ABSTRACT

Current projections envision Asia’s emerging economies becoming the largest economic group in the world in the next two decades. Yet many observers warn that Asia’s growth processes are unsustainable and could be headed for the “middle income trap.” This paper examines past growth engines—including exports to advanced economies—and those that might replace them. It argues that factors that will increasingly drive Asian demand—urbanization, infrastructure development and middle class consumption—are correlated with the region’s comparative advantages, could benefit from great scale economies, and offer the potential for substantial productivity growth. These reinforcing drivers of demand and supply do not guarantee future growth, but can provide autonomous foundations for the region’s development in the context of favorable economic policies.

JEL Classifications: O20, O30, O40, O53.

Key phrases: Asian economies, growth engines, China, economic growth, investment, productivity.
Table of Contents

1. Wall of worry ........................................................................................................................................ 3
   Predictions of doom .......................................................................................................................... 3
   The middle income trap ..................................................................................................................... 4
   Scope of this study ............................................................................................................................. 6

2. The dynamic middle as an engine of growth .................................................................................... 7
   What are growth engines? ................................................................................................................. 7
   Asian growth engines in practice ....................................................................................................... 9

3. Potential Asian growth engines: a typology .................................................................................... 11
   Demand-based engines ..................................................................................................................... 11
   Productivity-based engines .............................................................................................................. 13
   Policy-based engines ....................................................................................................................... 14

4. Some $1 trillion examples ................................................................................................................. 15
   Tata Nano ......................................................................................................................................... 16
   Hallstatt, Guangdong? ....................................................................................................................... 16
   Shanghai Metro ................................................................................................................................. 17

5. Conclusions ....................................................................................................................................... 18
   References ......................................................................................................................................... 20
   Annex A. Growth Projections ............................................................................................................ 23
   Figures, Tables .................................................................................................................................... 27
Can Asia grow fast on its own?  
The economics of the dynamic middle  

Peter A. Petri  
Brandeis University and East-West Center

1. Wall of worry

According to most recent projections (see Annex A), by 2030 Asia’s emerging economies\(^1\) will become larger than those of the United States and the European Union.\(^2\) By then, the world economy should be twice as large as it is today and middle-income countries will dominate demand and production. These trends imply extensive (and hopefully peaceful) rearrangements of economic and strategic influence, and could lead to unprecedented innovation and prosperity as well as severe stresses on the environment. In other words, they need to be taken seriously. But are these projections reasonable or even feasible?

Many observers don’t think so. The prospects for the “Asian century” (see for example ADB 2011) contrast sharply with recent (as of August 2012) negative global trends, including in Asia, and much negative commentary. The global recovery has been far slower than expected—even given warnings about the grueling history of financial crises—due to the depth of the initial U.S. financial shock and the extent of its eventual spread to sovereign debt markets in Europe and elsewhere. While Asian economies held up well in the initial stages of the crisis, four years later they are also succumbing to its effects.

Predictions of doom

The structure and durability of Asian growth are now widely questioned. The argument is that rapid Asian growth cannot continue because it has been driven by unsustainable factors. Eventually, some cyclical or unexpected trigger will generate a crash, and growth will then stabilize at much lower levels. These views originate, in part, in a financial community eager to avoid missing still another bubble. James Chanos, a hedge fund manager who earned his reputation by reportedly shorting Enron, has long predicted that the crash of China’s real estate

\(^1\) The data used in this paper relate to China, India and Southeast Asia and are based on Petri and Zhai (2012), a background paper for an ongoing study of ASEAN, China and India. The diversity of this group cannot be addressed adequately in a short analysis. Thus the qualitative arguments are of course dominated by China, which accounts for about 2/3 of the group’s GDP.

\(^2\) We use projections by CEPII (Foure et al., 2010) which broadly represent recent studies. Annexes show that the region’s per capita income would roughly triple and its share of the world output more than double, from 13 percent in 2010 to nearly 30 percent in 2030.
markets “is going to be a doozy” (Oprita, 2010). Martin Wolf (2011) of the Financial Times has compared China to Japan in the 1980s, where “the attempt to sustain growth in investment-led domestic demand led to a ruinous credit expansion.” And two of the Economist’s (2011) “most influential economists of the decade,” Professors Nouriel Roubini and Tyler Cowen, lead the army of doom: Professor Cowen rhetorically asked, “how about a bone-crunching, bubble-bursting, no soft landing, Chinese auto crash-style depression within the next seven years?” These projections do not merely anticipate a cyclical downturn, or a gradual deceleration as countries approach the global productivity frontier (both of which are inevitable), but the end of growth based on transient causes.

Policy studies have reinforced these worries. While generally hopeful about Asian growth, ADB’s Asia 2050 (ADB 2011) is thoroughly hedged and goes to some length to emphasize that growth is not foreordained and could slow dramatically. A prominent Chinese publication noted that “if there's a sustained slowdown, China will find itself in serious trouble without a proper plan. It would be at risk of a financial crisis and social conflict, and unable to pull itself back onto a path of steady growth. Hence, the government cannot afford to ignore these ‘prophets of doom.’” Avoiding deceleration—the middle income trap—also became a central theme of the recent World Bank-Development Research Center of the State Council China 2030 study (World Bank 2012).

The middle income trap

These concerns have some basis in economic research. For example, by Garrett (2004) and Gill and Kharas (2007) argue that countries tend to get stuck in a “middle income trap” because their wages become too high to compete with low wage economies and they don’t have enough technology to compete with advanced economies. The evidence is mostly anecdotal, with Latin American economies often used to illustrate growth deceleration at middle income levels. On the other hand, Japan, Korea, Taiwan and Singapore have clearly sailed past these dangers. In an important empirical contribution, Eichengreen et al. (2011) estimates that the probability of encountering a substantial deceleration in growth rates rises at around $17,000 per capita, a level that the World Bank classifies as high income, but one that China and other Asian economies will approach in the next two decades.

But the empirical case for growth deceleration at middle income levels is far from robust. Figure 1 shows retrospective differences between “past” and “future” growth rates (each based on a 15 year interval) for countries in different quartiles of the world’s per capita income distribution,

---

3 Whether intended or not, the term “doozy,” which means “something extraordinary” in American slang, is unusually appropriate. This word entered popular use as “Duesy,” the nickname of the Duesenberg J-model automobile, which was was designed to be the best and most prestigious in the world. The car was launched with much fanfare on December 1, 1928, but soon the Great Depression hit and its markets evaporated. Less than 500 units were ever sold, mainly to movie stars and gangsters. The company collapsed in 1937.

4 That prediction was made just about seven years ago (Cowen 2006), and it came true shortly after it was made, but in the United States and Europe and not in China. The Chinese economy has still not experienced a crash, although it is now decelerating. There is an extensive inventory of expired predictions of doom. The most interesting in retrospect is Gordon G. Chang’s (2001), The coming collapse of China, which even identified the precise cause that would precipitate the crash in a chapter entitled: “WTO Accession Will Trigger Collapse.”

5 There are some rebuttals to these views—see for example Roach (2011).

6 Caixin editorial, June 29, 2011. http://english.caing.com/
centered on years between 1975 and 1995. The bottom and top quartiles are represented with solid lines and middle-income countries with dotted lines. The diagram is dominated by a powerful global trends: general growth deceleration in the early 1980s has gradually turned to acceleration in the 1990s.

**Figure 1. Growth rate acceleration by country income quartile**

From the 1970s to the mid-1980s, both middle income groups lagged the bottom and top quartiles of countries—everyone was decelerating then, but the middle income groups decelerated more sharply than others. This appears to confirm the hypothesis of the middle income trap. In the late 1980s, however, the middle income countries began to catch up, and by the end of the data in 1995 the four groups were lined up in order, with the least developed countries accelerating the most and the most developed ones the least. Some obvious implications of Figure 1 are that global trends dominate results by country groups, and that differences among the latter don’t follow a consistent pattern over time.

Far more detailed analysis is needed to understand changes in long term growth rates, and there may not be enough data to distinguish conclusively among alternative explanations. For example, it is possible that the middle income decelerations in the early years of Figure 1 reflected the special circumstances of the 1980s and 1990s, namely the foreign exchange rate crises that roiled middle income economies during that period. For obvious reasons, middle-income countries then had much larger net, non-official foreign exchange exposures than either poorer or richer economies, and were therefore disproportionately exposed to these shocks. Because of those experiences, most middle income countries today (along with their creditors) avoid such “currency mismatches” and some have accumulated substantial foreign exchange reserves.

