This fact has been well documented. The rationale is based on the lifecycle income hypothesis. In the early years, an individual is merely a consumer. As the individual enters and passes-through the working age years, her income and savings increase. Finally, when she retires, she goes back to consuming. Therefore, having a larger number of working age adults relative to the very young or retired leads, to increases in savings rates.

¹⁰ See Appendix C and 'India CAN Afford Its Massive Infrastructure Needs', *Global Economics Paper No. 187*, September 16, 2009.

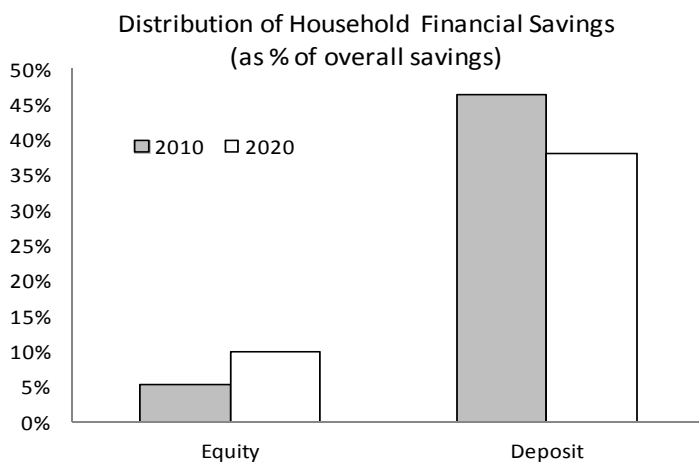
We believe the demographic trends of falling dependency ratios and rising proportion of ‘thorties’ in the population will have an important impact on the financial sector. These are the prime earning and saving years for adults. Evidence suggests that the proportion of net wealth invested in risky assets increases as people age. Young people’s (in their 20s) financial wealth is low, and so savings are scarce. As income increases, it tends to boost savings and demand for financial assets. Given the age profile of the population, we expect a greater preference for stocks and bonds over bank deposits.

We estimate that the share of equities in household savings could double from around 5% today to over 10% in 2020.¹¹ This, coupled with the overall growth in financial savings would mean that annual inflows into equities could rise nearly 6 times by 2020, compared to a 2.5 fold increase in bank deposits. Our analysis on inflows into equities are based on current trends, cross-country evidence from Asia, and taking into account the changing demographic profile of India’s population.

Our earlier work¹² suggests that India may also witness a rapid expansion of its domestic bond markets, in part due to its changing demographic profile. We project that India’s overall bond market may grow from US\$150 billion currently to nearly US\$1 trillion by 2020.

The rise of the ‘thorties’ suggests that housing demand will also ratchet up. In our previous work,¹³ we have shown that age structure has had an impact on housing demand and house prices in Japan and Korea. As India’s population age structure enters that period, we would expect similar trends to occur.

Exhibit 22A: Preference for financial assets by households changes with demographics



Source: RBI, GS Global ECS Research projections.

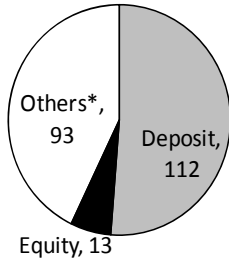
¹¹ See Appendix D for details.

¹² See ‘Bonding the BRICs: A Big Chance for India’s Debt Capital Market’, *Global Economics Paper No. 161*, November 7, 2007 and ‘India’s Debt Market: Growing But Not Maturing’, *Global Viewpoint 10/02*, February 9, 2010.

¹³ See ‘Baby Boom and Ageing, Property Boom and Bust: Why Korea Will Not Follow Japan’s 1990s Experiences’, *Global Economics Paper No. 197*, June 11, 2010.

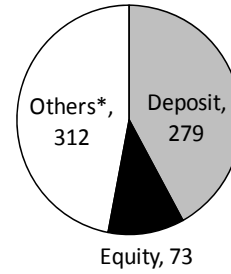
Exhibit 22B: 2020 projections of flows into financial assets—equities may see greater inflows, and bank deposit less

Distribution of Household Financial Savings, US\$bn, 2010



* Others include Insurance, Pension and Government Bonds

Distribution of Household Financial Savings, US\$bn, 2020



* Others include Insurance, Pension and Government Bonds

Source: RBI, GS Global ECS Research projections.

Section V: Can India create enough jobs? The rise of manufacturing

One of the chief drivers of economic growth, and a key demographic trend that we have identified is the movement of surplus labour from low productivity agriculture to higher productivity industry and services. Agriculture continues to employ some 57% of the labour force, one of the highest in Asia, and the pace of migration remains slow by international comparisons. A critical question is—can India absorb the labour coming out of agriculture to sustain growth?

India's services sector has in the past outperformed its manufacturing sector, with the IT and software sectors being the best known, but also the construction and retail trade sectors generating significant employment growth. The services sector has averaged a growth rate of over 9% over the past 10 years.

