



New Economic Horizons for Myanmar

Scenarios for Inclusive and Sustainable Growth

January 2017

This publication was produced by Nathan Associates Inc. for review by the United States Agency for International Development.

New Economic Horizons for Myanmar

Scenarios for Inclusive and Sustainable Growth

DISCLAIMER

This document is made possible by the support of the American people through the United States Agency for International Development (USAID). Its contents are the sole responsibility of the author or authors and do not necessarily reflect the views of USAID or the United States government.

Economic Reform and Growth Dynamics

Discussion Paper Series

In 2015, as Myanmar prepared for new elections, the United States Agency for International Development (USAID) commissioned a set of discussion papers to review Myanmar's economic status, benchmark its performance relative to other countries, and identify priority policy reforms, investments, and institutional innovations to re-establish the country on a new, inclusive growth path. This effort has been led by Nathan Associates under the Private Sector Development Activity (PSDA) and the Association of Southeast Asian Nations (ASEAN) Connectivity through Trade and Investment project Economic Reform through ASEAN Integration program.

Nathan Associates has a long history of providing economic analysis of the Myanmar economy. Originally headed by the economist Robert R. Nathan, who helped develop the United States' first national accounts in the U.S. Department of Commerce, Nathan Associates was founded in 1946 to provide applied economic analysis services to clients in the United States and around the globe and started working in Burma in 1951 at the request of the U Nu government. The latter sought "advice with respect to various important aspects of the country's economy and engineering problems and assistance in solving practical operating difficulties." Nathan Associates worked in Burma until 1959 with two U.S. engineering firms to deliver this advice, initially with funding from the U.S. Technical Cooperation Administration (a predecessor to USAID) and later with direct support from the Burmese government.

In 1953, Nathan Associates, along with the firms of Knappen Tippetts Abbett McCarthy Engineers and Pierce Management, delivered to the U Nu government an 8-year economic and social development program. The comprehensive plan, "Economic and Engineering Development of Burma," laid out a strategy of economic and administrative policies to stimulate growth in agriculture and irrigation, transportation, telecommunications, power, and industry, along with an analysis of the country's macroeconomic conditions. Unfortunately, what the report called a "golden opportunity" for rapid growth was lost, as many of the recommendations were set aside due to political developments in the late 1950s and early 1960s.

The present set of discussion papers is designed to revive the initiative begun more than 60 years ago, providing a careful analysis of conditions in Myanmar and recommendations on how the country can accelerate its integration into the global economy and deliver growth and prosperity to all of the people of the country.

Lynn Salinger, Principal Associate at Nathan Associates, has led the design and implementation of the Discussion Paper Series in collaboration with Steve Parker, Chief of Party of the Private Sector Development Activity, and Tim Buehrer, Chief of Party of the ASEAN Connectivity through Trade and Investment Project. Daniel Swift has supervised the effort from the U.S. Agency for International Development Mission to Burma.

Acknowledgements

This report was authored by Professor David Roland-Holst of the University of California, Berkeley, acting as a private consultant for Nathan Associates, Inc., under general sponsorship of USAID. The author would like to thank Steve Parker, Lynn Salinger, Tim Buehrer, and many national and international project team members for valuable collaboration and guidance. Thanks are also due Daniel Swift, Leslie Marbury, and other USAID staff for many constructive insights. Any shortcomings of this report are the responsibility of the author alone.

Acronyms

ADB	Asian Development Bank
ADBI	Asian Development Bank Institute
BOP	Balance of payments
CBM	Central Bank of Myanmar
CES	Constant elasticity of substitution
CET	Constant elasticity of transformation
CGE	Calibrated general equilibrium
CPI	Consumer price index
CSED	Central Statistics and Economic Department
CSO	Central Statistical Organization
ELES	Extended linear expenditure system
EV	Equivalent variation
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign direct investment
GDP	Gross domestic product
GE	General equilibrium
GMS	Greater Mekong Sub-region
HIES	Household Income and Expenditure Survey
I-O	Input-output
NESAC	National Economic and Social Advisory Council
NMS	Nationwide Manufacturing Survey
OECD	Organization for Economic Cooperation and Development
PPP	Purchasing power parity
PRC	Peoples' Republic of China
SAM	Social accounting matrix
SBTC	Skill-biased technological change
TFP	Total factor productivity
TVET	Technical and vocational education and training
UNDP	United Nations Development Program
USAID	United States Agency for International Development
USD	United States dollar

Contents

Acronyms	v
1. Introduction	1
2. Overview of the Economy-wide Model Framework	3
An Economic Forecasting Model for Myanmar	3
3. Scenarios for Sustained and Inclusive Growth	5
Baseline - Reference Scenario	6
Agriculture	7
Enterprise Development - Industry Policy	12
Human Resource Development	17
Note on Energy and Trade	19
4. Scenario Results	20
5. Conclusions and Extensions	35
References	37
Appendix 1. Model Summary	47
Production	47
Consumption and Closure Rules	48
Foreign Trade	48
Prices	49
Elasticities	49
Appendix 2. Overview of Myanmar Data Resources	54
Agricultural Statistics	56
National Accounts Statistics	56
External Sector Statistics	56
Public Finance and Price Statistics	57
Industrial Statistics	57
Monetary Statistics	58
Nationwide Manufacturing Survey (NMS)	58
Distributive Trade Statistics Survey	58

Mass Media Survey	58
Housing Construction Survey	59
Sector/Commodity Detail	59
Household Disaggregation	59
Demographics, Labor, and Migration	62

Illustrations

Figures

Figure 1: Rice Yields by Country/Region, 1960–2016	8
Figure 2: Asian Regional Investment Needs for Infrastructure Projects, 2010-2020	13
Figure 3: Private Investor Risk Premium and Public Enterprise Competition	16
Figure 4: Factor Productivity Growth in Asia, 1999-2008	18
Figure 5: Real GDP Impacts of Policy Reforms	22
Figure 6: Real GDP Impacts of Policy Packages (Simplified by Scenario Group)	23
Figure 7: Cumulative and Incremental Real GDP Growth, by Scenario	24
Figure 8: Urban Income Distribution in China and India	29
Figure 9: Cutting the Cake – Middle-Income Transition	30
Figure 10: Real GDP Impacts of Policy Packages	31
Figure 11: Household Cost-of-Living Changes are Pro-Poor	32
Figure 12: Household Cost of Living Changes – Aggregate Impacts of All Scenarios	33
Figure 13: Production Function for Crops	50
Figure 14: Production Function for Livestock	51
Figure 15: Production Function for Non-Agriculture	52
Figure 16: Trade Aggregation	53
Figure 17: Population by Age and Gender	63

Tables

Table 1: Scenarios for Sustainable and Inclusive Growth	6
Table 2: ADB Estimates of East and Southeast Asia’s Transport Infrastructure Needs, 2010-2020	14
Table 3: Regional Transport Infrastructure, 2010-2020	15
Table 4: Incremental Macroeconomic Impacts of Policy Reforms	21
Table 5: Primary Surveys Compiled and Published by the CSO (2014)	55
Table 6: Sectors for the 2014 Myanmar Input-Output Accounts	60
Table 7: Households Disaggregated by Rural-Urban Status and Region	61

1. Introduction

Thanks to determined political initiative across the diverse spectrum of its society, Myanmar stands at the beginning of an unprecedented institutional reform and development process. Some might see this horizon as full of challenges, but this report takes a different perspective, elucidating a wide array of opportunities for Myanmar to achieve the sustained and inclusive economic growth already enjoyed by many of its Asian neighbors. Using a state-of-the-art policy decision tool, a long-term economic forecasting model, we investigate the many drivers of growth that exist in this resource-rich and diverse economy, embedded in one of the most dynamic economic regions of the world. Our results are intended to contribute to a new generation of evidence-based, fiscally prudent growth policy that will support Myanmar's successful economic transition.

Considering a total of 16 different policy scenarios for inclusion in the country's overall reform and development strategy, our assessment is that this resource rich economy can deliver sustained and inclusive prosperity to its people within a generation. Indeed, our forecasts offer a variety of pathways that, if supported by determined long term policy commitments, **can bring Myanmar to upper middle-income status by within two decades**. In the results assessment below, we spell out package of sufficient conditions to achieve such progress, including sustained investments to higher labor productivity, more equitable and efficient domestic capital allocation, and broad-based infrastructure development. Significantly, **all these policy recommendations are fiscally sustainable and rely on self-directed market agency for poverty reduction**.

Another salient finding of this research is **the importance of developing the country's agrifood potential**. Myanmar has a very strong comparative advantage in this sector, hindered today by chronically low productivity. Supply-side development strategies for agrifood, including product diversification, productivity growth, improvements in market access, and external investment partnership can transform the sector from subsistence to one of the primary drivers of long term prosperity. Success in this area will require, among other things, agricultural diversification, secure property rights, productivity growth, and improved market access.¹ What can be achieved is dramatic and can be the hallmark of a successful inclusive growth strategy - self-directed poverty reduction for the country's rural majority.

If successful, **Myanmar will be distinctive for the degree of its reliance on agrifood development**, yet more traditional "Asian Miracle" drivers, including manufacturing and service sector modernization, can also make important contributions to national development. As is now well known, this will require aggressive engagement with external

¹ A strategy for modernizing Myanmar's agricultural and food sector is detailed in a 2016 white paper by the National Economic and Social Advisory Council.

markets and investors, including more determined efforts to promote open multilateralism, capital account liberalization, transparent property rights, and enforceable contracts

This fundamental triad (agriculture, manufacturing, service) approach to development strategy can establish a solid basis for a more productive and diversified economy, but to sustain its momentum and achieve upper middle income status, Myanmar must also broaden commitments to skill-intensive development, and promote productivity-based compensation and employment practices. In parallel with more prosperity-oriented human resource development, capital reforms will also be needed to support long term prosperity. This will facilitate broad-based domestic enterprise investment, a climate hospitable to international investors, more efficient risk management, and robust growth of domestic savings to support future growth.

Using modern research techniques to provide evidence in support of more effective, evidence based policy has been a hallmark of successful growth experiences, in Asia and globally, and it is hoped that the present exercise will provide new impetus for more rigorous ex ante policy assessment and careful targeting for the multiple objectives of growth, equity, and sustainability. Much work remains to be done in this area, particularly to improve original information and analytical support available to decision makers. In light of such constraints, the present contribution must be seen as preliminary, and its results at best as indicative. Many assumptions have been needed to bridge uncertainties about the quality of today's data resources, as well as reasonable expectations regarding institutional constraints. We see this as a necessary part of building capacity for more definitive analysis, however, and continued commitments to improved data and analysis can substantially improve the coherence and effectiveness of public policy dialogue, as well as the decisions of private stakeholders who must anticipate public policy and make essential contributions to inclusive economic development.