The theoretical underpinnings of the middle income trap are also tenuous. The analogous “low-income trap” has a familiar analytical basis: when incomes are low, people are unable to save and therefore cannot accumulate enough capital to raise incomes. No similarly compelling model has been offered to explain why countries should be able to move to middle income levels but not beyond them. Azariadis (1996) provides a survey of theoretical explanations for traps at levels above the low income threshold, but most hinge on peculiarities of demographic and saving functions—such as the possibility of drastic declines in human capital investment—that do not appear to be relevant to Asia’s current circumstances.

We offered one possible explanation for the middle income trap in a recent Asian Development Bank study (ADB forthcoming, Chapter 1). The question the study asked was: why might middle income countries be unable to switch to new drivers of growth when their wages rise? In other words, what would prevent them following the path traveled by advanced economies by raising skill levels, improving legal and financial systems, and developing better tools to manage demand? There is an important common denominator to the factors required to move beyond middle income stages: they take a long time to develop. If a country grows fast enough—and faces a wall of worry about its future—there will be great uncertainty about when these factors will be needed, and the investments may not be made early enough to assure a smooth transition. This leads to a classic coordination problem, as identified for example by Rodrik (1996).
The “lead time” explanation will be especially relevant to economies that (a) need to switch to more complex production structures that require long-lead-time investments, and (b) approach that stage at a high speed or growth rate. In other words, it is a theory of why fast-growing, middle-income countries decelerate. The hypothesis also contains solutions. It calls for identifying future infrastructure requirements, both institutional and physical, perhaps based on the experience of more advanced economies, as recommended by Lin (2010). It also suggests that planning—not developing sectoral directives, but creating an active dialogue about expected economic conditions—could reduce the chances of poor outcomes by resolving uncertainty about the economic environment. And it may suggest intervention, for example in education and infrastructure, to offset the riskiness of distant future returns.

**Scope of this study**

We take as given that Asia’s growth drivers are changing and that these changes could, in the worst case, lead to a prolonged period of adjustment and slow growth. But the conventional narrative is essentially backward-looking—it argues that historical trends cannot be sustained, but does not pose the question whether “new” growth engines might supplant the “old” ones. That is the subject of this paper.

The thesis of the paper is that new sources of demand, including some already on the horizon, could drive growth at rates similar to those experienced in the past, subject, of course, to gradual deceleration as the gap between Asian and frontier technologies narrows. Moreover, this demand does not require as large a shift in production structures or as much technological upgrading as is commonly assumed. Put simply, China does not have to compete with Boeing and Airbus to grow fast (although it is trying to do that too); it merely has to become good at selling clothes, furniture, apartments, electronics and cars to the Chinese middle class.

To make this case, we assemble evidence that Asia’s burgeoning middle spenders—households, firms and governments with relatively low but rapidly growing incomes—will become the most important source of global demand in the intermediate future. Moreover, this demand will be focused on products and services that are similar to those now exported to advanced countries, and may be even better adapted to the production advantages of Asian economies. Asia’s potentially massive middle demand could generate exceptional scale economies and play a role similar to that played by exports to advanced countries in the past. Since this demand appears to match the region’s comparative advantage, it could continue to drive factors from less to more productive activities, autonomously sustaining high rates of productivity growth and investment.

Even in the best case the transition will not be simple, rapid or smooth. It will take time to shift incomes to households and to government services spending, to design products appropriate for middle income markets, and to develop distribution systems that serve them efficiently. In some cases, challenging policy measures and new institutions will be also required. Some of these factors are examined in the ADB (forthcoming) report and will be noted in this paper.

To tackle these issues, we limit the analysis in several ways. First, we focus on economics and abstract from the other forces that will affect growth, such as those associated with resource and environmental issues, and the political and social transformations that many emerging economies
face alongside economic development. These “other” transformations also pose great risks. To be sure, the pragmatic politics of contemporary East Asia have allowed several countries—for Japan, Korea, Indonesia and Taiwan—to complete major political transitions with, if anything, positive effects on growth.

Second, we examine structural mechanisms and abstract from cyclical factors that may be more important in a shorter time frame. Even in their periods of miracle growth, Korea and Japan experienced major cyclical setbacks. A significant slowdown appears inevitable across much of Asia at this writing. Asian economies are subject to the usual shocks, from overheating and financial bubbles to global business cycles and raw material price increases. Indeed, economies undergoing rapid change appear to be especially vulnerable to financial crises; Asia has not escaped them in the past, nor will it in the future. From a long-term perspective, however, crises can have positive results—as the region demonstrated in 1997-98, they can trigger reforms that bring economic institutions in line with the current requirements of growth.

Third, we emphasize autonomous growth, in the sense of regionally-driven growth, and abstract from the role that trade with advanced economies and other regions will play in Asia’s future. This is not to deny the importance of such broader economic integration. Trade is likely to remain central to Asia’s growth strategy, especially since the region’s reliance on imported raw materials is expected to rise. But it is nevertheless useful to single out regional drivers of growth; if Asia is to develop much faster than the rest of the world, it cannot depend on export deepening as its growth engine. This, then, is a limited survey of the feasibility of sustained, fast growth; it is not a prediction, but rather a demonstration of one of possibly many multiple equilibria.

2. The dynamic middle as an engine of growth

We use a Shumpeterian analytical framework and emphasize the role of growth engines in driving high rates of investment and productivity growth. We start by defining this concept and then turn to possible growth engines in Asia’s future. We conclude with anecdotes on some engines that could be emerging drivers of Asian growth.

The term “growth engine” is not well defined; it is often assumed to be something that we “know when we see,” as U.S. Supreme Court Justice Potter Stewart famously said about pornography. The concept of a growth engine was particularly effectively presented in Schumpeter’s (1942) explanation of the dynamism of a capitalist economy, although earlier examples can be also identified (Kondratiev 1925). Schumpeter argued that the “evolutionary character of the capitalist process is not … due to a quasi-automatic increase in population and capital…The fundamental impulse that sets and keeps the capitalist engine in motion comes from new consumers, goods, the new methods of production and transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates” (p. 82). In other words, dynamic growth is not an automatic product of exogenous changes in factors and productivity; it results from novel events that provide an impetus for investment and further innovation.

What are growth engines?

Applications of the “fundamental impulse” concept multiplied as economists focused on the problem of development after World War II. Kaldor (1957), for example emphasized investment
in industry which led to productivity gains through scale and innovation. Hirschman (1959) and Nurske (1953) highlighted economies of scale, and Kravis (1970) saw trade as the “handmaiden of growth” because it expanded markets to exploit production advantages and improved productivity. Contemporary endogenous growth theory (Romer, 1986) has returned to the concept of the growth engine by emphasizing the self-fueling accumulation of knowledge.

The place of a growth engine in the growth process is schematically illustrated in Figure 2. The upper layer of the diagram corresponds to the usual growth accounting equation linking output to labor, capital and total factor productivity, while the lower layer suggests that it is also necessary to study mechanisms that ultimately drive these proximate determinants of growth.

**Figure 2. Growth engines**

How does a growth engine stimulate investment and TFP growth? Modern growth theory offers several possibilities, including endogenous productivity growth due to accumulating knowledge. In this paper we focus mainly on another candidate, the transfer of resources from relatively low- to relatively high-productivity sectors. Represent an economy’s overall productivity as:

\[
Q = \sum_i q_i s_i
\]

where \( Q \) = overall productivity
\( q_i \) = productivity in \( i^{th} \) sector
\( s_i \) = share of resources engaged in \( i^{th} \) sector

then the change in productivity is:

\[
dQ = \sum_i dq_i s_i + \sum_i q_i ds_i
\]

\( Q \) can change either because of productivity growth in the several sectors (the first term) or because of resource shifts among them (the second term). We assume that \( q_i \) differ, at least temporarily, hence the second term matters. Productivity differentials between the traditional and modern sectors played an important role in early development theory, which focused on Lewis-style wage setting in agriculture. There is now again interest in such differentials due to firm-level theories that explain international trade in terms of productivity heterogeneity.