The manufacturing sector is seen as a laggard, employing only 19% of the work force. A dominant view is that given the problems in its industrial sector, and strengths in services, India can bypass the industrial stage and move directly from agriculture to service. We think this view is incorrect—India will not be able to sustain high growth rates without a larger role for industry.

We estimate that India needs to generate an additional 40 million jobs in industry over the next 10 years to absorb the increase in its labour force and sustain GDP growth rates of +8%. If India generates these jobs, we estimate industry would need to grow by on average 8.5%.¹⁴

Our projections also show that the services sector would need to generate 45 million jobs, and the residual employment in agriculture would be about 16 million over the next 10 years.

In our view, recent trends, policy changes, low unit labour costs, and the experiences of other countries undergoing demographic changes, suggest that industry can generate the required number of jobs.

Recent trends in industrial production have been encouraging, with the sector averaging a growth rate of 8% since 2002. In 'India's Rising Growth Potential', *Global Economics Paper No. 152*, January 22, 2007, we had analysed the increase in productivity, and latest data suggest that productivity and investment in the sector have continued to rise. Since 2002-03, Total Factor Productivity growth in industry has averaged around 4%, a historical high.

¹⁴ See Appendix E for details on assumptions.

Exhibit 23: Productivity in Indian industry has been rising



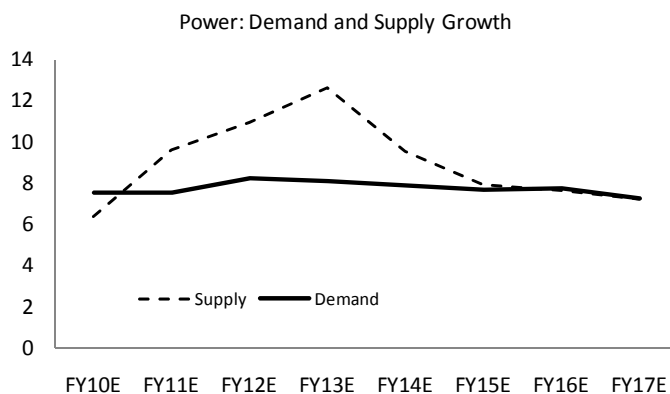
Source: CEIC, GS Global ECS Research.

Recent and prospective policy changes, we think, will increase the competitiveness of the manufacturing sector. First, import duties have progressively come down—from a peak tariff rate of nearly 300% in 1990 and 40% in 2000—to 10% currently (effective import tariffs are lower). The reduction in duties is critical for lowering the cost of imported inputs and enhancing competitiveness.

Second, the telecom revolution with India having over 600 million wireless subscribers is cutting down communication costs and enhancing productivity.

Third, the infrastructure build-out currently underway will help in improving competitiveness.¹⁵ Roads, power, and ports are seeing frenetic activity. On roads, India has undertaken an aggressive policy of road construction to move from 2 km to 20 km a day. The pace of construction has already reached 10 km a day. On power, we think that the deficit has peaked, and with substantial new generating capacity coming on-stream, supply would outpace demand over the next several years and alleviate a key constraint on industry. The availability and cost of power has been a key constraint on domestic industry. On ports, handling capacity may nearly double with the projects under implementation, and increase further with the projects in the bidding stage. According to the Ministry of Shipping, this could increase India’s port capacity from 145 mtpa to 326 mtpa over the next few years.

Exhibit 24: We project power supply growth to outstrip demand growth over the next few years



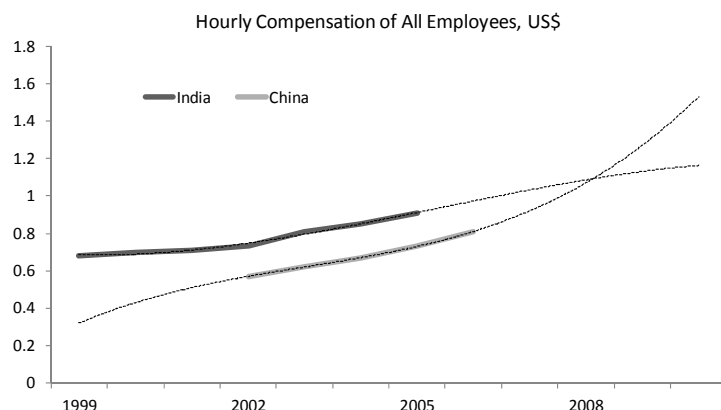
Source: CEIC, GS Global ECS Research.

¹⁵ See ‘India CAN Afford Its Massive Infrastructure Needs’, *Global Economics Paper No. 187*, September 16, 2009 for more details on the prospects and financing for infra.

Fourth, the nationwide Goods & Services Tax (GST) expected to come into effect from April 1, 2011 will reduce the effective rate of taxation on industry. Currently, services are not under the purview of central and state VAT, and states do not have the power to tax services. By redistributing the burden of taxes equitably between services and manufacturing, the GST will broaden the tax base and reduce effective rate of taxation on industry. It will replace a plethora of taxes—including sales, excise, octroi, surcharges, duties and myriad cesses, thus reducing compliance costs.