The next section describes the dynamic economic forecasting tool used for assessment. This is followed by a description of the Baseline and 16 alternative policy scenarios. A fourth section discusses assessment results, followed by concluding remarks and indications about extensions of the present analysis.

2. Overview of the Economy-wide Model Framework

AN ECONOMIC FORECASTING MODEL FOR MYANMAR

In this section, we introduce a new dynamic economic forecasting model to evaluate long-term growth prospects for Myanmar. The model is an advanced policy simulation tool that models demand, supply, and resource allocation across the Myanmar economy, estimating economic outcomes annually over the period 2015–2035. This kind of Calibrated General Equilibrium (CGE) model is a state-of-the-art economic forecasting tool, using a system of equations and detailed economic data that simulate price-directed interactions between firms and households in commodity and factor markets. The role of government, capital markets, and other trading partners are also included, with varying degrees of detail, to close the model and account for economy-wide resource allocation, production, and income determination.

The role of markets is to mediate exchange, usually with flexible market prices, the most important variables in a typical CGE model. As in a real market economy, commodity and factor price changes induce changes in the level and composition of supply and demand, production and income, and the remaining endogenous variables in the system. In CGE models, the model equations are solved for prices that correspond to market equilibrium of supply and demand. If such a system is precisely specified, equilibrium always exists and a consistent model can be calibrated to base period data. The resulting CGE model is then used to simulate the economy-wide impacts under different policy and external event scenarios.

The distinguishing feature of a general equilibrium model, applied or theoretical, is its closed-form specification of all specified activities in the economic system under study. This can be contrasted with more traditional partial equilibrium analysis, where linkages to other domestic markets and agents are deliberately excluded from consideration. A large and growing body of evidence suggests that indirect effects (e.g., upstream and downstream production linkages) arising from policy changes are not only substantial, but may in some cases even outweigh direct effects. Only a model that consistently specifies economy-wide interactions can fully assess the implications of economic policies or business strategies. In a single-country model like the one used in this study, indirect effects do not include the trade linkages between countries and regions, which themselves can have policy implications.

Why use an economic model?

Myanmar's reform policies are shaped by public aspirations for better livelihoods, and also by a collective sense that economic modernization and market-oriented institutions can deliver sustained economic growth. These “animal spirits” are essential to large-scale economic mobilization and the intuition behind them is of course consistent with the dynamic Asian growth experience. Having said this, however, today's global economy is so complex that policymakers relying on intuition alone are unlikely to achieve anything close to optimality. For this reason, evidence-based policy generally, and economic forecasting in particular, have become essential tools for decision makers. This kind of scenario analysis

enables policymakers to assess the effects of alternative development strategies before they are implemented, avoiding unanticipated costs and irreversibilities.

Why a dedicated national model?

Southeast Asia, as well as the Greater Mekong Sub-region (GMS) have been the subject of extensive economic modeling in the past, yet these efforts offer little guidance for Myanmar's broad-based reconsideration of development strategy. Because of unique geographic and institutional characteristics, Myanmar needs its own research capacity to support its own policies. Public and private stakeholders need more accurate prior information about the adjustment process to participate effectively. Projects may be local, but spillover effects implicate stakeholders across the country. This can arouse both cooperative and competitive interests, both of which need to be anticipated.

General Equilibrium (GE) models capture extensive interactions, through markets, production systems, and expenditure decisions. These forecasting tools reveal more detailed economic impacts and support more effective policy from three perspectives:

1. Complexity - Given the complexity of today's market economies, policymakers relying on intuition and rules-of-thumb alone are assuming substantial risks.
2. Linkage - Indirect effects of policies often outweigh direct effects.
3. Political sustainability - Economic policy may be made from the top down, but political consequences are often felt from the bottom up.

GE models, supported by reliable data resources, can elucidate these linkages and improve visibility for policymakers. Moreover, this kind of simulation framework permits them to identify benefits and costs *ex ante*, recruiting those who will gain to support policies and anticipating the adjustment needs of others.

Data Sources

The data for the Myanmar CGE were obtained from a variety of official national, multilateral, and academic sources. Most of the economic data are compiled in a new (2014) Social Accounting Matrix for Myanmar, estimated by the author. The current version of the model has been updated from one developed under ADB sponsorship (Roland-Holst and Park 2012). While the analytical structure has not changed significantly, much new data have improved the quality and detail of our Baseline calibration. These updates are discussed in more detail below, but it is important to bear in mind that the detail, timeliness, and accuracy of Myanmar economic and demographic data remain a significant challenge for effective policy support. Progress is being made rapidly in this area, and while the scenario results presented here are subject to constraints regarding data quality, sensitivity analysis indicates that the main findings are robust.

3. Scenarios for Sustained and Inclusive Growth

For a country at Myanmar's stage of economic and institutional development, there are essentially a limitless number of possible pathways forward. This of course is both a blessing and a challenge, since it implies great flexibility as well as uncertainty. To take full advantage of the former while responsibly managing the latter, this analysis seeks to support policy design and dialog with evidence-based scenario analysis. In this section, we summarize a series of 16 leading economic policy issues that are relevant to Myanmar's economic transition. This sample is not intended to be exhaustive, but it does address a representative and diverse subset of leading reform questions under current discussion.

The scenarios considered here are divided into three broad categories that reflect first-tier reform and strategic development priorities:

1. Agriculture – The agrifood sector not only secures the subsistence of the nation, but remains home to most of the population, labor force, and households in poverty. Most observers also agree that this sector has enormous economic growth potential for Myanmar. As a prominent 2016 white paper by the National Economic and Social Advisory Council (NESAC) on the subject makes clear, agricultural policy must have a central role in any comprehensive strategy to move Myanmar to a future of sustained prosperity.
2. Enterprise Development & Industry Policy – Myanmar has a long history of vibrant enterprise activity, particularly commerce associated with maritime trade and its historic urban centers. Since the middle of the last century, however, enterprise and industrial development in Myanmar have not kept pace with experiences in East and Southeast Asia, and comprehensive policy appraisal is needed to facilitate robust and sustained entrepreneurship across the nation.
3. Human Resource Development – Despite a long and rich cultural history and substantial educational progress since the nineteenth century, Myanmar's educational and vocational learning resources have not delivered globally competitive skills to most of the working population. The government is well aware that this is an area of urgent unmet need, and policies to accelerate skill development in all its aspects are at the forefront of the reform agenda.

Each of these general categories should be the subject of more dedicated and detailed economic policy research, but for indicative purposes we consider here a few examples of each in this report. Detailed in the next table, scenarios were chosen to improve visibility for policymakers on leading issues, but also to illustrate the usefulness of this kind of *ex ante* policy evaluation. We discuss each scenario in more detail next. It should be emphasized, however, that in addition to the three main topics above, many other leading areas of policy, including energy, trade, etc., can also be subjects of this kind of impact assessment.

Table 1: Scenarios for Sustainable and Inclusive Growth

Label	Description	
Baseline	Reference scenario, calibrated to reflect expected annual growth rate of 4.25 percent	
AGRICULTURE		
1	Rice	Rice yields increase 3 percent annually over next two decades
2	AgProd	Diversification of Agriculture – Total factor productivity (TFP) growth of 3 percent annually, including other crops and livestock
3	AgVA	Value added – Assume TFP in agrifood is double that of Scenario 2 (includes fishery/aquaculture)
4	MAC1	Market Access – 25 percent distribution margin reductions
5	MAC2	Market Access – 50 percent distribution margin reductions
6	AgFDI	Foreign capital inflows dedicated to the agrifood sector (up to 5 percent of total investment by 2035). This will increase FDI overall, as well as the share going to agrifood.
ENTERPRISE DEVELOPMENT AND INDUSTRY POLICY		
7	EntRes	Resource-based sectors: TFP growth increases by 3 percent per year.
8	EntLgt	Light industries: TFP growth increases by 3 percent per year.
9	EntMfg	Manufacturing: TFP growth increases by 3 percent per year.
10	EntTour	Tourism: TFP growth increases by 3 percent per year.
11	EntPrSr	All private services: TFP growth increases by 3 percent per year.
12	Infra	Infrastructure development: 50 percent reductions in costs of trade and transport.
13	Credit	Private sector credit rationing: Rising cost of capital in sectors in which public enterprises dominate.
14	FDI	Capital account liberalization (up to 10 percent of total investment by 2035). This scenario represents the non-agricultural 5 percent.
HUMAN RESOURCES AND LABOR MARKETS		
15	Skill	Skills development: TFP growth rises to meet GMS average by 2020 and remains there for fifteen years (50 percent of which is assumed to be due to skill development)
16	Educ	Education: TFP growth rises to meet GMS average by 2020 and remains there for fifteen years (50 percent of which is due to education)

BASELINE - REFERENCE SCENARIO

No matter how advanced or competently implemented, an economic forecasting model will never be a crystal ball. Having said this, models like the Myanmar CGE can trace out patterns of growth, resource use, and other economic variables to help policymakers assess aggregate consistency and identify emergent constraints. The Baseline scenario is intended for use as a dynamic reference for so-called Business-as-Usual, or continuation of existing policies. This one is calibrated to consensus forecasts for real GDP obtained from independent sources (e.g., World Bank, International Monetary Fund, Data Resources International, and Cambridge Econometrics), averaging 4.25 percent per year to 2035. The model is then run forward to meet this target, making national average capital productivity growth. This calibration yields productivity growth that would be needed to attain the macro trajectories. These are then held fixed in the model under other policy scenarios. Other exogenous macro forecasts could have been used and compared, but this is the standard way to calibrate these models.

AGRICULTURE

Myanmar has the largest share of agriculture in gross domestic product (GDP) of 32 percent, compared to an average of 16 percent for all of Southeast Asia, as well as the highest population share of low-income smallholders (OECD 2010b). Although Myanmar is officially classified as a food-surplus economy, 16 percent of the country's 50.5 million population, or a total of 7.8 million individuals, suffer from undernourishment (last recorded in 2007, but down from 13.5 million in 2001). Moreover, subsistence production remains the dominant pattern of agriculture in the country. All these attributes make Myanmar a leading candidate for agriculture and food-oriented development strategies.

Rice - Productivity Potential

Because of geographic diversity and differences in stages of development, agricultural productivity growth varies substantially around the world. In Myanmar growth in recent decades has been good, but it is generally agreed that agrifood output remains far below its ultimate potential, especially when higher value-added products are considered. Because of relatively small-scale land tenure patterns, substantial improvements in productivity are needed if rural households in Myanmar are to achieve significant livelihood improvements.