Productivity differentials among firms and sectors are presumably due to market imperfections that impede the flow of resources from low- to high-productivity activities. These differences are hard to identify empirically; it is generally difficult to get accurate measures of absolute productivity levels. But there is considerable evidence that productivity growth rates differ across sectors and among countries for substantial stretches of time, thus creating potential intersectoral and international gaps. For example, Eichengreen et al. (2010) report that Korea’s thirty-year productivity growth rates ranged from negative 4.2% in education, health and social work to positive 13.5% in electrical machinery. They also report that almost half of Korea’s productivity growth in the 1970s and 1980s was due to resource shifts in the sense of equation 2. Deng and Jefferson (2011) report large labor productivity differentials among sectors and regions.

---

7 See Lewis (1954) and Fei and Ranis (1964).
within China—on the other of 2:1 two decades ago, and still as high as 1.6:1 recently—despite similar factor market conditions.

If sectoral productivity differentials are large, then the shift effects of engines that move resources into the right industries can be substantial. For example, if productivity is twice as high in a “modern” sector than in a “traditional” sector, then a growth process that shifts one percent of an economy’s resources into the modern sector will add one percentage point to the overall productivity growth rate. Korea again offers a useful benchmark. In 15 years between 1975 and 1990, about 30 percent of the economy’s labor force moved from agriculture to manufacturing and services.

Against this background, we define a growth engine as a profit opportunity that induces significant investment and hence shifts of resources into relatively high-profit activities. Often such an opportunity will arise due to a productivity increase in the target sector itself. This definition does not require, as some do, that a growth engine generate further profit opportunities in the process of its operations. Thus the growth engines we discuss may “run out of steam” as the adjustment to its effects is completed. But we do restrict attention to processes that are significant enough to yield macroeconomic results. Thus, we are interested in potentially large, productive, and fast-growing sectors that can have a macroeconomic impact.

By “profit opportunity” we mean a chance to earn excess return on capital. This will make an activity expand rapidly; it provides a magnet for entrepreneurship, ideas and resources. Such opportunities may emerge spontaneously: the diffusion of the internet in the 1990s led to the US dot-com boom (and eventual bust). In other cases, governments facilitate the exploitation of new opportunities or create them, say, through the adoption of a trade agreement or building new infrastructure such as a highway or train system.

Asian growth engines in practice

An (over)simplified view of the traditional pattern of East Asian development is that exports helped to drive the shift toward more productive industries. Based on technologies borrowed or purchased from abroad, exports offered attractive returns and provided large-scale opportunities for investment and for transferring low productivity agricultural workers into high productivity industrial jobs. (Of course, other enabling factors had to be in place, otherwise the East Asian growth model would have been replicated much more widely.) Over time, as wages increased, export industries were forced to improve productivity and shift to more sophisticated products. It is difficult to imagine how such wide ranging, productivity-raising shifts in output could have been based on domestic or regional demand in the early stages of Asian industrialization.

---

8 A more demanding definition would regard growth engines as processes that not only respond to an exogenous profit opportunity, but also endogenously generate additional opportunities through their operations. For example, Kaldor saw industrial investment as an especially strong engine because he believed that industrial activity led to income distribution effects that expanded opportunities for growth. While scale and agglomeration effects are likely to be associated with many of the engines analyzed in this paper, endogenously generated opportunities are not used as a definitional requirement.

9 In some countries devaluations, subsidies and various types of administrative support helped to highlight export opportunities in the early stages of export development. The large literature on these issues is surveyed in ADB (2008).
If Asia’s domestic markets are to drive rapid productivity growth today, three conditions will have to be met. First, income growth will have to generate rapidly expanding demand for modern products and services, similar to those that were exported advanced countries in recent decades. It appears that investment demand and consumer expenditures by the middle class do in fact generate such shifts, as described in Section 4. Extensive needs lie behind this demand: in much of Asia infrastructure and housing are underdeveloped and the natural and built environment are neglected. Firms that address these needs can grow much faster than the economy. If their productivity levels are high, overall productivity growth will follow.

Second, the structure of Asian demand will have to match comparative advantage. This is likely to be true because middle income growth generates demand for consumer durables. Moreover, the basic, labor-intensive varieties of products favored by lower middle income consumers—so-called frugal innovations, in the terminology of business strategist Prahalad (2010)—correlate well with the strengths of Asian producers. They have the further advantage of proximity to their own markets. In fact, foreign firms serving these markets may also have to invest in Asia for access to market knowledge and production cost advantages. Thus, entrepreneurship, innovation, capital and technology should converge in the relevant industries. Asian firms may themselves master the tools to concentrate these resources, ranging from raising capital and creating international brands to operating fragmented production chains.

Third, there must be scope for improving productivity in expanding industries. This condition is also likely to be met: Asia’s emerging economies are still well behind the productivity frontier in non-traditional industries and, given their relatively low per capita income levels, will remain so for some decades. (Of course, this generalization inevitably hides important country and sector differences.) The vast economies of scale implied by Asian growth will stimulate and facilitate catch-up. To be sure, to sustain the catch-up process, Asian economies will need to continue improving institutions, including finance and governance.

Examples of sectors that meet these conditions are what regard as engines of the “dynamic middle.” In these sectors, strong demand is fortuitously matched to productivity-raising opportunities on a relatively large scale. These reinforcing advantages do not necessarily benefit every middle income economy, but they do appear to be working in concert in many Asian countries. Indeed, the fact that the industrial agglomerations typical of Asian economies are lacking in other middle income economies—say in Latin America and the Middle East—may explain why they failed to progress as rapidly at similar stages of development. (Of course, in many cases they also failed to invest heavily, or invested in the wrong industries, or borrowed too much—pitfalls that are less likely to impede Asian growth.)

As growth based on exports, growth based on the dynamic middle will be amplified by scale effects (including scale, scope, variety and agglomeration effects) and by urbanization. Vigorous investment is both a cause and result of these processes. In fact, there may be even broader pro-growth effects are associated with reaching middle income ranks—a rising middle class could also generate greater social cohesion and more effective governance (Easterly 2001).
3. Potential Asian growth engines: a typology

Growth engines can be categorized by the source of excess profits. **Demand-based** engines reflect new demand for products or services; they generate excess profits while markets adjust. **Productivity-based** engines reflect favorable changes in technology or input prices; they allow firms to realize high margins while the competition catches up. **Policy-based** engines reflect profit opportunities created by government through direct expenditures, or indirect measures involving regulation, deregulation, taxes and subsidies. Potential Asian growth engines exist in each of these categories.

**Demand-based engines**

Over the next two decades, the growth in world demand is likely to be dominated by low and middle income countries, and especially those in Asia. These trends are illustrated in Figures 3a and 3b, based on global projections by CEPII (see Annex A). The figures show that the share of low and middle income economies in world consumption will reach 53% by 2030, while their share in the growth of world consumption, that is, in the new markets that are being established then, will be close to 80%. The growth rate differentials between advanced and emerging economies are so large in most projections, that the basic message would be the same even if much projections at the most conservative end were used.

Figures 3c and 3d repeat the exercise for investment expenditures. They indicate even larger shares for low and middle income countries—which have significantly higher savings rates than advanced economies—amounting to 65% of world investment and 90% of the growth in world investment. Asia’s emerging economies account for roughly two-thirds of these magnitudes.

**Figures 3a and 3b. Global consumption shares**

**Figures 3c and 3d. Global investment shares**

These changes in international growth patterns will dramatically increase the size of the global middle class (defined following Kharas [2010] as people spending between $10 per day and $100 per day). In 2010, only one-third of the world’s population was in this expenditure category; by 2030 that share is likely to rise to nearly two-thirds (Petri and Zhai, 2012). Middle and upper expenditure classes should, by then, account for more than 75 percent of the total population of ASEAN, China and India (see Figure 4).