India's unit labour costs are among the lowest in emerging markets, and the large prospective increase in the labour force may keep them from rising substantially. Recent data comparing China and India on unit labour costs suggests that costs are rising in China faster than in India, a trend which we can expect to continue.

Exhibit 25: China's unit labour costs are gradually rising relative to India

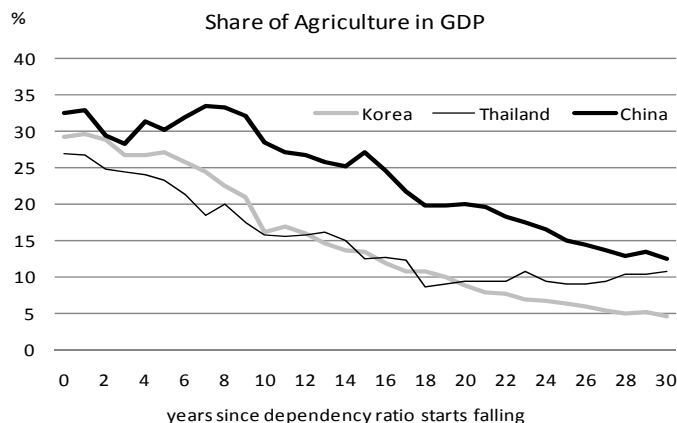


Note: bold lines show actual values and dotted lines show projected values

Source: US Department of Labor, GS Global ECS Research.

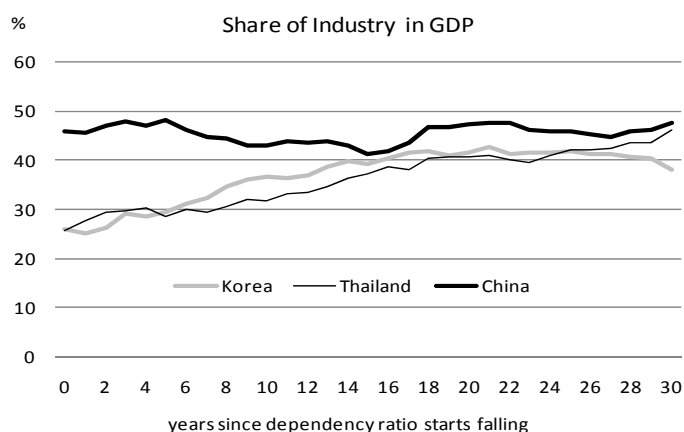
The experience of East Asia suggests that in countries going through the demographic transition, their share of industry increased dramatically. This was also due to rapid urbanisation and jobs created in industry. The movement of labour from agriculture to industry has been a key dynamic, again well-documented, in demographic transitions and growth experiences of the Asian economies.

Exhibit 26: Share of agriculture declines rapidly during demographic transitions...



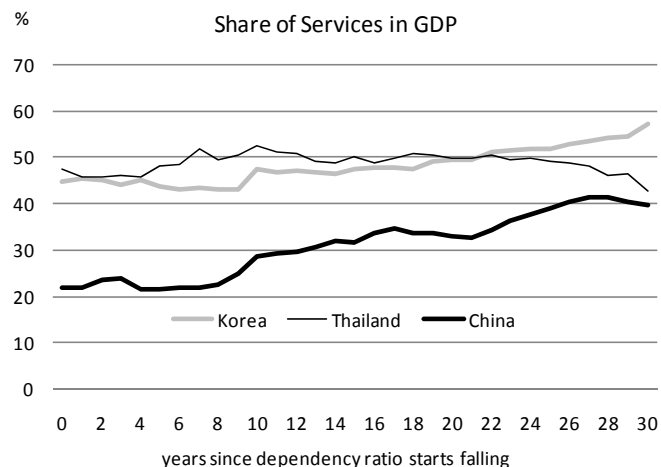
Note: t=0 means 1975 for China; 1970 for Korea; 1975 for Thailand.
 Source: WDI, GS Global ECS Research projections.

Exhibit 27: ...while share of industry rises...



Note: t=0 means 1975 for China; 1970 for Korea; 1975 for Thailand.
 Source: WDI, GS Global ECS Research projections.

Exhibit 28: ...as does the share of services



Note: t=0 means 1975 for China; 1970 for Korea; 1975 for Thailand.
 Source: WDI, GS Global ECS Research projections.

Section VI: The policy priorities

To convert India's demographic potential into reality requires significant policy commitment. We emphasise policies which fall into 3 categories—education, labour market reforms, and ease of doing business.

First, all areas of education need massive investment. India starts from a position of weakness in this regard, and policy needs to devote resources and energy in this crucial area. We had discussed these issues at length in 'Ten Things for India to Achieve its 2050 Potential', *Global Economics Paper No. 169*, June 16, 2008. There are some steps in the right direction, including the recently passed Right to Education Act, guaranteeing education for all Indians between the age of 6-14, and the Foreign Universities Bill which seeks to allow foreign universities to set up campuses in India. However, government investment in education needs to be massively scaled up.