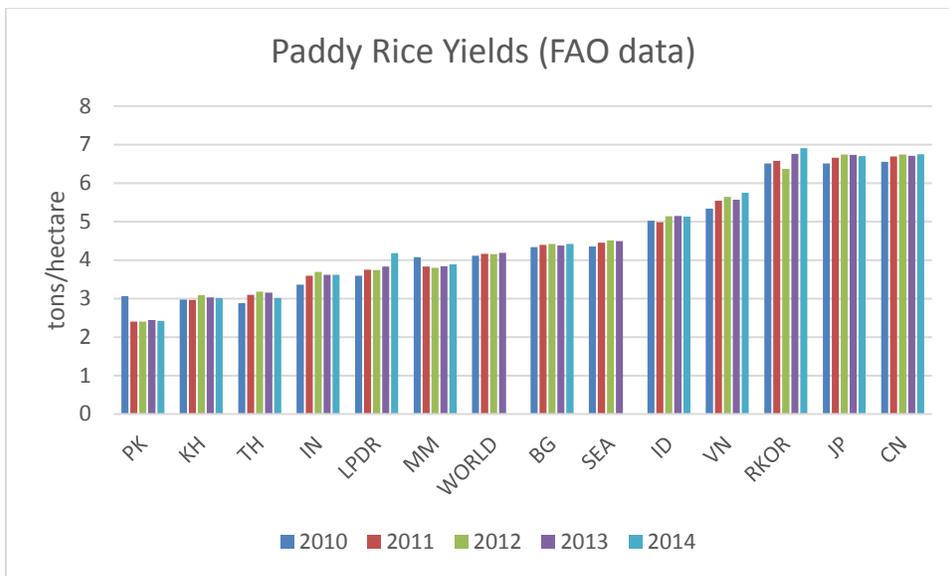
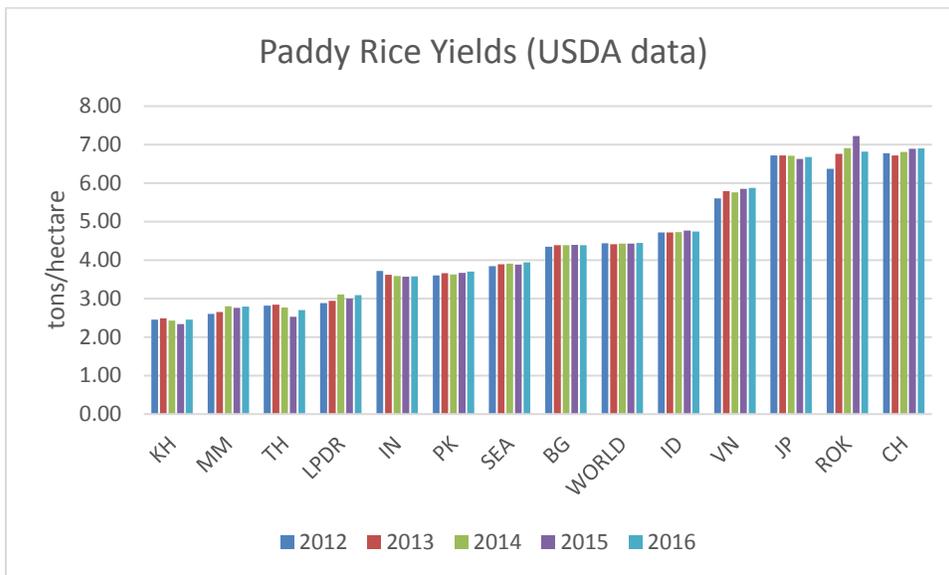
In an initial set of productivity scenarios, we examine the potential for higher rice output to benefit Myanmar and its majority rural population. As Figure 1 indicates, Myanmar rice yields are comparable to those in Thailand, but below regional and global standards. While high-income Asia sets a difficult example to attain, significant progress could be made with higher levels of investment and intensification. Of course, it will take significant time and resources before lower yielding Southeast Asian nations achieve yields established in Indonesia and Vietnam, let alone in Japan and the Republic of Korea, but even partial narrowing of this gap would have momentous implications for the poor rural majority in Myanmar.

In particular, we assume for this scenario that Myanmar can improve rice yields by 3 percent annually (above Baseline) over the next two decades, which would overcome half the gap between its productivity and that of the most productive Asian economies, consistent with other Southeast Asian experience. External supply chain and investment partnerships in this sector could significantly alleviate these constraints, while also liberating more workers for non-farm employment. However, Myanmar's very low initial per capita incomes will make it difficult for Myanmar smallholders to finance the rates of technology adoption or achieve the rates of productivity increase observed in Korean and Japanese rice production over the last generation.

Rice is both an essential staple and an historic source of global export opportunity, but rice exports may not be the best way to promote inclusive growth with Myanmar's agricultural resources. Meeting domestic food needs from its own rice sector can be important to both the rural and urban poor because it keeps food costs low and stable. Once sufficiency is reached, however, cereals generally, and rice, in particular, offers limited value-added or livelihoods upside to the rural poor. Most evidence from low- and middle-income exporters (e.g., Thailand) suggests that increasing grain yields for export is of limited benefit to the

poor, and merely increases inequality. Processors and traders, rather than smallholders, capture most of the incremental income from external markets.²

Figure 1: Rice Yields by Country/Region, 1960–2016



Notes: PK Pakistan, KH Cambodia, TH Thailand, IN India, LPDR Lao People's Democratic Republic, MM Myanmar, BG Bangladesh, SEA Southeast Asia, ID Indonesia, VN Vietnam, RKOR Republic of Korea, JP Japan, CN China

Source: Data from U.S. Department of Agriculture, Food and Agriculture Organization, International Rice Research Institute, World Rice Statistics

² A study by the Thailand Development Research Institute estimated, for example, that millers alone captured 70 percent of the benefits of the controversial, multibillion U.S. dollar rice support scheme during the last Thai administration. See Jikkham and Bunyamane (2013).

AgProd – Agricultural Diversification and Productivity Growth

Agricultural diversification for domestic and regional markets may have higher risk-adjusted returns to Myanmar farmers than expanding rice monoculture. Excessive national reliance on a single cash crop entails substantial risks, as we have seen in a long history of commodity price cycles. Moreover, cereals have relatively low income elasticities,³ meaning that they underperform as export crops in a rapidly prospering regional market like Asia. By contrast, specialty agriculture (e.g., livestock and fisheries products, fruits, and vegetables) and higher value-added products are the bases of some of the most dynamic supply chains in the region. Decades of experience with globalization have revealed limited direct benefits for the world's rural poor majority. In some countries, however, domestic agrifood supply chains have allowed the rural poor to participate indirectly in urban growth, marketing more income-elastic agrifood products to cities. Thus, agricultural diversification may yield more inclusive growth for Myanmar, if productivity can be promoted across a broader spectrum of farm products. In this scenario, we examine the growth potential from more general agricultural productivity growth (including fishery and aquaculture).

AgVA – Agrifood Value-added

Higher productivity in terms of raw agricultural output can only go so far to improve livelihoods. A defining characteristic of agricultural modernization and higher farm living standards is improvement in quality and other value-added product characteristics that are conferred by food processing activities. Given the diversity of agrifood products, it is difficult to specify a scenario capturing this, so we are left to model higher agrifood product value as higher productivity in food processing sectors. In particular, our AgVA scenario is characterized by TFP growth that is 3 percent above its Baseline annually. This may not provide relevant guidance for farm-level value improvements via extension services, but it does indicate the economic potential of such improvements to the extent that Myanmar can capture more value-added in agrifood supply chains.

MAC1 and MAC2 - Market Access for Agriculture via Reduced Distribution Margins

Throughout economic history, market access has been the primary gateway out of poverty. For the world's poor rural majority, this happens either when farmers gain access to agrifood products markets or when rural households send members as migrants to urban labor markets. In either case, there are many informational and logistical barriers that confer high access costs and search-related matching risks (e.g., perishability and unemployment). Because of substantial geographic and institutional barriers to domestic trade, farmers in Myanmar are generally restricted to local markets and even subsistence.

As one would expect, the nature of market access depends on the market being considered. In the present context, we refer to the most general usage from microeconomic theory, that is, to the costs or other barriers that may constrain an actor from entering a given market.

³ That is, as incomes increase, demand for rice and other cereals declines, while demand for foods with higher income elasticities, such as meats, seafood, dairy, and horticulture, increases.

Examples in the present context would be downstream marketing of farm products to towns and cities, migration from rural areas to urban labor markets, etc. Other usages, such as border measures in international trade, are analogous but only partially relevant to the present discussion. For Myanmar agriculture, barriers to a given export market might be the result of partner or domestic trade policy. With respect to global market access, market access barriers take many forms, e.g., domestic export restrictions, a wide range of costs to develop export quality products, reach borders, complete border procedures, and find destination partners or selling opportunities. As a general rule, domestic market access is much more important to the rural poor, who have direct access to international markets only in border areas. With supply-chain partnerships, however, they can leverage external demand for growth even from deep in the interior.

Improving market access will be a high priority for the new government because of its commitments to economic inclusion and poverty reduction. In our scenario, we decompose access barriers into two components, institutional and logistic. The first category refers generally to the “soft” infrastructure of trade - information, intermediary agency, trade facilitation, etc. These institutional barriers are reflected in search and transactions costs, monetized risk, and moral hazard, as well as agency margins and fees. Logistical access barriers are more tangible, such as poor or nonexistent roads, bridges, etc. The access costs associated with these take two main forms – transport and product depreciation (e.g., perishability) costs.

We examine logistical barriers in a separate Infrastructure scenario below, but for the present use a two-step approach to appraise the effect of facilitating agrifood market access by reducing transactions costs. Empirical estimates of these costs are available for other countries (see e.g., Anderson and Wincoop 2004), and for developing countries with extensive and dispersed rural majorities they can represent 50 percent of producer prices. The MAC 1 scenario assumes that institutional reforms, including contracting, cooperatives, and other facilitation measures, cut this margin in half, reducing overall distribution margins for farmers by an average of 25 percent. Although it will likely not be possible to eliminate soft agrifood market access costs completely, the MAC 2 scenario tests this prospect empirically, reducing farm distribution margins by another 25 percent.

AgFDI - Foreign Direct Investment in Myanmar Agrifood Development

A defining characteristic of low-income economies everywhere is limited domestic savings resources. The former limits the progress of development by restricting enterprise investment in productive assets and enterprise expansion. The era of globalization has altered the nature of this constraint, however, with the advent of transboundary or foreign direct investment (FDI) that permits low-income countries to leverage foreign savings for domestic investment, technological change, and growth. To help low-income economies achieve their economic potential in the timeliest fashion, FDI can be an essential catalyst. The same logic applies to rural poor enclaves within middle-income Greater Mekong Sub-region (GMS) economies. Savings disparities between urban and rural areas are only partially offset by migrant remittances and public rural development schemes. Improving domestic

market access and smallholder productivity could accelerate private investment from urban to rural areas, and from large to small agrifood enterprise development.