**Figure 4. Shares of populations by expenditure class**

Amplified by large Asian populations, these changes in expenditure composition have major implications for both Asian and global demand. The projected contributions of various groups of economies to global expenditure categories in the next 20 years are summarized in Figure 5. The middle class dominates the figure, with Asian economies accounting for most of the expansion in this and other expenditure groups. Two billion Asians—nearly one-third of the world’s population—will move from low income categories into the middle class by 2030. By then, extreme poverty will largely end in Asia and as many Asians will be added also to the highest expenditure brackets as in all advanced economies combined (Petri and Zhai 2012).
Figure 5. Change in populations by expenditure class, 2010-2030

If other emerging market contributions are added to Asian contributions, virtually all of the growth of the middle class will occur in emerging economies. Emerging economies will also account for about two-thirds of the increase in the world’s high expenditure class. Thus, by 2030 more than 80 percent of middle-class and more than 50 percent of upper-class consumers will live in emerging economies. The obvious implication is that Asian producers will have “front row” seats on the major market developments of the next two decades.

Not surprisingly, McKinsey & Company, a prominent consultant to multinational companies, has been eagerly assessing these momentous changes. Much of their work has focused on the BRICs, attempting to identify the product implications of these new markets. They found, for example, that television sets and refrigerators achieve nearly complete penetration as household reach the lower limit of the middle class, but air-conditioners, motorcycles and automobiles begin to take off only as they move higher into the middle expenditure range (see Figure 6 from McKinsey 2010). Most of these durables then reach full penetration at the upper end of the middle expenditure bracket. To facilitate these purchases, in turn, distribution systems tend to become much more sophisticated; supermarket penetration, for example, rises from roughly 1/3 at average income levels corresponding to the bottom of the middle expenditure class to around 90 percent at the upper end (Figure 7).

Figure 6. Consumer durable penetration by daily income

Figure 7. Supermarket penetration by income

McKinsey has also focused attention on the implications of urbanization, which typically accompanies middle income development. The growth of industry and services promotes agglomeration. China is now in the steepest segment of the urbanization process; India is about to enter it. The implications include both demand and production effects; cities require large investments in infrastructure and real estate, and urban densities offer higher rates of productivity and economies of scale. McKinsey projects that there will be 221 cities of 1 million or more in China by 2025, seven times as many as there are in Europe (McKinsey 2009). In rough terms, this growth will require 40 billion square meters of new residential and commercial space, representing an investment of $12-16 trillion, or around $1 trillion annually. In another study, McKinsey (2010) estimates that residential investment in China and India alone would reach $2 trillion in 2030, not counting related infrastructure investments. We will also provide examples of these opportunities in Section 4.

Importantly, these directions of market growth play into Asia’s production strengths. The commonly used method to measure comparative advantage is Balassa’s Revealed Comparative Advantage measure, which is plotted against differences in expenditure structure between middle and low income consumers in Figure 8. It shows that Asian RCAs are correlated with middle class expenditure differentials, that is, with the fastest growing markets of the future. This analysis is conducted on a fairly aggregated level in this paper, but more detailed analysis would likely point to even stronger relationships, since within any product category middle technology
producers tend to have an advantage in low-end, price-competitive product relative to the more advanced varieties (Eichengreen et al. 2010).

**Figure 8. RCA index vs. expenditure shares**

*Productivity-based engines*

Asia’s catch-up is based on multiple foundations, including ample investment for introducing new embedded technologies, vigorous national and international competition, educated labor forces, and in many countries substantial foreign investment. These factors are likely to continue, and if anything will be amplified by maturing technological capabilities.

Technological catch-up is likely to remain an important factor in future Asian growth and the substantial opportunities remain for sustained progress. Gaps between productivity levels in emerging Asia and advanced countries are large. At the same time, the environment for technological diffusion and implementation is improving thanks to increased regional competition and integration, high rates of investment, rapid demand growth, and the pressure of rising wages. Meanwhile, advanced-country firms with technology assets have few alternative opportunities to match those offered by Asian markets, and are generally, though reluctantly, willing to trade technology for market access.

Asia’s capabilities for absorbing and generating technology are also improving rapidly, although the results are uneven and some countries still have a long way to go (Jimenez, Nguyen and Patrinos 2012). The ratio of R&D investment is rising rapidly and a rapidly increasing proportion of students is enrolled in higher education. The OECD reports, for example, that China increased its R&D expenditures at rates exceeding 20 percent per year throughout the global crisis, roughly doubling its share of world R&D between 2004 and 2009 (OECD 2012). The unusual density of economic activity and industrial and research agglomerations in Asia encourage the flow of ideas and people among firms. These flows are reinforced by research outsourcing and by global technological developments—especially the internet—that were not available to developing economies in the past.

Intra-Asian trade growth will provide additional support for the growth of Asian productivity. Gravity equations suggest a disproportional increase in the bilateral trade of rapidly growing economies—in other words, they will become unusually important partners to each other. Asia is likely to remain the world’s industrial belt, although specialization patterns within the region are likely to shift. This will be facilitated by new transport corridors that will link north-south and east-west trade routes. By 2030, the result could be a reasonably integrated industrial belt with 3.2 billion people and $40 trillion of output (ADB 2009).

Trade promotes productivity through multiple channels. It enables production chains to be fragmented across countries with different factor prices and production conditions. While labor costs will rise throughout Asia, differences remain wide and will sustain a range of production techniques for some time to come. Should Chinese wages rise steeply, for example, there would be ample opportunities to relocate labor intensive processes to Vietnam or India. Trade also raises productivity by permitting greater economies of scale in each product variety, and thus generates benefits from access to more diverse final goods and from more productive inputs.
Finally, much recent research confirms the new theoretical view that an important consequence of trade is to shift resources to productive firms within sectors (Melitz 2003).

These beneficial effects of trade growth are likely to be amplified by declining trade barriers; Asian economies are now among the most active in negotiating bilateral and regional FTAs. Agreements have been concluded between ASEAN and the so-called “plus 6” (China, India, Japan, Korea, Australia and New Zealand) and other countries in Latin America and elsewhere. Discussions are underway on a Trans-Pacific Partnership agreement among 11 countries including the United States, and on an agreement to connect the large economies of China, Japan, Korea. All of these could eventually lead to a massive Asia-Pacific free trade zone (Petri, Plummer and Zhai, forthcoming). Asia has a particular incentive to pursue global liberalization since its resource-poor economies will increasingly depend on other regions to meet rising food, energy and raw materials requirements,

Policy-based engines

Policy can promote growth by correcting market failures and by removing impediments to economic activity. Recent development theory also emphasizes the need for institutions to support market development. The “new structuralist” approach (Lin 2010) argues that governments need to lay the foundations for economic growth by investing in the soft and hard infrastructure necessary to enter new industrial activities consistent with an economy’s comparative advantages.

Soft infrastructure — the institutional, legal and financial framework of economic activity — will be critical for future growth. The World Bank’s “Doing Business” indicators rank Singapore, Hong Kong and Korea among the top best in the world, but China, Indonesia and India are at or below the global median (91st, 129th, and 132nd, respectively). This is good and bad news. On the positive side, the scope for progress is very substantial and many countries are now aggressively targeting the quality of the business environment. On the negative side, the climate testifies to the strength of traditional impediments to progress, including widespread corruption. Asia’s small scale enterprises sometimes also impede progress; for example, many countries greatly restrict large-scale, competitive business models in the service sector. That Asian economies can perform well in services is demonstrated by the success of business process outsourcing in India, the Philippines and other countries; the challenge is to replicate these models in large, domestic markets.

Government expenditures on hard infrastructure should have and even more salient impact, affecting both demand and productivity. ADB (2009) estimates that around $8 trillion will have to be invested in Asian infrastructure over the next decade (Table 1). In orders of magnitude, this estimate is consistent with McKinsey Global Institute’s projection that China and India alone will spend $1.33 trillion on infrastructure annually by 2030 (McKinsey 2010). Energy, communications, transport and other infrastructure indicators are central to “Doing Business” surveys and hence increasingly the target of “national brands.”