Second, India needs more flexible labour markets and needs to reform labour laws (see Box 2). It is extremely difficult to lay off workers in India, and even when successful, on average, it costs more than a year's wage. Other policy changes which would help are:

- Privatize information bureaus to reduce search costs for labour.
- Encourage more on-the-job training through tax incentives.
- Retraining of workers who are out of jobs.

India's female labour force participation rates are abysmally low. To enhance female participation, policy has a large role to play:

- Subsidies for employers hiring women with children.
- Generous child-care benefits.
- In industry, encourage women workers through incentives.

Third, India needs to improve its investment climate for industry and alleviate supply-side constraints in order to absorb the labour coming out of agriculture. It takes an entrepreneur 30 days to start a business, 195 days to obtain various licenses and permits, 44 days to register a property, nearly 4 years to enforce contracts, and a shocking 7 years to close a business.¹⁶ Even though India is making progress in reducing red tape, the scale of the problem remains immense. Action on these issues is important because it is the small and medium-sized enterprises that create the most jobs.

¹⁶ See 'Reforming through Difficult Times', *IFC Doing Business Report 2010*.

Box 2: Labour reforms—the biggest challenge to industrial growth

India needs urgent reforms of its labour laws to take advantage of its demographic dividend. It needs to simplify legislation, allow for hire and fire, ease rigidity, encourage economies of scale, and reduce the role of the informal sector.

- **Simplify:** The body of legislation that shapes the industrial and labour environment in India is huge, chaotic, and seriously outdated. According to the All India Organisation of Employers, there are more than 55 central labour laws and over 150 state labour laws. Apart from arguably the most important Industrial Disputes Act, 1947, there exists several other laws such as Minimum Wages Act, 1948; Trade Unions Act, 1926; Contract Labour Act, 1970; Weekly Holidays Act, 1942; Beedi and Cigar Workers Act, 1966; The Payment of Wages Act, 1936; The Workmen's Compensation Act, 1923; The Factories Act, 1948; the list goes on. Together, they form a crisscrossing network of chaotic, strangulating, overlapping and often-contradictory laws that need urgent reform and simplification.
- **Hire and fire:** The Industrial Disputes Act, 1947 requires companies employing more than 100 workers to seek government approval before they can fire employees or close down. In practice, permission for retrenching employees is rarely granted. This law is one reason why the World Bank estimates that it takes nearly 10 years in India to close a business. We think this law has done more to hold back the growth of India's manufacturing sector than any other policy and needs urgent amendment. It keeps most of India's labour force in the informal sector, and primarily in temporary jobs preventing employers from investing in their training, and stripping them of any formal benefits. The large differences between formal and informal worker benefits and wages could potentially become a social problem.
- **Rigidity of rules:** According to the World Bank, India is among the most rigid countries with a score of 48 (100 being the highest possible score). China has a score of 30, Korea 34, Norway 30; Singapore close to 0. Data suggests that nations with less rigid labour laws have more efficient economies, higher wages and a smaller share of labourers who are long-term unemployed.
- **Contractual issues:** The Contract Labour Act, 1970 which governs contracting, and therefore affects a majority of employment and employment growth, is currently highly restrictive. It does not allow contract labour in direct production or be directly supervised and prohibits women from working on night shifts which severely affects their employability in industry. The Industrial Disputes Act (IDA) prevents flexibility in contracts. A firm may want to manufacture a product that has volatile demand—such as fashion garments, and wants to offer workers higher wages but on a temporary contract—which could be terminated with a month's notice. Such a contract will have no legal standing because the IDA specifies in advance how and when workers may and or may not be retrenched. India's failure to reap the full benefits of the expiration of the multi-fibre agreement, can in part be attributed to such contractual restrictions.
- **Informal sector:** Labour laws result in most manufacturing jobs being restricted to the informal sector which is characterized by low productivity and wages and to which labour laws do not apply.
- **Sub-optimal scale:** Anecdotal evidence suggests that Indian manufacturers often set up several plants instead of a single large one to get around labour laws. This, however, limits their flexibility to meet seasonal variations in demand. They also lose out on economies of scale and investment: on average, Indian textile and clothing firms have only a fraction of the machines that a typical Chinese plant does.

Section VII: Concluding remarks

A big part of India's growth story is based on its demographic dividend. This study reaffirms that belief and finds that it is very real and substantial. In 20 years, India's labour force could rise by over 200 million and contribute upwards of 4 ppt annually to GDP growth.

Economic growth and the forces discussed in this paper may, however, exacerbate rural versus urban and educated versus uneducated divides. On the one hand, the higher returns to education and urban employment can be aspirational. On the other, these could cause social tensions. The alternative is not to disincentivise urbanization through policies such as guaranteed rural employment, but to provide opportunities to all. This is why labour market reform is critical to reduce the incidence of a 'labour elite'.