As we shall see below, the growth potential of Myanmar's agrifood sector, under the impetus of improvements in productivity, value-added, and lower cost market access, is enough to sustain dramatic, long-term livelihood improvements for the country's majority rural population and a broad web of intermediaries extending through urban areas and to the borders of the country. The momentum of agriculture in Myanmar can make an historic and sustained contribution to long-term national prosperity, but it still faces a substantial constraint on realizing its potential – limited investment and technology resources. Because of initial conditions, especially very low income, productivity, and supporting financial services, Myanmar's rural sector will grow at well below its potential if it relies only on domestic savings, technology, and markets.

If, by contrast, Myanmar follows more dynamic examples of regional agrifood modernization, including Taiwan and neighboring Thailand, the sector will open itself to foreign direct investment (FDI). Private overseas investment has been one of the most potent catalysts for growth in Asia, and is widely acknowledged to have been essential to the Asian Miracle, the result of export-oriented development strategies that transformed the region over two generations. FDI confers a “holy trinity” of growth benefits on recipient economies. First, external savings relieve the domestic, low-investment trap that is endemic to low-income countries. Second, most FDI committed to building productive assets in a developing country brings with it new and generally more productive technology. This technology transfer has not only increased labor productivity and real wages, but in the more advanced Asian economies it has instigated virtuous cycles of domestic innovation as skills rise and imported technologies are reproduced, adapted, and improved. Finally, most FDI partnerships originate with an export objective for the foreign investor, usually an OECD firm seeking lower resource costs for production. This export motive in turn confers market access on the developing partner country, often to much larger foreign markets that might be very difficult to enter alone.

A very good case in point is the Japanese agrifood sector. Japan has some of the most rigorous imported food standards in the world. While these may not be a conscious trade barrier, they represent a very significant technology hurdle for low-income exporters. Both Taiwan and Thailand learned this lesson early. Both sought partnerships with Japanese agrifood companies, and both developed extremely lucrative and now very advanced domestic agrifood industries as a result of these partnerships. Their domestic capacities could accelerate rapidly with foreign demand and investment, while adopting and internalizing more advanced partner technology and standards allowed them to enter a new tier of global competitiveness. Meanwhile retained profits from shared growth enabled domestic firms (e.g., CP Foods⁴) to reinvest for their own expansion and sub-regional leadership.

⁴ CP Foods is headquartered in Bangkok: “Charoen Pokphand Foods Public Company Limited is the leading agro-industrial and food conglomerate from the Asia Pacific region. The Company operates in both livestock (swine,

In the AgFDI scenario, we assume that foreign capital enters Myanmar and is committed to the agrifood sector, with historic productivity and competitiveness benefits analogous to Thailand during a comparable period (1980-1995). From Baseline levels (essentially zero), FDI in agrifood sectors is assumed to rise (linearly) by 2035 to 5 percent of total domestic investment.

ENTERPRISE DEVELOPMENT - INDUSTRY POLICY

Myanmar has a long history of vibrant enterprise activity, particularly commerce associated with maritime trade and its historic urban centers. Since the middle of the last century, however, enterprise and industrial development have not kept pace with East and Southeast Asia generally, and with Myanmar's middle- and high-income neighbors in particular. Myanmar established an independent, non-market development path decades ago, and military economic management was similarly inhospitable to decentralized entrepreneurial development and market-based resource allocation. As the new government looks to a different future, there is much to learn by comparison with experience elsewhere in Asia, at once the region with the most dynamic and enterprise-driven economies in the world.

To assess the potential for more robust enterprise and industry development to contribute to long-term, inclusive growth, we examined scenarios for productivity improvements similar to the previous ones considered for agrifood activities. In particular, we partitioned the model's 32 production activities⁵ into Agrifood, Resources, Light Industry, Manufacturing, Tourism, and Other Services. Each of these make different contributions to economic output, value-added, and employment, and we wanted to identify their roles individually for the sake of comparison.

With better economic policies, infrastructure, and institutions in place, Myanmar can finally realize the vision of its people. Rather than controlling the economy, the government must learn to use policies, laws, regulations, practices, and rule of law to open the economy. This means providing equitable access to resources and modern supports, such as banking services and access to the Internet. It also means assuring that an effective system of standards, certifications, and institutions is in place to protect Myanmar citizens from unsafe work, environment, foods and other goods, and from unscrupulous exploitation in the market. With well-managed economic reforms in place, entrepreneurial spirits can be nurtured to allow the Myanmar people to find the post-election economic dividend they seek.

For our scenario experiments, we divide the model's 32-sector database into five generic activity groups. In each scenario, we assume factor productivity rises at the rate specified in

broilers, layers, and ducks) and aquaculture (shrimp and fish) businesses. The vertically integrated businesses incorporate the manufacturing of animal feed, animal breeding, animal farming, meat processing, and food processing." From www.cp-foods.com, (accessed August 19, 2016).

⁵ See Appendices 1 and 2 for detailed presentations of the structure of the model and data used.

the AgProd scenario above, i.e., 3 percent per year (GDP shares for each sector group in parentheses).

1. EntRes - Resource-based Sectors: Forestry, Energy Fuels, Minerals (23% of GDP)
2. EntLgt - Light industries: Processed Food, Textiles and Apparel, Wood Products (11%)
3. EntMfg – Manufacturing (6%)
4. EntTour - Tourism, Recreation, and Hospitality (4%)
5. EntPrSr - All Other Private services (14%)

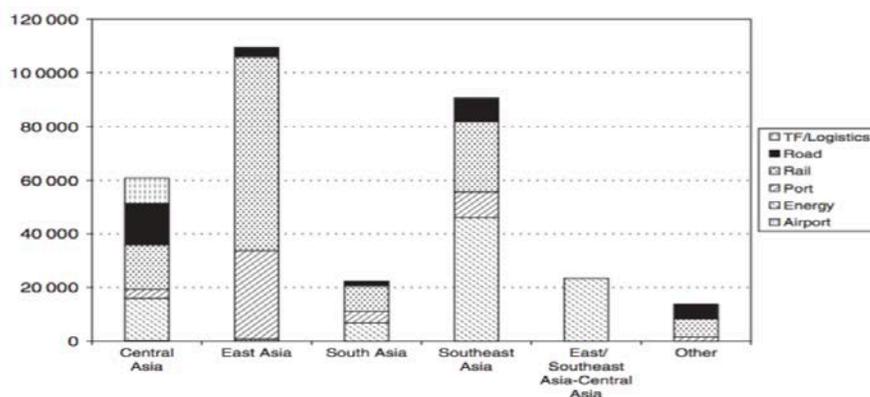
Infra - Infrastructure Development

Broad agreement exists on what constitutes infrastructure, yet its economic agency is quite diverse. In this subsection we offer a conceptual framework and indicative scenarios to elucidate infrastructure’s contribution to East and Southeast Asian regional growth.

Because of its generality, this kind of spending can be targeted across a wide spectrum of regions and socioeconomic groups, conducted at the national, regional, or local level, and timed to coincide with cyclical economic events. In the case of real public goods infrastructure, multiplier effects from both direct employment and downstream use can be substantial. Obviously, the latter benefits will be greater the more investment can be focused on real public goods and widely used infrastructure capacity. In this study, we examine targeted increases in investment in trade and transport infrastructure for Asian economies that are considered to have the greatest unmet needs.

In the Asian Development Bank’s (ADB) flagship report on Asia’s infrastructure needs (Plummer et al. 2016), the ADB identified 1202 regional projects valued at approximately US\$320 billion (Figure 2), with an average infrastructure investment need of about US\$29 billion per year for the period 2010–2020. Several countries will need to maintain higher long-term infrastructure investments if they are to “catch up” with faster growing or higher-income countries in the region, meet the needs of their growing populations, and stimulate rising incomes.

Figure 2: Asian Regional Investment Needs for Infrastructure Projects, 2010-2020
(US\$ million)



Source: Bhattacharyay (2012)

To accomplish this, it is estimated that low-income countries must sustain infrastructure investment levels at 6.3 percent of GDP over this period and beyond. At the moment, many of these countries have rates below 3 percent because of low domestic savings, weak fiscal institutions, or both. In the analysis presented below, we examine the growth and structural implications of more determined commitment to these investment objectives in Myanmar. The underlying issue is not a shortage of money: according to data from the International Monetary Fund (Cameron 2012), in all of Asia, savers put away \$1.3 trillion in 2011 alone, and there is enough excess liquidity in developed economy financial markets looking for reliable long-term returns to meet a significant part of this financing requirement.

For Myanmar, the investment commitments per capita are the lowest in East and Southeast Asia, less than half the second lowest country (Cambodia) and about 20% of the regional average (Table 2). The existing road density in Myanmar is lower than any country in the region but Mongolia (Table 3), critically limiting domestic and international market access. Compounding these difficult initial conditions is limited domestic capacity to fill the infrastructure gap. Estimated needs for catching up with the sub-region are over three times annual per capita GDP (Bhattacharyay et al. 2012). Simply put, Myanmar cannot in a reasonable time overcome its infrastructure deficiencies with investments financed from domestic savings alone. Asia as a whole does have such a savings reserve, but access to these regional financial resources will require determined commitment to regional investment partnerships such as those envisioned by AIIB, ADB, and other Intergovernmental Organizations.