Table 1. Infrastructure investment requirements, 2010-2020
Transport is critical in dense, trade-dependent Asia and the region is embarked on many ambitious investments. Seven of the world’s ten best airports (as ranked by London-based Skytrax) and seven of the world’s ten largest seaports are in Asia. Much of this capacity is state-of-the-art; the Shanghai port, for example, doubled throughput between 2004 and 2007. In remarkably little time, China built a road system similar in scale to that of the United States and its rail systems now covers 74,000 km (and is scheduled to expand to 120,000 by 2015). Its urban transit systems are highlighted below with the example of the Shanghai metro, now the world’s largest. McKinsey Global institute (2011) estimates that in the next 20 years India’s will build one subway system equivalent to Shanghai’s every year, while China will build two to four. These massive projects have their share of hiccups, ranging from major accidents to financial disasters and extensive corruption—perhaps inevitably, given that these industries are new to the region. Yet many projects are moving forward in an otherwise weak investment environment and are accumulating experience that will improve efficiency over time. Despite inefficiencies, these projects may look like a bargain in retrospect, as wage increases, stiffer regulations, greater political constraints and higher industrial and residential land prices make infrastructure development more difficult and expensive.

Energy output has matched the blistering pace of industrial growth. Increasingly, Asia is also embracing the renewable sector; China and India are now the largest investors in wind energy and installed 56% of the world’s new capacity in 2010. China has led infrastructure investment because of its powerful central control; the state has encouraged, funded and facilitated a wide range of investments. A significant share of infrastructure investments (estimates range from $1.6 to over $2 trillion) has been funded by essentially local government debt through financial platforms backed by project revenues. Some of this debt is in trouble and will eventually need to be taken over by the central government. Better models for financing infrastructure will need to be developed in the future, but the progress made has been substantial and arguably at a cost that cannot be replicated at more advanced stages of development.

New industries may also emerge from social and environmental goals, although their contributions to growth will depend in part on yardstick used. Asia is now the world’s leading emitter of greenhouse gases and faces a wide range of environmental problems. Many Asian countries also lag behind in public services, including health, education and public safety (ADB, forthcoming). These concerns will become more prominent as expectations rise and the region’s citizens gain influence in political decisions. The resulting expenditures and investments will contribute to welfare growth, but may not increase productivity as conventionally measured. For example, policies that substitute costlier low-carbon fuels for coal would likely increase welfare while reducing conventional productivity.

4. Some $1 trillion examples

Asia’s economic history is punctuated by anecdotes of remarkable innovation. For example, in the mid-1950s when the United States scaled back its expenditures after the Korean War, Korea became desperately short of hard currency earnings and had virtually no raw materials, capital, technology or market connections for building an export industry. Within months, however, it “discovered” the market for wigs made from human hair and quickly became the world’s leading
exporter. Japan’s electronics, Taiwan’s computers, Thailand’s auto cluster offer other, more advanced examples. What will be the anecdotes of Asia’s future? One cannot predict or even imagine the industries that will be generated by the forces discussed in previous sections. Nevertheless, some emerging examples can illustrate the possibilities.

**Tata Nano**

By 2030, Asia’s emerging economies may purchase 100 million new automobiles a year (up from around 25 million units now), representing annual sales of around $1 trillion. The new kinds of products required by this remarkable market—and more generally by the new middle classes—are illustrated by India’s entry-level automobile, the Tata Nano. When introduced in 2008, it attracted worldwide attention and was heralded as the new “Model T.”

To be sure, the Nano met with huge skepticism. Some called it two motor scooters with a tent in between. It had five seats, was smaller than the 2-seat Daimler Smart, and had a maximum speed of 60 miles per hour. Its instrument panel was a speedometer (Figure 9). But its $2,300 price was less than half that of competitors and sales jumped off to a fast start. In the event, the Nano had problems, including safety issues, and sales fell way behind those of competitors. Today India’s low-end market is handily dominated by the locally-produced Maruti-Suzuki Alto, which sells for twice as much as the Nano. It will take more experiments to find the right products for India’s middle income market—the Nano example shows that the price-quality tradeoff will be hard to get right—but the point is that this experimentation is taking place in Asia and to a large extent by Asian firms, and the industries that capture the market are bound to be built in Asia.

*Figure 9. Instruments: Tata Nano (l) and Maruti-Suzuki Alto (r)*

**Hallstatt, Guangdong?**

Housing Asia’s urban populations will take extraordinary investments. If 600 million people move into cities in the next two decades, some 150 million apartments will have to be built, requiring investments of at least $20 trillion, or $1 trillion per year. These investments have begun in a spectacular fashion, encouraged by easy credit policies followed during the global financial crisis in China and Southeast Asia. Indeed, many argue that a massive real estate bubble has already formed in China. Real estate prices soared in many cities, and large numbers of new units—maybe as much as one-quarter according to unofficial estimates based on unused electric meters in China—came to be unoccupied. Led by government efforts, prices have since settled back, but they remain high relative to income and there is no evidence of a general market collapse so far. (In contrast to European and US real estate markets, Chinese residential real estate is financed with conservative mortgages and considerable equity.)

The property market will certainly remain volatile, as should be expected given the speed of the region’s development and the inherent uncertainties associated with such long-lived investments. But all of this is fully consistent with huge long-term demand. In response to rising social concern about access to affordable housing, the Chinese government is now aggressively building subsidized units—some 36 million units are planned for 2011-2015. Thus, while the market is softening, housing investment remains reasonably strong. Land is still controlled by the state and is easily developed; there are few regulations to protect agricultural land or to require
high construction standards, or insist that former occupants be fairly compensated. However one might judge the welfare implications of these factors, they facilitate fast and extensive urban development.

An example of the jubilant competition in the real estate sector is provided by a project to replicate Hallstatt, a prototypical Austrian village and UNESCO World Heritage Site (Figure 10), in Huizhou, a city of four million people just north of Shenzhen. The site is complete with lake and a steep mountain backdrop, which is currently being dug from a larger mountain. When the citizens of Hallstatt heard of the project, they were shocked—no one had asked for permission! The owner of Hallstatt’s inn was pleased, however, hoping that millions of Chinese would now want to visit the original.11

Figure 10. Hallstatt, Guangdong?

Shanghai Metro

The Shanghai Metro is a remarkable example of large-scale infrastructure investment. Until recently, underground subway systems were mostly built by wealthy cities. In the last 15 years, however, Shanghai developed the world’s largest underground system with 427 kilometers of track (Figure 11). The cost is not known, but may have been on order of $30 billion ($1,500 per resident). This is a large investment compared to per capita income, but it’s difficult to think of any other investment, in transportation at least, that could have provided similar value. Due in part to improvements in the city’s infrastructure, Shanghai’s property prices have risen dramatically and are now similar to those in the world’s most expensive cities.

The cost of building a subway system in China appears to be at most 1/5 as high as the cost of doing so in an advanced economy, due to low labor costs and few political impediments.12 Assuming that these differences diminish with development, given usual discount rates—and especially very low current rates—it might even make sense to build a system that is not fully utilized for many years. It also makes sense to factor such expectations of systemic change directly into development policy. For example, the current U.S. interstate highway system (launched in the 1950s) or Japan’s Shinkansen rail system (launched in the 1960s) would have been far more difficult and costly to build only a few decades later.

Figure 11. Track length of the Shanghai Metro (km)

The Shanghai Metro and 14 others already built or in progress in China are also generating technological expertise that will make China a leader in public transport infrastructure. Both Beijing and Shanghai have plans to double their current subway systems over the next decade. Twenty other cities are planning to begin building subway lines. McKinsey (2011) estimates that China and India alone will build 1150-1900 km of subway tracks (three to five times the size of the Shanghai system) every year for the next 20 years. Subway projects can be also become convenient stimulus programs when economic activity slips; for example, the National

11 Tony Paterson, “Alpine villagers bewildered as China clones their home,” The Independent, June 20, 2011.
12 Keith Bradsher, “Clash of Subways and Car Culture in Chinese Cities.” New York Times, March 27, 2009.
Development and Reform Commission approved 25 new projects in response to deteriorating economic numbers in 2012 (Wall Street Journal, 2012a).

To be sure, important mistakes have been made in this expansion process. For example Shanghai’s special Maglev line to connect the airport to the city ends in a terminal well outside the center, as it become impossible to continue the line into the city center due to cost and public objections. The high-speed train collision in Wenzhou that killed 40 people is another prominent example. But the Chinese government is not deterred; in 2012 the State Council announced that it will triple the high-speed rail network from 13,000 to 40,000 kilometers by 2015, connecting virtually every city with more than half million residents. China has also begun to export high-speed rail components to Siemens, the German company that helped to develop some of the Chinese system (Wall Street Journal, 2012a). The impact of such projects is large compared to the risks, both in generating demand during construction and in raising productivity in the long run.