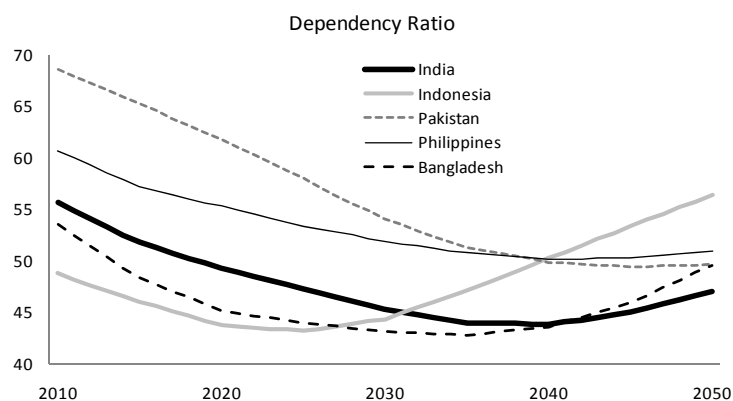
Apart from the economic effects identified in this paper, demographic changes will affect all aspects of society, culture, and politics. More women in the workforce will impact traditional gender relations and culture. Politics will change to cater for these changes, especially as it becomes more urban, more female, and more oriented to the 'thorties', rather than a focus predominantly on rural poor.

With the share of employment increasing in industry and services, there will be more predictability in earnings compared to agriculture, and therefore to invest in fixed and financial assets.

Our analysis of India's demographic changes and its impact would have some implications for other 'late demographic transitioners' in the region—Indonesia, Pakistan, Bangladesh, and the Philippines (4 members of our N-11). Together, these countries represent over 650 million people. They will also benefit from a demographic dividend, although the magnitudes may differ based on individual country characteristics. Of the 4, Bangladesh appears to have the most favourable demographics, with low and declining dependency ratios similar to India's.

India's demographics will also have a large impact on the global economy. The effects will be felt through economic growth, location of production, and demand for commodities. Given the considerable implications, India's ability to turn its demographic potential into reality should be of pressing importance, not only for the fate of its own labour force but also for the progress of the global economy.

Exhibit 29: 'Late Demographic Transitioners' in Asia—favourable demographics, especially for Bangladesh



Source: CEIC, GS Global ECS Research.

Appendix A: Projecting India's labour force dynamics

In order to get a sense of India's labour force trends, we look at 4 main underlying dynamics—population size and age structure, labour force participation rates, levels of urbanisation and education. Except for population size and age structure, which is largely pre-determined by India's current demographic profile, we analyse alternate scenarios in order to understand their relative importance and contribution to overall growth in the coming decades.

Population size and age structure

We use UN population division projections of population size and age structure. These trends are inherent in India's current demographic profile.

Exhibit A1: India's population by age groups, million

	[0-9]	[10-19]	[20-29]	[30-39]	[40-49]	[50-59]	[60-69]	[+70]	Total
2010	251	245	216	174	135	102	56	36	1215
2020	242	246	240	211	168	126	85	49	1367
2030	221	238	243	236	204	158	108	77	1485
2040	203	218	236	239	230	194	138	107	1565
2050	194	201	216	233	235	220	172	144	1615

Source: UN Population Division, GS Global ECS Research.

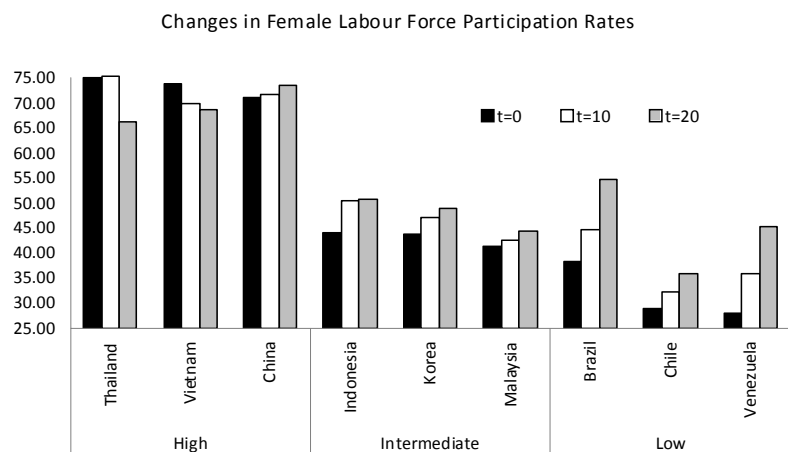
Labour force participation rates

We look at male and female participation rates separately and take into account the changing age profile and age specific participation rates in our projections.

Male age specific participation rates in India are in line with other countries. Based on the experience of other countries that have gone through a similar demographic transition, we do not expect any significant change in the age specific participation rate. Thus we project the current trend and expect a modest decline in overall male participation rates from 81% to 78%.