Table 2: ADB Estimates of East and Southeast Asia’s Transport Infrastructure Needs, 2010-2020

Country/Sub region	% of total Asian investment need	Estimated investment needs (US\$ millions)	Investments as % of total		Total investment per year	Total investment per capita (US\$)	2008 GDP per capita (constant 2000 US\$)
			New capacity (%)	Maintenance (%)			
East and Southeast Asia	66.553	5472327	71	29	497484	2886	1765
Cambodia	0.163	13364	51	49	1215	918	511
PRC	53.118	4367642	72	28	397058	3297	1965
Indonesia	5.476	450304	70	30	40937	1981	1087
Lao PDR	0.138	11375	56	44	1034	1833	475
Malaysia	2.287	188084	79	21	17099	6962	5151
Mongolia	0.122	10069	37	63	915	3812	735
Myanmar	0.264	21698	56	44	1973	438	–
Philippines	1.546	127122	53	47	11557	1407	1225
Thailand	2.103	172907	72	28	15719	2566	2640
Viet Nam	1.335	109761	53	47	9978	1273	647

Source: Bhattacharyay (2012)

Table 3: Regional Transport Infrastructure, 2010-2020

	Road density (km/1000 sq km land)			Rail network density (km/1000 sq km land)			Household electrification rates (% of households)			
	1990	Latest year		1990	Latest year		Earliest year	Latest year		
East and Southeast Asia										
Cambodia	203	217	2004	3	4	2005	17	2000	21	2005
PRC	127	371	2006	6	7	2007	–	–	–	–
Indonesia	159	216	2005	–	3	1998	49	1991	91	2007
Lao PDR	61	129	2006	–	–	–	–	–	46	2002
Malaysia	262	283	2005	5	5	2007	–	–	–	–
Mongolia	27	31	2002	1	1	2007	67	2000	86	2005
Myanmar	38	41	2005	5	–	–	–	–	47	2002
Philippines	539	671	2003	2	2	2006	65	1993	77	2003
Thailand	141	352	2006	8	8	2006	–	–	99	2005
Viet Nam	295	717	2004	9	10	2007	78	1997	96	2005

Source: ADB (2009)

Credit - Reducing the Cost of Private Sector Credit

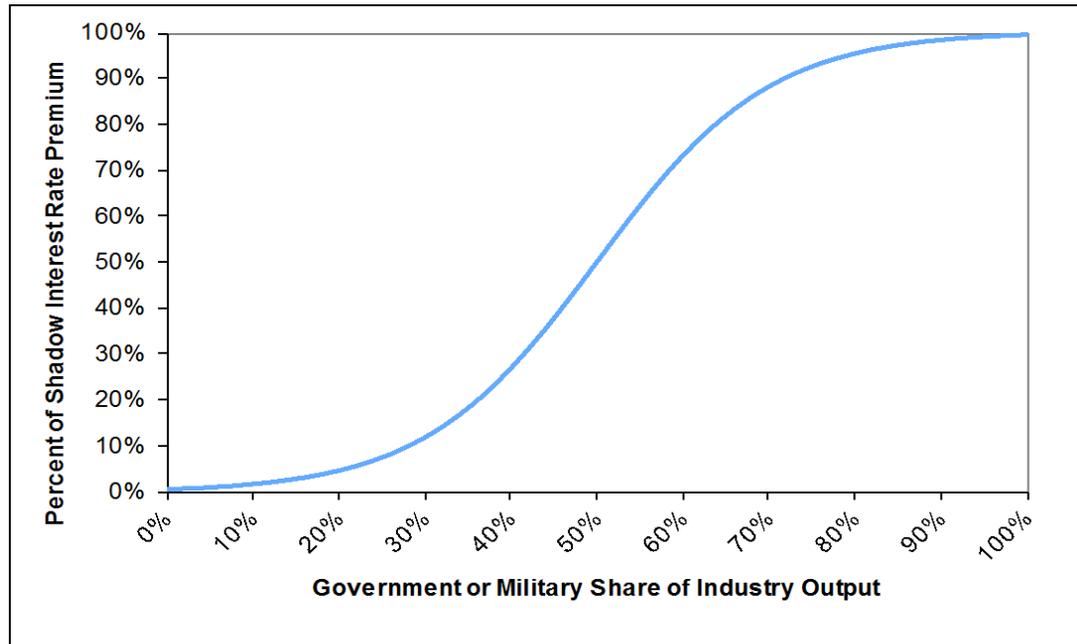
Because of initial conditions, credit rationing is a fact of life in every low-income country, whether or not public policy facilitates it. In most developing countries, relative scarcity of savings eligible for enterprise investment combine with weak private and public institutions to restrict efficient capital access and thereby misprice underlying risks and returns. The situation can be seriously compounded when public institutions exert preferential influence on the allocation process, usually favoring state enterprises or private firms with formal or informal public social capital. This problem is particularly acute when state enterprises constitute a large share of certain industries, as their capital needs are seen to be meeting both governmental and social needs.

The usual result in such situations is emergence of an informal parallel market for enterprise and other private credit, generally lacking formal safeguards and competitive interest rates. These systems are often termed “shadow banking” because they recruit both credit constrained borrowers and depositors seeking premium returns. Because banks themselves may have to offset substandard returns from loss-making state enterprises, even they may be tempted to join this market. It is quite rare, however, for this kind of crossover to substantially mitigate rate distortions, with the result that private sector borrowers are often forced to pay a substantial scarcity premium to access working capital. As one might expect, this distortion seriously undermines private investment returns, undermining the essential risk-taking and innovation potential of private sector agency.

The informal nature of this kind of credit rationing makes it inherently difficult to measure and estimate. It is very important, however, to understand its potential to retard the development process. For the present assessment, we approached the issue heuristically, modeling the cost of credit as a risk premium for private sector investors competing in a market crowded with public sector incumbents that inflate borrowing costs for private competitors. To model this, we assume the existence of a risk premium for competing in

sectors with state enterprise participation. If one assumes the prevailing risk premium P exists in the shadow banking system, then new investors will pay something between 0 and P in addition to competitive rental rates if they want to invest in a sector against public firms. Figure 5 shows a simple logistic specification of the risk premium, 0 without public firms and increasing to P as their market share rises to 100 percent. For this indicative scenario, we assume the “shadow lending” market interest premium is 50 percent.

Figure 3: Private Investor Risk Premium and Public Enterprise Competition



FDI - Capital Account Liberalization

As was emphasized in the AgFDI scenario, international partnerships for foreign investment can be a potent catalyst for growth and modernization of a developing country. Assuming that these partnerships are negotiated effectively and national property rights are protected, the benefits of inbound external savings for investment growth, technology transfer for productivity enhancement, and export market access for demand stimulus have been extremely effective in other dynamic Asian economies.

Myanmar need be no exception to this positive synergy, as long as foreign capital is allocated toward the country’s leading sustainable comparative advantages. These include agriculture, as has already been emphasized, but Myanmar can also be competitive in a variety of labor-intensive activities. The long-term potential for manufacturing expansion will depend, ultimately, on the labor force, both in terms of skill development (see below) and the space-time dimensions of demographics. For example, the strong agrifood development strategy will stabilize rural populations, offering livelihood improvements more directly to rural areas and limiting migration. This is valuable insurance against “excessive” migration that has led to enormous challenges in some cities in other regions, where millions are trapped in chronic unemployment and poverty.

If Myanmar can pursue parallel strategies of agricultural and manufacturing leadership, diversifying toward two core comparative advantages, it will provide insurance against

adverse external demand cycles and lower risks of labor market mismatches that lead to long-term inequality and stagnation. Assuming the Agriculture strategy is successful and incorporates robust FDI, it can be expected that rising productivity will free more workers from rural areas for nonfarm diversification and urban job prospects. Having a higher opportunity cost at home in this scenario, however, limits the risk of mass exodus to urban labor markets that may not be ready to receive them.

For the Manufacturing and Service development strategies, it is just as important to leverage the financial, technology, and demand stimuli offered by FDI partnerships. To assess this potential, our FDI scenario assumes that up to 10 percent of total domestic investment comes from overseas by 2035, with half of this amount going to Agriculture and the rest going to Manufacturing and Services. In this particular scenario, we are evaluating only the incremental 5 percent going non-agriculture. The AgFDI scenario captures the other component.

HUMAN RESOURCE DEVELOPMENT

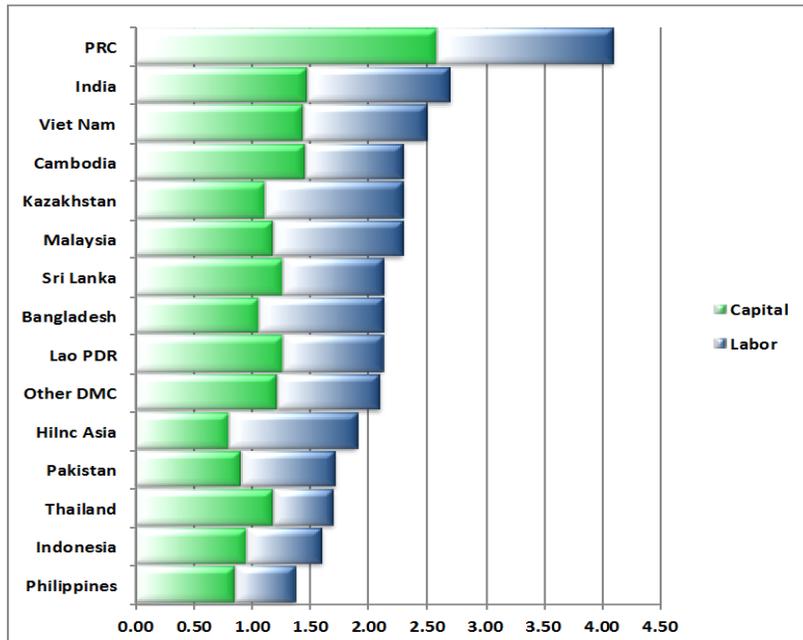
Archaeological evidence establishes a number of locations in the geographic footprint of Burma that represented very high levels of civilization and attendant economic activity. Even though they may not be active today, thriving early commerce in places like Pagan, Mandalay, Ava, and Arakan was supported by highly skilled workers, artisans, and entrepreneurs. Despite this long and rich cultural history, Myanmar's present educational and vocational learning resources need to deliver more globally competitive skills to most of the working population. Especially since the 1980s Myanmar's education system has not kept pace with that of its regional neighbors, and very determined commitments will be needed to close this gap.

Human resources have been the bedrock of successful Asian growth policies, and they will be no less fundamental to Myanmar's efforts to achieve sustained prosperity. In this report, we make no prescriptions about choice of leading sectors, but only emphasize the importance of a balanced reform process that promotes productivity growth and investment incentives across the economy. As **Error! Not a valid bookmark self-reference.** makes clear, economic dynamism across Asia has varied with factor productivity, and these countries owe a large part of their growth successes to more efficient technology and workers.

Although the present report focuses on macroeconomic growth outcomes, it is important for policymakers to be able to assess the potential contributions of individual sectors to aggregate growth dynamics. To elucidate these structural issues, we considered above a series of sector-focused scenarios for factor productivity growth, collecting activities into generic product groups. In each case, we constructed a trend whereby TFP growth of the target sectors rise to meet the GMS average by 2020 and remains there for fifteen years. We further assume this productivity growth has two equal drivers, skill-biased technological change and education, each contributing half of the assumed stimulus in two separate scenarios.

Figure 4: Factor Productivity Growth in Asia, 1999-2008

(percent per annum)



Note: Other Developing Member Country (DMC) refers to ADB membership.

Source: Norojono, Roland-Holst, and Sugiyarto (2014).