5. Conclusions

Asia’s future growth will require sustained productivity growth at a rate and over a period of time never before experienced in countries so large. The foundations of Asia’s success remain in place, including high savings, entrepreneurial, market-oriented economies and, for the time being, favorable demographics. At the same time, Asia is outgrowing its external drivers of growth and will need to replace them with new, autonomous engines.

There is a now much pessimism about the likelihood that Asian can make these transitions. Powerful global headwinds are slowing Asian growth and there is widespread condemnation of the stimulus programs, particularly China’s infrastructure investments, that helped Asia ride out the worst of the global financial crisis. There also worries about the longer-term effects of the middle income trap.

All of these are serious concerns, but this paper argues that Asia’s new growth engines are likely to be up to the challenge. Some promise massive new markets in the $1 trillion range. The fuel for these engines is the “dynamic middle:” rapidly rising middle class consumption, urbanization and infrastructure investment, and the vigorous growth of middle technology industries that are associated with these demands. Moreover, Asia’s patterns of comparative advantage should enable the region to capture much of its own new demand, generating economies of scale and new clusters of entrepreneurship, investment and innovation. Asian integration will also permit deeper exploitation of fragmented production based on the region’s diversity. Asia’s rising multinationals are increasingly spearheading these efforts.

Indeed, the economics of the middle may have wider applications than are discussed in this paper. For example, projections suggest that urban economic growth in coming decades will take place largely in “middleweight” cities, in contrast to megacities, which now face diseconomies (McKinsey Global Institute 2011). A more general formulation may be that all kinds of catch-up processes are accelerating—probably due to improved information flows—allowing middle activities (or countries or cities) to close in on these in the lead, while leaders experience the slower progress characteristic of the frontier.
If this hypothesis is correct, Asia’s progress need not be scaled to the growth of the rest of the world or to the size of high income economies; it can evolve at its own, faster pace. Of course, effective institutions will be essential for steering development through these transitions and managing the inevitable shocks. Asian economies still have far to go in developing the financial systems, business laws and regulations, and mechanisms of public and corporate governance that will be needed to cope with greater prosperity. But most have managed such institutional transformations pragmatically and successfully in the past.

Despite the prospects for autonomous growth, Asia will remain deeply interdependent with the rest of the world. Its rising requirements for energy, food and raw materials will make global trade and trade rules increasingly important. Thus, Asia will need the support of global economy to drive growth with its dynamic middle; it cannot become protectionist or afford protectionism in advanced countries. Increased tensions with advanced or other emerging economies are likely, but so are powerful incentives to manage these strains. Asia’s development can serve as an engine of global growth and all countries have a large stake in supporting its rise.

None of this implies that Asia will grow fast. This paper sidesteps questions of political stability and the feasibility of growth in the face of global resource and environmental constraints. Nor does it claim that the “high equilibrium” represented by the region’s autonomous growth is the only such alternative. But it does argue that sustained, rapid Asian growth is plausible, even without the growth engines of the past. Among the world’s major regions, Asia is best positioned to keep global economic development on track, the headwinds and pundits notwithstanding.
References

Asian Development Bank, 2008. *Emerging Asian Regionalism: A Partnership for Shared Prosperity*. Manila: ADB.

-----, 2009. *Seamless Asia*. Manila: ADB.

-----, 2011. *Asia 2050: Realizing the Asian Century*. Manila: ADB.

-----, forthcoming. ASEAN, the People’s Republic of China and India: the Great Transformation. Manila: ADB.

Azariadis, Costas, 1996. The Economics of Poverty Traps, Part I: Complete Markets. Journal of Economic Growth. 1: 449-486. December.

Chang, Gordon G., 2001. *The Coming Collapse of China*. New York: Random House.

Cowen, Tyler, 2006. “China Skeptics.” Marginal Revolution website. [http://marginalrevolution.com/marginalrevolution/2006/02/china_skepticis.html](http://marginalrevolution.com/marginalrevolution/2006/02/china_skepticis.html)

Deng, Paul and Gary Jefferson, 2011. Explaining Spatial Convergence of China’s Industrial Productivity. Brandeis University processed.

Economist, 2011. “Economics’ most influential people.” February

1. [http://www.economist.com/blogs/freeexchange/2011/02/economics&fsrc=nwl](http://www.economist.com/blogs/freeexchange/2011/02/economics&fsrc=nwl)

Eichengreen, Barry, Dwight Perkins and Kwanho Shin, 2010. *From Miracle to Maturity: The Growth of the Korean Economy*, Cambridge, Mass.: Harvard East Asia Center, forthcoming.

Eichengreen, Barry, Donghyun Park and Kwanho Shin, 2011. When Fast Growing Economies Slow Down: International Evidence and Implications for China. Working Paper 16919. Cambridge: National Bureau of Economic Research.

Easterly, William, 2001. The Middle Class Consensus and Economic Development. *Journal of Economic Growth*. 6:4, 317-335.

Fei, John C. H. and Gustav Ranis, 1964. *Development of the Labor Surplus Economy: Theory and Policy*. Homewood Illinois: Richard A. Irwin.

Fouré, Jean, Agnès Bénassy-Quéré and Lionel Fontagné. 2010. The world economy in 2050: a tentative picture, CEPII Working Paper, No. 2010-27, December.

Garrett, Geoffrey, 2004. “Globalization’s Missing Middle.” *Foreign Affairs* 83: 6, 84-96. Nov/Dec.

Gill, Indermitt and Homi Kharas, 2007. *East Asian Renaissance*. Washington: World Bank.
Goldman Sachs, 2003. Dreaming with BRICs: the Path to 2050. *Global Economics Paper No.* 99. New York: Goldman Sachs.

----, 2007. BRICs and Beyond. New York: Goldman Sachs.

Hirschman, Albert O., 1959. *The Strategy of Economic Development.* New Haven: Yale University Press.

Jimenez, Emmanuel, Vy Nguyen and Harry Anthony Patrinos, 2012. “Stuck in the middle: How human capital development can help Southeast Asian countries achieve high-income status.” Washington: World Bank. May.

Kaldor, Nicholas, 1957. “A Model of Economic Growth,” *The Economic Journal,* 67(268), pp. 591-624. December.

Kondratiev, Nikolai 1925. *The Major Economic Cycles* (in Russian), translated as *The Long Wave Cycle,* New York: Richardson & Snyder, 1984.

Kravis, Irving B. 1970. “Trade as a Handmaiden of Growth: Similarities Between the Nineteenth and Twentieth Centuries.” *The Economic Journal,* 80(320), pp. 850-872. December.

Lee, J. W., and K. Hong. 2010. Economic Growth in Asia: Determinants and Prospects. ADB Economics Working Paper Series No. 220, Asian Development Bank, Manila.

Lewis, Arthur, 1954. “Economic Development with Unlimited Supplies of Labour.” *Manchester School,* 22:139-191.

Lin, Justin Yifu, 2010. “New Structural Economics: A Framework for Rethinking Development.” *Policy Research Working Paper No.* 5197. Washington: World Bank.

McKinsey Global Institute, 2009. *Preparing for China’s Urban Billion.* McKinsey Corporation.

McKinsey Global Institute, 2010. *Farewell to Cheap Capital: The Implications of Long-Term Shifts in Global Investment and Saving.* McKinsey Corporation.

McKinsey Global Institute, 2011. *Urban world: Mapping the economic power of cities.* McKinsey Corporation.

Melitz, Marc J. 2003. The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity. *Econometrica* 71, no. 6: 1695–725.

Nurske, Ragnar, 1953. *Problems of Capital Formation in Underdeveloped Areas.* New York: Oxford University Press.
Organization for Economic Cooperation and Development (OECD), 2012. Science, Technology and Industry Outlook 2012. Paris: OECD.

Oprita, Antonia, 2010. “Jim Chanos: China’s Real Estate Bubble is Unprecedented,” CNBC.com, http://www.cnbc.com/id/35056774. January 25.

Petri, Peter A., Michael Plummer and Fan Zhai, forthcoming. The Trans-Pacific Partnership and Asia-Pacific Economic Integration: A Quantitative Assessment. Washington: Peterson Institute for International Economics.