Female labour force participation rate trends in countries undergoing demographic transition are mixed. For countries which start off with high female labour force participation rates, we do not observe any significant changes. On the other hand, countries with low and intermediate female labour force participation rates show a strong and modest increase in female labour force participation respectively. Given India's extremely low female labour force participation rate, we expect India's female labour force participation rates to rise. We model India's female labour force participation by looking at comparables, i.e., low female labour force participation rate countries in the initial stages and intermediate female labour force participation countries later.

Exhibit A2: Changes in female participation rates across emerging markets



Source: CEIC, GS Global ECS Research.

We consider three alternative scenarios for female labour force participation:

- *Base Case:* Female labour force participation rises from 33% at present to around 46% in 2050, with the most rapid growth taking place in the next two decades.
- *Low Case:* India's age-specific female labour force participation rates remain constant, implying overall female labour force participation declines from 33% to 30% due to changes in the age structure of the population.
- *High Case:* Female labour force participation rises from 33% at present to around 57% in 2050.

Urbanisation

We follow a similar methodology for urbanisation, assuming that India urbanises at a relatively high rate initially (similar to China, Indonesia and Thailand) and once India's urbanisation rate catches up, she urbanises at a slower pace (akin to Korea and Malaysia).

We once again consider 3 alternative scenarios:

- *Base Case:* Urbanisation rate increases from 29% at present to around 62% in 2050.
- *Low Case:* Urbanisation rate does not accelerate and follows current trends, reaching only 41% by 2050.
- *High Case:* India urbanises at a faster pace, with urbanisation levels reaching 70% by 2050.

Education

Levels of education, which following the literature, we measure by the average years of schooling of the population aged 15 years and above, determine the quality and thus productivity of the labour force. It is also extremely sensitive to public policy and its effectiveness. We compare India to various developed and developing countries.

Exhibit A3: A comparison of average years of schooling

	1960	1965	1970	1975	1980	1985	1990	1995	2000
India	1.68	1.93	2.27	2.70	3.27	3.64	4.1	4.52	5.06
Korea	4.25	5.39	4.91	6.60	7.91	8.68	9.94	10.56	10.84
China	NA	NA	NA	4.38	4.76	4.94	5.85	6.11	6.35
Thailand	4.3	3.8	4.09	4.03	4.43	5.18	5.58	6.08	6.50
Malaysia	2.88	3.39	3.90	4.43	5.09	5.48	6.03	6.49	6.8
US	8.49	9.09	9.53	9.69	11.86	11.57	11.74	11.89	12.05
UK	7.85	7.36	7.66	8.03	8.27	8.52	8.77	9.09	9.42

Source: CEIC, GS Global ECS Research.

We consider three alternative scenarios:

- *Base Case*: Average years of schooling increases from 5.06 at present to 7.62 in 2050 (average of Korea, China, Thailand and Malaysia in 2000).
- *Low Case*: Average years of schooling remains constant at 5.06.
- *High Case*: Average years of schooling increases from 5.06 at present to 11.31 in 2050 (developed country levels).

It is interesting to note that India's average years of schooling in 2000 was similar to that of China's in 1985.

Appendix B: Demographics' contribution to growth

Based on these 4 dynamics, we estimate the contribution of demographics to population growth in the coming decades. We follow a growth accounting framework to estimate the contribution of the size of labour force, age structure, urbanisation and education levels to overall growth.

At the first stage, use a 'Cobb-Douglas production' function to estimate the contribution to growth from physical and human capital accumulation, as well as productivity gains.

$$Y = AK^\alpha (L \times E)^{(1-\alpha)} \quad (1)$$

where

Y: Total (real) output

A: Total factor productivity (TFP)

K: (Real) physical capital stock

α : Factor share of capital

$(1-\alpha)$: Factor share of labour

L: Labour inputs

E: Labour quality index based on average educational attainment

By taking the difference in natural logarithms of Equation (1), we can derive the various input contributions to output growth (where a dot above a variable denotes its time derivative):

$$\dot{Y} = \dot{A} + \alpha \dot{K} + (1-\alpha)\dot{L} + (1-\alpha)\dot{E} \quad (2)$$

and

$$\dot{A} = \dot{Y} - \alpha \dot{K} - (1-\alpha)\dot{L} - (1-\alpha)\dot{E} \quad (3)$$

As we can see from Equation (2), GDP growth (\dot{Y}) can be boosted by higher growth in labour inputs (\dot{L}), educational attainment (\dot{E}), capital stock (\dot{K}), as well as TFP (\dot{A}).

While we observe the contribution of the size of labour force and education levels directly from equation (3), in order to separately assess the contribution of the change in age structure and urbanisation (which are part of TFP in equation (3) above), we go a step further.