Skill – Skills Development

It is a truism that value depends on quality, and quality depends on performance, but labor markets bring this concept to reality in the economic growth process. The quality of human capital, in terms of productivity, is the most fundamental determinant of real wages, livelihoods, and growth. That same quality, in turn, is determined by more complex factors, including education, its private counterpart training, health status, and the efficiency of labor markets in matching workers with productive and skill-appropriate tasks. In this brief analysis, we consider education to be a macro driver of growth via its influence on labor productivity, using the historical experience of Myanmar's GMS neighbors as a reference. This macro perspective oversimplifies the human capital story, but the results on the growth opportunity cost of the current skill deficit are startling and should focus the attention of the policy community on how to expedite progress in this area (see e.g., World Bank 2013).

Educ - Education

Labor productivity can sometimes seem a technical abstraction, but its origins are no secret: education, training, and technology. A vast literature explains education's contribution to growth (see, e.g., T. W. Schultz 1960, 1961, and 1971; Self and Grabowski 2004; Bils and Klenow 2000). While the findings are almost uniformly positive, magnitudes vary by country, level of average educational attainment, and occupation. After an exhaustive survey of empirical work relevant to Asian dynamic export economies, we specified a scenario for Myanmar that reflects success stories in the same region. Generally speaking, East and Southeast Asian economies transitioning from low- to middle- or high-income status over a comparable (approximately 20-year) time period improved education-induced labor productivity at a rate that, for Myanmar, would lead to a 30 percent increase across skill

levels by 2035. Of course, this progress is heterogeneous, depending on initial conditions and the composition of public and private investments in education and training. Elucidating these compositional challenges and impacts would be an important direction for future research, but this will require more intensive data development and analysis.

NOTE ON ENERGY AND TRADE

In all scenarios, it should be noted that we do not change baseline growth of domestic or foreign investment in the energy sector as its long-term prospects remain quite uncertain, depending on resource development, electric power portfolio choice, investments in energy access, etc. These possibilities are too complex to be assessed with one or even a few macro scenarios, and should be the subject of a dedicated study.

Secondly, we have not included trade policy scenarios in this assessment. The reason for this, simply, is the uncertainties associated with data on both trade and protection levels. Despite intensive efforts to use mirror accounting for imputation of unrecorded and informal trade, we have not yet been able to make this consistent with other economic accounts. Moreover, both the scope and stringency of application for Myanmar's tariff and non-tariff trade barriers remain very uncertain, making it difficult to calibrate initial conditions or predict the real consequences of nominal changes. Having said all this, available evidence suggests that most effective protection is in the low single digits, on an *ad valorem* basis. It is apparent that logistical and administrative impediments may be much more important determinants of import and export competitiveness. In any case, rigorous empirical support for trade policy would require a dedicated study.

4. Scenario Results

As described in the last section, after establishing the Baseline dynamic reference over the time horizon of interest (2015-2035), we now compare it to scenarios comprising individual and combined policy initiatives and evaluate the implied economic impacts with the detailed structural model. These effects include changing patterns of demand, supply, incomes, and employment induced by scenario assumptions regarding different policy choices and external events. The resulting impact assessment elucidates opportunities and challenges that the country faces in its transition to a modern market economy that delivers higher living standards to its population. While the actual growth process will depend on many other factors, these scenarios are intended to identify some of the main growth drivers and impacts that can be expected from public and private actions that promote/facilitate them. These core growth drivers, including development strategies for agriculture, industry, services, human and other resources, will be evaluated with the CGE model in a multi-decade dynamic framework.

The general macroeconomic impacts of our 16 policy scenarios are summarized in Table 4. The most arresting general finding is that real GDP could be about two and a half times larger than it would be without reforms, if all policy scenarios were to be pursued. All the policies considered offer some growth advantage over Business-as-Usual, but greater attention to the economy's institutional and resource constraints could lead to much higher real GDP, even more dynamic growth of real household income and consumption, and dramatically higher levels of trade and real wages. Each of the policy scenarios considered here makes a different contribution to these improvements. Individual scenarios are implemented inclusively from top to bottom (1-16), as presented in Table 1.⁶

Although the component trends are somewhat crowded together in Figure 5, the dynamism of Myanmar's growth opportunities is plainly apparent. In Figure 6 a few generic drivers of superior growth can be seen by bundling policies. As mentioned in the scenario list in Table 1, the scenarios were implemented in an incremental manner. From top to bottom of Table 4, we added each scenario specification to all the previous ones. Thus Figure 6 shows results for each of the main growth components: Baseline, Agriculture Development (up to AgFDI), Enterprise Development (up to FDI), and Human Resource Development. The cumulative effect of all scenarios is the same, but these simplified trends identify the primary growth strategy. Baseline growth is moderate (4.25% annually) for an emerging market economy, but determined commitments to sectoral development can sustain much higher rates. It has been emphasized throughout this study that agriculture is a sustainable core growth driver, and we see here that (in combination with directed FDI) it can actually contribute nearly half the overall growth potential of reform, roughly doubling Baseline GDP growth by 2035.

⁶ Thus for example, Educ includes all the previous scenarios. Incremental contributions of each policy package are examined further below. We also experimented with different sequencing and incremental contributions are independent of this.

Few other Asian economies are in a position to do this. China has over half the world's population, but only 7 percent of the farmland (and this area is shrinking). Vietnam has half Myanmar's land area and twice its population. With unusually high levels of arable land per capita, Myanmar can be an essential contributor to the region's dynamic agrifood trade expansion.

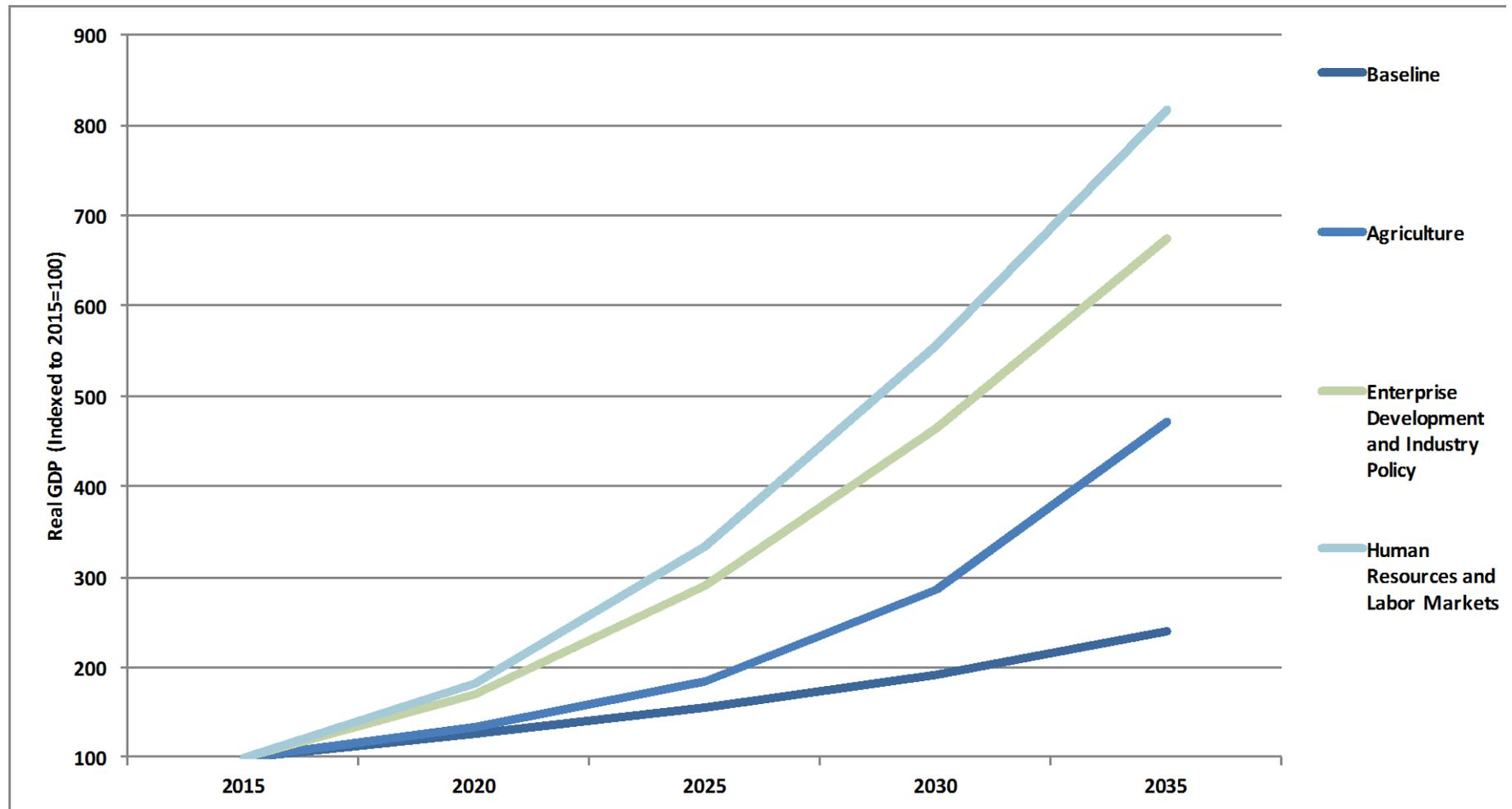
Table 4: Incremental Macroeconomic Impacts of Policy Reforms

<i>% change from Baseline in 2035</i>	Real GDP	Household Real Income	Real Consumption	Exports	Imports	Real Wage	Revenue
AGRICULTURE							
1. Rice	2	1	5	0	0	3	1
2. AgProd	11	5	19	5	5	12	5
3. AgVA	24	6	16	37	20	11	5
4. MAC1	20	13	14	37	31	16	10
5. MAC2	3	3	3	4	5	4	2
6. AgFDI	36	17	15	67	47	28	17
ENTERPRISE DEVELOPMENT AND INDUSTRY POLICY							
7. EntRes	8	37	29	-9	10	35	36
8. EntLgt	2	1	2	1	1	1	0
9. EntMfg	4	2	3	2	0	4	1
10. EntTour	8	2	6	7	5	0	2
11. EntPrSr	14	9	14	13	8	16	6
12. Infra	26	135	131	21	178	207	426
13. Credit	11	27	41	26	16	39	403
14. FDI	13	40	29	1	97	90	141
HUMAN RESOURCES AND LABOR MARKETS							
15. Skill	32	39	27	47	56	64	114
16. Educ	29	37	22	47	54	59	107
SUBTOTALS							
Agriculture	96	45	72	150	108	74	40
Ent. Develop	86	253	255	62	315	392	1015
HR & Labor	61	76	49	94	110	123	221
Total	243	374	376	306	533	589	1276

Enterprise development strategy has an equally important parallel role to play. This approach sets in motion more traditional forces of dynamic manufacturing and service sector development, fueled by a combination of non-agricultural productivity growth, infrastructure investment, economy-wide financial modernization, and FDI promotion. As indicated, this contributes almost as much as realizing the potential of Myanmar's agrifood economy. Finally, the human resource development scenarios remind us that, beyond traditional sector promotion, the full promise of this resource-rich economy can only be realized by investing in its human resources.