Petri, Peter A. and Fan Zhai, 2012. “Navigating a Changing World Economy: ASEAN, China and India.” Tokyo: ADB Institute. Background paper to ACI study.

Prahalad, C. K. 2010. The fortune at the bottom of the pyramid: eradicating poverty through profits. New Jersey: Prentice Hall.

Roach, Stephen, 2011. “Ten Reasons Why China is Different,” Project Syndicate website, www.project-syndicate.org. May 27.

Rodrik, Dani, 1996. “Coordination failures and government policy: A model with applications to East Asia and Eastern Europe.” Journal of International Economics 40, 1-22.

Romer, Paul, 1986. “Increasing Returns and Long-Run Growth.” Journal of Political Economy, 94(5), pp. 1002-1037. October.

Schumpeter, Joseph A., 1942. Capitalism, Socialism and Democracy. New York: Harper, 1975 edition. 82.

Wall Street Journal, 2012a. “China Make High-Speed Rail Sale to Siemens.” August 9.

Wall Street Journal, 2012b. “Asia: Subways Add to Chinese Stimulus.” September 7.

Wolf, Martin, 2011. “How China could yet fail like Japan,” The Financial Times, June 15.

World Bank, 2011. Global Development Horizons 2011: Multipolarity: The New Global Economy. Washington: World Bank.

World Bank and Development Research Center of the State Council, 2012. China 2030: Building a Modern, Harmonious, and Creative High-Income Society. Washington: World Bank.
## Annex A. Growth Projections

**Table A1. Sources of Projections**

| Code | Source | Horizon |
|------|--------|---------|
| IMF  | World Economic Outlook, April 2011, and website: [http://www.imf.org/external/pubs/ft/weo/2011/01/weodata/index.aspx](http://www.imf.org/external/pubs/ft/weo/2011/01/weodata/index.aspx) | 2016 |
| CEPII| Foure et al. (2010) and website: [http://www.cepii.fr/anglaisgraph/bdd/baseline.htm](http://www.cepii.fr/anglaisgraph/bdd/baseline.htm) accessed May 12, 2011. | 2050 |
| ADB  | Lee and Hong (2010), Table 4. | 2030 |
| WB   | World Bank (2011), Figure 1.16. | 2025 |
| GS   | Goldman Sachs (2003) and Goldman Sachs (2007). | 2050 |
| USD  | [http://www.ers.usda.gov/data/macroeconomics/](http://www.ers.usda.gov/data/macroeconomics/) accessed November 2010. | 2030 |

Source: author.
### Table A2. Projections of Real Output Growth, 2010-2030

|                      | 1990- | IMF 2010 | IMF 2010-16 | CEPII USD2005 | ADB PPP | WB 2010-25 | GS PPP | USDA USD2005 | Mean   | Standard Deviation | Projection Range | M-SD | M+SD |
|----------------------|-------|----------|-------------|----------------|---------|------------|---------|---------------|--------|---------------------|-------------------|------|------|
| **ACI economies**    |       |          |             |                |         |            |         |               |        |                     |                   |      |      |
| ASEAN                | 5.0   | 5.7      | 4.9         | 1.3            | 3.6     | 6.2        |         |               |        |                     |                   |      |      |
| Brunei              | 1.9   | 2.9      | 4.5         | 1.7            | 3.0     | 1.4        | 1.6     | 4.5           | 1.6    |                     |                   |      |      |
| Cambodia            | 7.4   | 6.6      | 6.1         | 6.3            | 0.4     | 6.7 | 6.0 | 6.0 | 6.0 | 6.7 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Indonesia           | 4.6   | 6.7      | 5.4         | 4.4            | 4.7     | 5.0         | 5.1     | 0.9 | 4.3 | 0.9 | 4.3 | 0.9 | 4.3 | 0.9 | 4.3 | 0.9 | 4.3 | 0.9 |
| Lao                 | 6.6   | 7.6      | 6.6         | 7.1            | 0.7     | 6.4 | 4.2 | 7.8 | 4.2 | 7.8 | 4.2 | 7.8 | 4.2 | 7.8 | 4.2 | 7.8 | 4.2 | 7.8 |
| Malaysia            | 5.8   | 5.1      | 4.5         | 5.2            | 4.1     | 4.7 | 0.5 | 4.2 | 5.3 | 4.2 | 5.3 | 4.2 | 5.3 | 4.2 | 5.3 | 4.2 | 5.3 | 4.2 | 5.3 |
| Myanmar             | 8.7   | 5.6      | 4.5         | 5.0            | 0.8     | 4.2 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 |
| Philippines         | 3.9   | 5.0      | 4.4         | 5.7            | 5.2     | 4.4 | 4.9 | 0.5 | 4.4 | 5.5 | 4.4 | 5.5 | 4.4 | 5.5 | 4.4 | 5.5 | 4.4 | 5.5 |
| Singapore           | 6.4   | 4.4      | 2.3         | 4.3            | 4.0     | 3.7 | 1.0 | 2.8 | 4.7 | 2.8 | 4.7 | 2.8 | 4.7 | 2.8 | 4.7 | 2.8 | 4.7 | 2.8 | 4.7 |
| Thailand            | 4.4   | 4.6      | 4.9         | 3.8            | 4.4     | 4.4 | 0.5 | 4.0 | 4.9 | 4.0 | 4.9 | 4.0 | 4.9 | 4.0 | 4.9 | 4.0 | 4.9 | 4.0 | 4.9 |
| Vietnam             | 7.4   | 7.1      | 4.3         | 6.8            | 6.5     | 6.2 | 1.3 | 4.9 | 7.4 | 4.9 | 7.4 | 4.9 | 7.4 | 4.9 | 7.4 | 4.9 | 7.4 | 4.9 | 7.4 |
| PRC                  | 10.4  | 9.5      | 7.7         | 5.5            | 7.0     | 5.4 | 7.2 | 7.0 | 1.4 | 5.5 | 8.4 | 5.5 | 8.4 | 5.5 | 8.4 | 5.5 | 8.4 | 5.5 | 8.4 |
| India               | 6.5   | 8.1      | 6.9         | 4.5            | 5.8     | 6.1 | 7.5 | 6.5 | 1.2 | 5.3 | 7.7 | 5.3 | 7.7 | 5.3 | 7.7 | 5.3 | 7.7 | 5.3 | 7.7 |
| **Other emerging economies** |       |          |             |                |         |         |         |               |        |                     |                   |      |      |
| Latin America       |       |          |             |                |         |         |         |               |        |                     |                   |      |      |
| Other               | 3.4   | 3.6      | 4.2         | 3.7            | 0.4     | 3.3 | 4.2 | 3.3 | 4.2 | 3.3 | 4.2 | 3.3 | 4.2 | 3.3 | 4.2 | 3.3 | 4.2 | 3.3 | 4.2 |
| **Advanced economies** |       |          |             |                |         |         |         |               |        |                     |                   |      |      |
| Japan               | 0.9   | 1.5      | 1.3         | 1.5            | 1.2     | 0.8 | 1.2 | 0.3 | 0.9 | 1.5 | 0.9 | 1.5 | 0.9 | 1.5 | 0.9 | 1.5 | 0.9 | 1.5 |
| Korea, Taipei,China | 5.2   | 4.4      | 2.2         | 3.3            | 3.3     | 1.1 | 2.2 | 4.4 | 2.2 | 4.4 | 2.2 | 4.4 | 2.2 | 4.4 | 2.2 | 4.4 | 2.2 | 4.4 |
| Australia, New Zealand | 3.0   | 3.2      | 2.2         | 2.8            | 2.7     | 0.5 | 2.3 | 3.2 | 2.3 | 3.2 | 2.3 | 3.2 | 2.3 | 3.2 | 2.3 | 3.2 | 2.3 | 3.2 |
| Canada              | 2.4   | 2.3      | 2.4         | 2.3            | 2.3     | 0.0 | 2.3 | 2.4 | 2.3 | 2.4 | 2.3 | 2.4 | 2.3 | 2.4 | 2.3 | 2.4 | 2.3 | 2.4 |
| United States       | 2.5   | 2.7      | 2.2         | 1.9            | 2.5     | 2.6 | 2.4 | 0.3 | 2.1 | 2.7 | 2.1 | 2.7 | 2.1 | 2.7 | 2.1 | 2.7 | 2.1 | 2.7 |
| Europe              | 1.6   | 2.8      | 1.9         | 2.1            | 0.6     | 1.5 | 2.7 | 1.5 | 2.7 | 1.5 | 2.7 | 1.5 | 2.7 | 1.5 | 2.7 | 1.5 | 2.7 | 1.5 | 2.7 |
| **World**           | 3.8   | 3.1      | 3.3         | 3.4            | 0.3     | 3.1 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 |