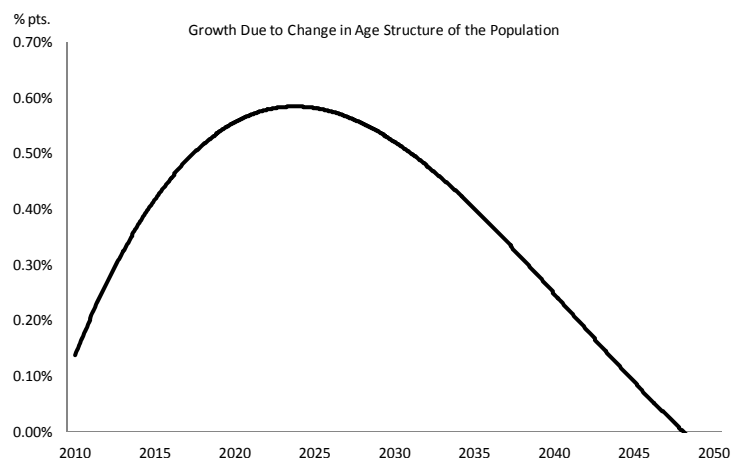
Age structure

The academic literature¹⁷ predicts that changes in age structure of the workforce have an effect on the overall TFP due to age specific differences in productivity levels. While the precise difference in levels of productivity depends on the nature of the economy and several other factors, in general, the 40-49 age group appears to be most productive, followed closely by the 30-39 age group (the 'thorties').

¹⁷ See Feyrer, James, February 2007, 'Demographics and Productivity', Review of Economics and Statistics, 89(1): for the relationship between age and productivity.

Our projections suggest that the growth contribution of changes in age structure would rise in the coming decades, peaking around 2030, and then gradually decline.

Exhibit A4: The ‘right’ age structure can increase productivity



Source: CEIC, GS Global ECS Research.

Urbanisation

We assess the contribution of urbanisation by looking at labour mobility across different sectors of the economy and looking at differential labour productivity in the 3 main sectors of the economy. We estimated 3 separate production functions for the sectors of agriculture, industry, and services.

The ‘Cobb-Douglas production’ function [Equation (1)] can be applied at the sectoral level as:

$$\begin{aligned}
 Y &= AK^\alpha (L \times E)^{(1-\alpha)} = Y^A + Y^I + Y^S \\
 &= A^A (K^A)^{\alpha^A} (L^A \times E^A)^{(1-\alpha^A)} + A^I (K^I)^{\alpha^I} (L^I \times E^I)^{(1-\alpha^I)} + A^S (K^S)^{\alpha^S} (L^S \times E^S)^{(1-\alpha^S)} \quad (5)
 \end{aligned}$$

where

superscripts A stands for agriculture, I for industry, S for services.

Y : Real output

A : Total factor productivity (TFP)

K : Real physical capital stock

α : Factor share of capital

$(1-\alpha)$: Factor share of labour

L : Labour inputs

E : Labour quality index based on average educational attainment

We use the framework developed in our *Global Economics Paper No. 152*, to estimate the impact of labour mobility on growth rates. We broke down GDP growth into three components: 1) the contribution from sectoral increases in labour productivity, suitably weighted by the sector's share in GDP; 2) the contribution from growth in the labour force in the sector, in the absence of labour mobility, again weighted by the sector's share in GDP; 3) the impact on GDP growth from inter-sectoral labour mobility, in the presence of differences in sectoral labour productivity levels.

These are summarized in the equation below:

$$\begin{aligned}
 g = & S^A \pi^A + s^I \pi^I + (1 - S^A - S^I) \pi^S \\
 & + S^A n^A + s^I n^I + (1 - S^A - S^I) n^S \\
 & + (l^A \times \frac{\Pi^I - \Pi^A}{\Pi} \times m^{AI}) + (l^A \times \frac{\Pi^S - \Pi^A}{\Pi} \times m^{AS}) + (l^I \times \frac{\Pi^S - \Pi^I}{\Pi} \times m^{IS})
 \end{aligned} \quad (1)$$

where:

superscripts *A* stands for agriculture, *I* stands for industry, *S* stands for services.

g: GDP growth

s: share of a sector in GDP

n: natural rate of growth of labour force in the sector

l: share of a sector in total employment

Π: level of labour productivity

π: growth rate of labour productivity

m: the net movement of labour between sectors (e.g., m^{AS} stands for labour movement from agricultural to industry).

The contribution of inter-sectoral labour mobility on overall GDP growth is represented by:

$$(l^A \times \frac{\Pi^I - \Pi^A}{\Pi} \times m^{AI}) + (l^A \times \frac{\Pi^S - \Pi^A}{\Pi} \times m^{AS}) + (l^I \times \frac{\Pi^S - \Pi^I}{\Pi} \times m^{IS}) \quad (2)$$

Appendix C: Savings projections

We model the private savings rate by basing it on fundamental determinants of savings: demographics, GDP growth and level of GDP per capita. The extant literature on savings identifies several other variables that determine a country's private savings rate, including real interest rates, inflation, financial depth, fiscal deficit, social security arrangements and urbanisation. In particular, we need to look at private savings (households and corporate) as separate from public savings.