Figure 6: Real GDP Impacts of Policy Packages (Simplified by Scenario Group)

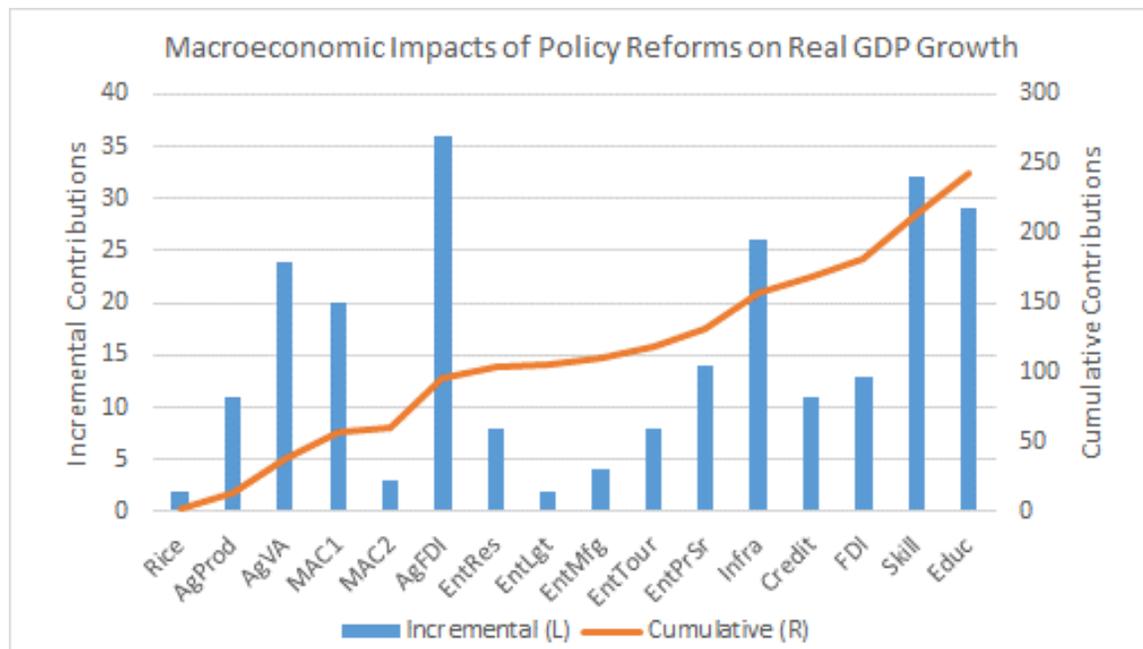
(percentage change from Baseline values in 2035)



Certainly, Myanmar’s very challenging initial conditions hold the promise of low wage competitiveness, utilized by other Asian economies as a stepping stone into labor-intensive, export-oriented manufacturing, but this is something no one has reason to envy in the long run. Low-wage comparative advantage can eventually become a low-income trap, as unhappy experiences around the developing world remind us. Only sustained commitments to rising skills will carry the economy toward the middle income status that it deserves and, according to our estimates, can attain.

Deeper insights into the country’s growth drivers can be obtained by closer inspection of the individual reform scenarios. Results until now have been presented mainly in a sequential and cumulative fashion, aggregating policy measures from Agriculture to Human Resources. We are reminded of the cumulative benefits of this in the red line and right-hand axis of Figure 7, which depicts real GDP growth above Baseline by 2035. By comparison, the blue columns and left-hand axis indicate the individual contributions to GDP growth of each reform scenario on the horizontal axis (just as in Table 4). The largest individual, incremental GDP growth contribution comes from increasing the share of FDI to agriculture (36%), whereas the next two most important contributions come from skill development change (32%) and education (29%), followed by the contribution from infrastructure expansion (26%). It should be observed, however, that a comprehensive enterprise policy, such as export-oriented, manufacturing growth along the lines of a traditional Asian Miracle economy, combined with domestic (services) and externally oriented (tourism) sector promotion, would combine the individual enterprise scenario benefits for a dividend of about 36 percent, roughly equal to the return on comprehensive agrifood sector development. This again suggests that a dual track development policy, leveraging both agrifood and more traditional dynamic Asian sectors, is the right approach for Myanmar.

Figure 7: Cumulative and Incremental Real GDP Growth, by Scenario
(percentage change from Baseline in 2035)



Agricultural Development

Thus, for example, the economy would be growing nearly twice as fast as Baseline under the combined agricultural strategies, but the final scenario in this group (AgFDI) makes the biggest single contribution (about 36%, measured on the left axis of Figure 7).

Looking at these components of agrifood reform, several insights suggest themselves. Firstly, rice is an essential commodity for the nation, always has been and always will be. Beyond national self-sufficiency and food security, however, its potential to contribute to overall economic growth is severely limited in comparison to alternatives. While rice yields in Myanmar could probably be increased substantially, the potential of this crop for income growth is severely limited by the unresponsiveness of cereal demand to income growth in the rest of the national and regional economy. This essential point must be made against interests who simply want to continue the dominance of cereal production and, thereby, poverty. Rice may be essential to subsistence, but Myanmar must outgrow subsistence to satisfy the natural aspirations of its people, and a product with zero income elasticity will never achieve this. Experience elsewhere (e.g., Thailand and Philippines) suggests that expanding rice cultivation only enriches processors and exporters, rarely contributing anything significant to poverty alleviation and actually aggravating inequality. Dreams of Myanmar as the rice bowl of Asia should remain just that, as this nation follows its most prosperous neighbors to modernized, higher value-added agriculture. This dream would actually become a nightmare if subsidy policies increase acreage commitments to this crop, displacing higher value fruits, vegetables, and even forest land.

Upside opportunity for agrifood development really begins with higher productivity and product diversification. Remembering that higher yields are the same as more farmland, it is easy to see why this path leads to dramatically higher income. Myanmar has ample farmland per capita for the Southeast Asian region, but holdings are still small by upper middle-income standards and productivity is extremely low, as use of advanced technologies (e.g., improved seeds and agrichemicals, greater water control, and mechanization) remains minimal in the country. Increasing value-added, via self-directed measures⁷ such as market-directed diversification and higher product quality, can contribute substantially to income growth, along with higher yields. This step has been essential in most early agricultural reforms.

When China abandoned the Iron Rice Bowl policy in the early 1980s, farmers knew exactly what to do, shifting their limited investment resources from dead-end cereals to higher value (and income elastic) specialty vegetables, fruits, and livestock. The result was the first great wealth transfer in Chinese history, from urban consumers to farmers. Enriching the country's rural poor majority suddenly made the reform agenda extremely popular, and

⁷ By “self-directed measures,” we mean independent farmer decision-making, as opposed to being told by authorities what to do. Being able to make good farming decisions requires access to, information about, and understanding of new opportunities and technologies.

provided the momentum needed to overcome hardliners and protectionists, carrying market reform and privatization to the urban areas.

Myanmar has its own political economy of reform, but the opportunities to break out of cereal-dominated subsistence are the same. If agronomic initiatives are combined with improved market access (MAC1 and MAC2), the rural sector can achieve something most sought-after in low-income countries: self-directed poverty reduction. Although it is a truism that low-income countries cannot afford transfer-based poverty reduction schemes, many have impoverished themselves using public funds this way directly and indirectly (via price subsidies). Even if such schemes do not run up unsustainable budget deficits, they still have an opportunity cost, robbing the general population of essential public goods and services. It is far better to focus on overcoming information and market access failures, allowing the very enterprising poor to improve their own lot and secure the nation's food supply.

In addition to necessary domestic market reforms and efficiency improvements, Myanmar agriculture could significantly expand its contribution to the overall economy with the agency of FDI. As already emphasized, this external growth catalyst offers an elastic supply of investment resources, state-of-the-art technologies that are largely or wholly absent now, and access to the world's largest and most affluent (i.e., highest value-added) food markets. It is no surprise, then, that the AgFDI scenario makes the largest contribution to national growth from among the agricultural development scenarios. Even though we must acknowledge that the mechanism is only unlocking the riches of the nation's resource base, it does in a few decades what required more than a century in Europe and the United States. Surely this accelerator effect justifies a determined approach to negotiating greater foreign participation in this sector. The experience of successful economies in the region (e.g., Thailand and Taiwan) clearly demonstrate that this strategy can be pursued in a manner that benefits both sides and dramatically improves the entrepreneurial prospects for host country sector interests.

Examples around the region provide ample precedence for public and private initiatives to improve the investment climate. Most of the later Asian Tiger economies benefitted substantially from the agency of export partners. Myanmar not only has the opportunity to emulate these bilateral strategies, it can also join the ever-expanding web of multilateral Asian regional supply chains that permeate East and Southeast Asia (Roland-Holst 2003). In the context of agriculture, the NESAC White Paper offers a variety of strategies to promote more intensive and extensive partnerships through supply chain development.

Enterprise Development

Like agriculture, enterprise development can make an important contribution to long term and sustainable growth, but the dynamics are quite different. As Figure 7 indicates, the sector productivity policies for enterprise/sector subgroups are more limited in their direct growth dividends, but together they are very close to agrifood in overall growth potential. As we have already noted, Myanmar is rich in natural resources, but its initial capital and labor resources are limited by a combination of low incomes and average education levels. Further constraints take the form of substantial barriers to domestic and international market access faced by firms across the country, leading to very high trade and transport margins outside the greater Yangon municipality.

In the absence of measures to relieve these constraints, enterprise promotion stimulates growth essentially in proportion to initial value-added shares of GDP. The energy and mineral sectors contribute about a third to GDP and a similar share to enterprise growth potential, while the biggest contribution to GDP and growth comes from services because they constitute over 40 percent of Baseline GDP (services also have much lower trade and transport cost shares). If the country is really determined to establish a parallel growth dynamic in the enterprise sector, this will require following through with measures to overcome economy-wide constraints, including infrastructure investments to lower trade and transport margins. The infrastructure component makes the biggest contribution to the enterprise development strategy simply because it improves market access, expanding the horizon for profitable enterprise investment in all directions. Moreover, it mostly benefits emerging sectors like manufactures which need to be embedded in regional and global supply chains to grow significantly.