Sources: see listing of sources in Table A1.
| Region   | 2010 | 2020  | 2030  |
|----------|------|-------|-------|
| ASEAN    | 995  | 1,597 | 2,474 |
| China    | 3,847| 8,779 | 17,091|
| India    | 1,180| 2,330 | 4,460 |
| Japan    | 4,540| 5,320 | 5,860 |
| NIEs     | 979  | 1,310 | 1,500 |
| Australia/NZ | 887 | 1,138 | 1,376 |
| USA      | 12,900| 16,400| 19,900|
| Canada   | 1,200| 1,590 | 1,920 |
| Europe   | 14,014| 17,060| 19,303|
| Latin America | 2,570| 3,709 | 5,023 |
| ROW      | 4,808| 7,039 | 10,177|
| World    | 47,920| 66,272| 89,084|

Source: CEPII, see Table A1.
Table A4. GDP at Purchasing Power Parity (USD2005 bill)

| Region  | 2010  | 2020  | 2030  |
|---------|-------|-------|-------|
| ASEAN   | 2,316 | 3,752 | 5,868 |
| China   | 8,900 | 20,589| 40,246|
| India   | 3,522 | 7,015 | 13,360|
| Japan   | 3,864 | 4,538 | 4,965 |
| NIEs    | 1,271 | 1,705 | 1,950 |
| Australia/NZ | 892 | 1,144 | 1,387 |
| USA     | 12,875| 16,398| 19,901|
| Canada  | 1,193 | 1,587 | 1,919 |
| Europe  | 13,542| 16,527| 18,697|
| Latin America | 4,484 | 6,503 | 8,822 |
| ROW     | 8,922 | 13,534| 20,511|
| World   | 61,778| 93,291| 137,626|

Source: CEPII, see Table A1.
Figure 1. Growth rate acceleration by country income quartile

Notes: forward less backward growth rates, each calculated over a 15-year period from the year indicated. Lines are averages for quartiles of countries, ranked according to per capita PPP GDP in the year indicated.

Source: author’s calculations based on the Penn World Table.
http://pwt.econ.upenn.edu/ accessed 10 March 2012.
Excel: middle/trap, EK174
Figure 2. Growth engines

Source: author.
Figures 3a and 3b. Global consumption shares

Source: author’s calculations based on CEPII, see Table A1.
Excel middle/Con, D185 and L185

Figures 3c and 3d. Global investment shares

Source: author’s calculations based on CEPII, see Table A1.
Excel: middle/Inv, D186 and L186
Figure 4. Shares of populations by expenditure class

Source: Petri and Zhai (2012).
Excel: middle/inc-dist, K403
Figure 5. Change in populations by expenditure class, 2010-2030, millions

Source: authors’ calculations based on Petri and Zhai (2012).

Excel: middle/inc-pres, C26
Figure 6. Consumer durable penetration by daily income

Source: McKinsey (2010).
Excel: middle/diffusion, Q16
Figure 7. Supermarket penetration by income

[Graph showing supermarket penetration rises with per capita income. Countries are plotted on a graph with per capita GDP (purchasing power parity basis) on the x-axis and supermarket share of retail food sales on the y-axis.]

Source: Prepared by USDA Economic Research Service using data from the Pacific Economic Cooperation Council.

Online: http://webarchives.cdlib.org/sw1vh5dg3r/http://www.ers.usda.gov/AmberWaves/June06/Features/Revolution.htm
Figure 8. RCA index vs. expenditure shares

Source: authors’ calculations.

*Excel: middle/rca, BZ4*
Figure 9. Instruments: Tata Nano (l) and Maruti-Suzuki Alto (r)

Sources: Nano - ,

Tata Nano (www.mestrecarros.com)

http://images.search.yahoo.com/images/view;_ylt=A0PD0V1dfz1QCUwA98qJzbkF;_ylu=X3oDA
MTB1MTQ4cGxyBHNYyNzc9RzbGsDaW1n?back=http%3A%2F%2Fimages.search.yahoo.co
m%2Fsearch%2Fimages%3Fp%3Dtata%2Bnano%2Binterior%26ei%3DUTF-8%26fr%3Dmy-
myy%26tab%3Dorganic%26ri%3D94&w=800&h=600&imgurl=mestrecarros.com%2Fwp-
content%2Fuploads%2F2011%2F11%2FTata-Nano-
interior.jpg&rurl=http%3A%2F%2Fmestrecarros.com%2Fos-10-carros-mais-baratos-do-
mundo.html&size=50.4+KB&name=Tata-Nano-
interior&p=tata+nano+interior&oid=8cd6b06787b36291c1fc3646314db23a&fr2=&fr=my-
myy&t=Tata-Nano-
interior&b=91&ni=200&no=94&ts=&tab=organic&sigr=11var4sb1&sigb=136erf6hj&sigi=122r
nu63&.crumb=uCpsQEM1E0w

Maruti-Suzuki Alto (www.cars4indians.com)

http://images.search.yahoo.com/images/view;_ylt=A0PD0QxSft1QqjAR8SJzbkF;_ylu=X3oD
MTB1MTQ4cGxyBHNYyNzc9RzbGsDaW1n?back=http%3A%2F%2Fimages.search.yahoo.co
m%2Fsearch%2Fimages%3Fp%3Dmaruti%2Balto%2Binterior%26ei%3DUTF-8%26fr%3Dmy-
myy%26tab%3Dorganic%26ri%3D186&w=346&h=346&imgurl=www.cars4indians.com%2Fi
images%2Fwallpaper%2Fwallpaper-Maruti_Alto_K10-
4.jpg&rurl=http%3A%2F%2Fwww.cars4indians.com%2Fressearch%2Fcar_research.asp%3Frid
%3D290&size=36.6+KB&name=Maruti+Alto+K10+LXi%2B%2BCar%2BPrice%2B%2BReview%2B...&p=maruti+alto+interior&oid=259a426b0956e6384a876482be8e
0db3&fr=my-
myy&t=Maruti%2BAuto%2BBLX%2B%2BCar%2BPrice%2B%2BReview%2B...&b=181&ni=200&no=186&ts=&tab=
organic&sigr=11tk3nh3t&sigb=1396mup88b&sigi=125qsa76h&.crumb=uCpsQEM1E0w
Figure 10. Hallstatt, Guangdong?

Source: free web image.

Online: http://www.uploadimages4free.com/browse_images/hallstatt_in_winter_austria-221.html
Figure 11. Track length of the Shanghai Metro (km)

Source: author’s calculations based on Wikipedia, accessed 12 July 2011.

Excel: middle/subway, A15
Table 1. Infrastructure investment requirements, 2010-2020

| Sector/Subsector         | New Capacity | Replacement | Total   |
|--------------------------|--------------|-------------|---------|
| Energy (Electricity)     | 3,176,437    | 912,202     | 4,088,639 |
| Telecommunications       | 325,353      | 730,304     | 1,055,657 |
| Mobile phones            | 181,763      | 509,151     | 690,914  |
| Landlines                | 145,590      | 221,153     | 366,743  |
| Transport                | 1,761,666    | 704,457     | 2,466,123 |
| Airports                 | 6,533        | 4,720       | 11,250   |
| Ports                    | 30,275       | 25,416      | 75,691   |
| Railways                 | 2,692        | 35,047      | 38,739   |
| Roads                    | 1,702,166    | 638,366     | 2,340,532 |
| Water and Sanitation     | 155,403      | 225,707     | 381,200  |
| Sanitation               | 107,925      | 119,573     | 227,498  |
| Water                    | 47,566       | 106,224     | 153,792  |
| **Total**                | **5,418,940**| **2,572,760**| **7,991,700** |

$ = United States dollar.
Sources: ADB (2009), Bhattacharya (2008).

Source: ADB (2009).