In most empirical studies, the variables that matter most for savings are GDP per capita, GDP growth and demographics. We use these fundamental determinants to project savings rates for India, using the equation below.¹⁸

Private Savings = constant + 0.59*Lagged Private Savings + 0.05*Real per capita GDP + 0.45*Real growth rate of per capita GDP - 0.66*Old Dependency Ratio - 0.3*Youth Dependency Ratio

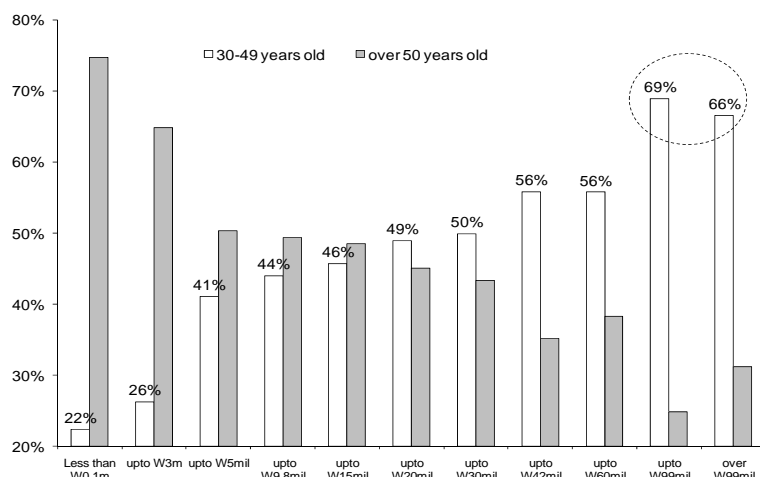
¹⁸ The co-efficients are from Loayza, Schmidt-Hebbel and Serven (see 'What Drives Private Savings Across the World' *Review of Economics and Statistics*, May 2000), and are derived from a comprehensive analysis of savings behaviour for 150 countries spanning a 30-year period.

Appendix D: Forecasting the size of household flows into equities

To forecast flows into equity markets in 2020 from household savings, we used historical trends in India and combined that with a Asia country panel comprising of Korea, Taiwan, Thailand, and Indonesia. Using data from 2000 on domestic flows into equities from the cross-country panel, we estimated the co-efficient on dependency ratio. Controls used were GDP growth, the level of country stock index, S&P 500 levels, and country fixed effects. The dependency ratio variable was significant, although the overall regression had low explanatory power.

A second round regression was run to determine the relation in India between annual domestic flows into equity markets and share of household savings held in equities. Expectedly this regression had a close fit. Then we combined the coefficient on the dependency ratio obtained from above with the trend increase in household flows into equities estimated from Indian data to get at share of household savings in equities in 2020. Evidence from Korea suggests that 30-49 age group has the largest equity investments.

Exhibit A5: Korea households—financial investments by age



Source: Korea Ministry of Land, Transportation and Maritime Affairs.

Exhibit A6: The age group of 35-54 have the biggest equity investments in the US and Korea (equity investments by age group in the US and Korea)

	1998	2001	2004	2007	2007
US (families having stock holdings, direct and indirect) (direct)					
All families	49%	52%	50%	51%	18%
Under 35 years old	41%	49%	41%	39%	14%
35 to 44 years old	57%	60%	55%	54%	17%
45 to 54 years old	59%	59%	57%	60%	19%
55 and over	45%	46%	50%	52%	20%
	1998	2001	2004	2007	2008
Korea (individuals having direct stock holdings)					
All individuals	4%	8%	8%	9%	9%
Under 35 years old	3%	6%	4%	6%	6%
35 to 44 years old	9%	15%	14%	15%	17%
45 to 54 years old	9%	17%	17%	16%	17%
55 and above	4%	10%	10%	11%	10%

Source: US Federal Reserve, Korea Stock Exchange.

Appendix E: Inter-sectoral distribution of labour force

Currently, 57% of India's labour force is employed in agriculture, followed by 24% in services and 19% in industry. Using our labour force projection and current inter-sectoral trends, we estimate that an additional 48 million people would need to be employed in services and an incremental 40 million in the industrial sector by 2020.

Using the sectoral level 'Cobb-Douglas production' function described previously, we estimate the sectoral growth rates. Our projections are based on the following assumptions:

- We project sectoral labour force based on our overall labour force and urbanisation projections and following current trends for the sectoral distribution of labour force.
- We assume that sectoral distribution of new investment follows current trends. The overall level of investment is based on our savings projections.
- We follow current trends for sectoral productivity growth, with the services sector showing higher growth in TFP vis-à-vis the industrial sector.

Based on this, we estimate that the industrial sector would grow at an annual rate of about 8.5% over the coming decade. This compares with growth rates of 7.7% in the sector during the 2001-2010 period.

While our sectoral growth estimates are large, current trends would still mean that the agricultural sector would have to absorb an additional 16 million people. Therefore, if India seeks to employ these additional people in manufacturing or services, the required sectoral growth rates would need to be even higher.

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