The final constraint to overcome is financial resource access and allocation. Without greater availability of investible funds, as well as the technology and market access that come with FDI, domestic enterprises will be starved for the resources they need to get off the low-wage, labor-intensive treadmill. It must also be emphasized that simply making deals with foreign interests will not deliver inclusive growth without equitable domestic capital allocation and local private enterprise partnership. In terms of aggregate growth potential, the quality of domestic credit allocation is almost as important as FDI itself, and the record for state enterprises in this regard is almost universally disappointing. Because of soft budget constraints and “social” objectives such as local employment maximization, state-owned enterprises rarely approach optimality in investment choices and financial management more generally. In this way, they generally make inferior partners for foreign investors. Despite their ability to use political connections to facilitate deals and overcome administrative hurdles, their rent-seeking behavior seriously compromises efficiency, productivity, investment quality, and loan performance. This is hardly surprising to anyone with experience in countries that experience international resource development with corruption, but the problem is more general. It hardly matters how much money is available for business if a lion’s share goes to loss-making, low productivity (read “resource-wasting”) enterprises that have to be subsidized by everybody else.

As a summary observation, sustainable prosperity also relies on the domestic supply side of capital markets. It is essential that innovation, efficiency, and decentralized-diversified risk taking be rewarded. It is just as important in the long run, however, to have a financial system that disciplines credit allocation, sustaining depository returns that can recruit and retain rising domestic saving resources.

Human Resource Development

The macroeconomic results for education and skills development show how human resource development and resulting labor productivity reinforce the basis for sustained growth from agriculture and enterprise development. These results actually understate the importance of these two drivers, readiness of the labor force for training and effective pairing of workers with complementary capital investments. Indeed, many of the previous scenarios assumed these features of the labor force were in place, so it is a bit artificial to disentangle them.

It is worth emphasizing too that these scenarios reflect a fundamental characteristic of the **dynamic Asian growth experience – skill-based development**. Unlike resource-intensive economies in Latin America and Africa, for example, Asian enterprise development has gone hand-in-hand with skill-based labor force development, striving for ever higher productivity and the lower unit costs that this delivers. Perhaps an unintended, but socially beneficial, consequence of this strategy has been the conferral of specific skills on workers themselves, who are thereby more mobile, more adaptable, and eligible for higher wages as they offer and re-offer these improving skills to the labor market. A skill-endowed labor force thus establishes the basis for an emergent middle class, as will be discussed in the next section.

The Pathway to Sustained Prosperity – A Middle-Income Society

The 16 indicative policy scenarios clearly demonstrate Myanmar's growth potential, but sustained realization of that potential will require more than innovative reforms that change the initial conditions for broad-based market development, inclusive enterprise participation, and human resource development. The current government recognizes this need for a new beginning, but the ultimate fulfillment of the nation's material aspiration, attainment of upper middle-income status, will require sustained commitment to inclusion in the growth process across a diverse and spatially dispersed population over decades. Only by extending participation in dynamic market-driven growth to the majority of its population, enterprises private and public, workers young and old, of every social group and region, can Myanmar complete this economic transition. Any other pathway will lead to lower growth and greater social polarization.

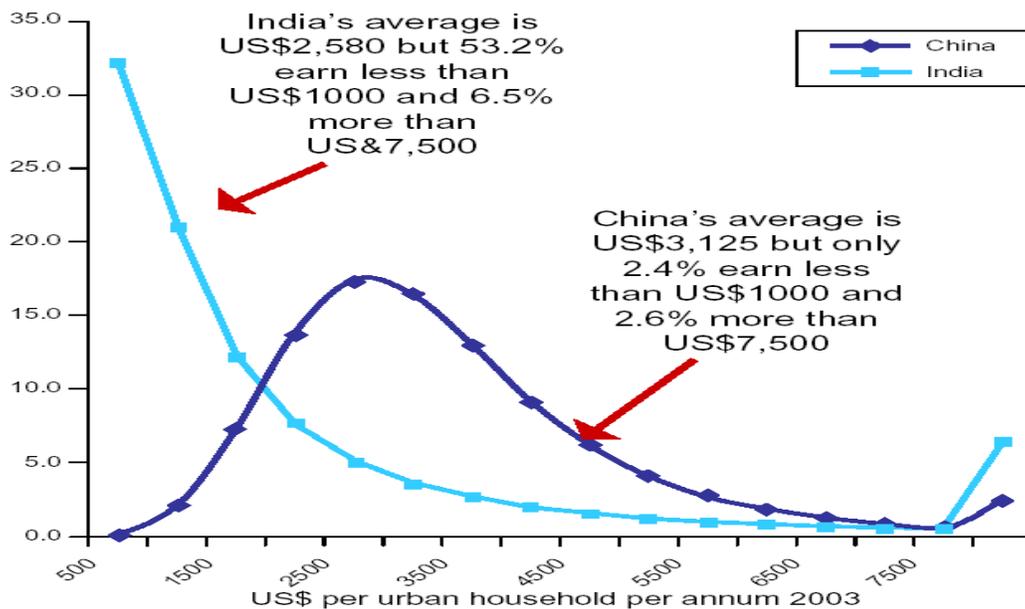
Broad-based initial reforms are a necessary beginning, but to better understand the sufficient conditions for middle-income transition, it is useful to consider the three main structural characteristics of higher income economies.

1. **Domestic consumption is the primary source of demand** - OECD and upper middle-income economies draw their primary growth stimulus from domestic demand. Exports are important demand sources for most economies in this era of globalization, but for higher income economies the dominant and sustaining source of growth is internal, a core of middle-class home consumption that for OECD economies comprises more than two thirds of total demand and grows with investment commitments to future supply. Because this demand is also the source of most employment, it is the engine of sustainability, varying with the business cycle but otherwise much more reliable and manageable than external demand.
2. **Higher income economies are ownership societies** – Countries with middle-class majorities are distinguished by extensive private and individual asset ownership, especially property and durable goods. Moreover, their levels of income are sufficient (given fiscal and social commitment) to finance the complementary public goods and services (electricity, roads, sanitation, etc.) needed to make these assets productive and preserve their value. The same fiscal resources can also be dedicated to human resources, including education and health services. All these are essential to sustain the virtuous cycle of a productive and peaceful civil society. These characteristics are starkly contrasted in Figure 8, which shows distinctly different urban income distributions in China and India. Although average urban incomes are comparably

low, the graph highlights a distinctly middle class in China, compared with India's income concentrated among the very poor, with a small tail at the upper end that brings up the average. Most Chinese urbanites are functionally middle class in the sense that they have discretionary income to spend every day, as well as income to finance more broad-based asset holding as well as public goods and services. These characteristics not only confer higher median living standards in the present, but imply much greater potential for sustained and inclusive future growth.

3. **Higher income means higher savings and investment** – An essential requirement for sustaining prosperity is the development of savings and financial institutions that effectively mediate systemic uncertainties and support profitable long term private saving and investment. Only with efficient financial services can savings be recruited, retained, and channeled into productive investment that provides for growth of future employment and real wages.

Figure 8: Urban Income Distribution in China and India

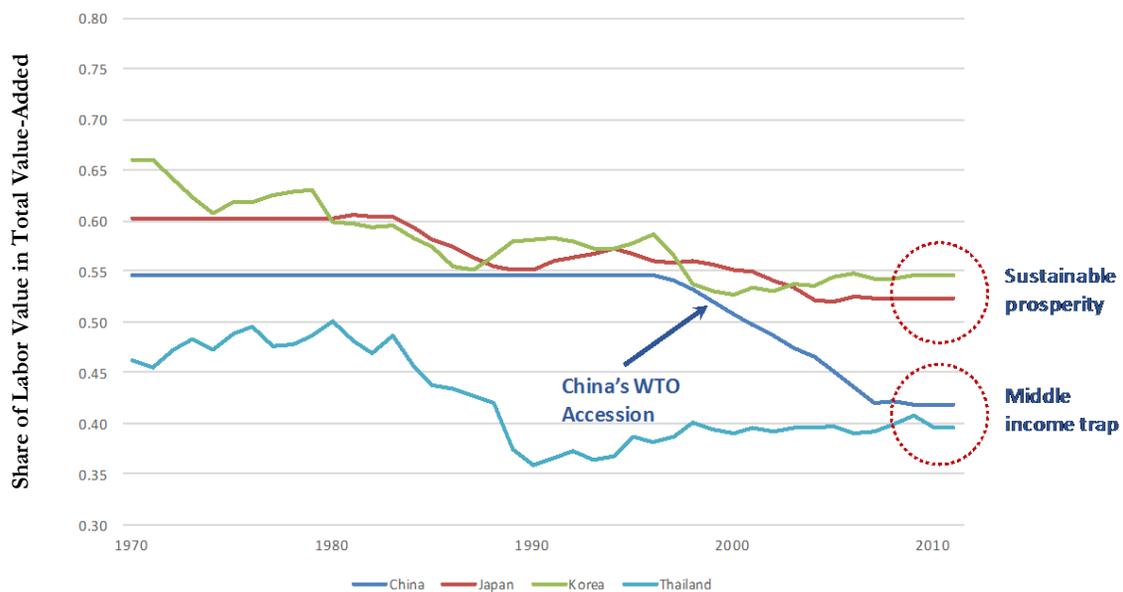


Source: World Bank Living Standards Measurement Survey data.

Our assessment of Myanmar's endowments, structure, and opportunities indicates clear potential to achieve upper middle-income status, but much has been written about Asia and other developing regions expressing concern about completing this transition. Sometimes referred to as the "middle-income trap," this dilemma arises when an emerging economy loses growth momentum. There are a few versions of this story (for example, Rodrik 2013), but the basic idea is that, while still relying on external demand, an economy's wage improvements may undermine export competitiveness, market share, and growth prospects. If the pace of GDP growth and real wage improvement falter, a country may not see domestic demand assume its ultimate role as the economy's dominant long-term growth driver. Such economies are then at risk of continued exposure to external market cycles, without the macroeconomic management tools or domestic fiscal resources to complete their transition to prosperity.

Figure 9 illustrates this kind of systemic risk in a way that also suggests how to overcome it. Modern trends in the value-added accruing to labor are shown in four Asian countries, two OECD members (Japan and Republic of Korea) and two successful, middle-income economies (China and Thailand). These trends show labor's share of GDP over the last generation. Despite greater similarity in the early years, stark differences are noted in the last decade. In Thailand and China, higher labor valued-added shares gave way to higher retained profits during strong entrepreneurial growth phases, in the 1980s for Thailand and post-WTO accession (2000s) as China joined the world economy. During these periods, enterprises expanded dramatically, capturing higher risk premia, while employing workers from very elastic supplies of low-wage, rural labor. In Japan and Korea, in contrast, maturing of dynamic industrialization led to modernization of labor relations, which in turn led to negotiation by workers and employers of productivity-based compensation and incentive-based recruitment and retention practices. Both of these practices, in turn, sustained substantially higher shares of value-added going directly to workers, households, and domestic consumption in Japan and Korea.

Figure 9: Cutting the Cake - Middle-Income Transition



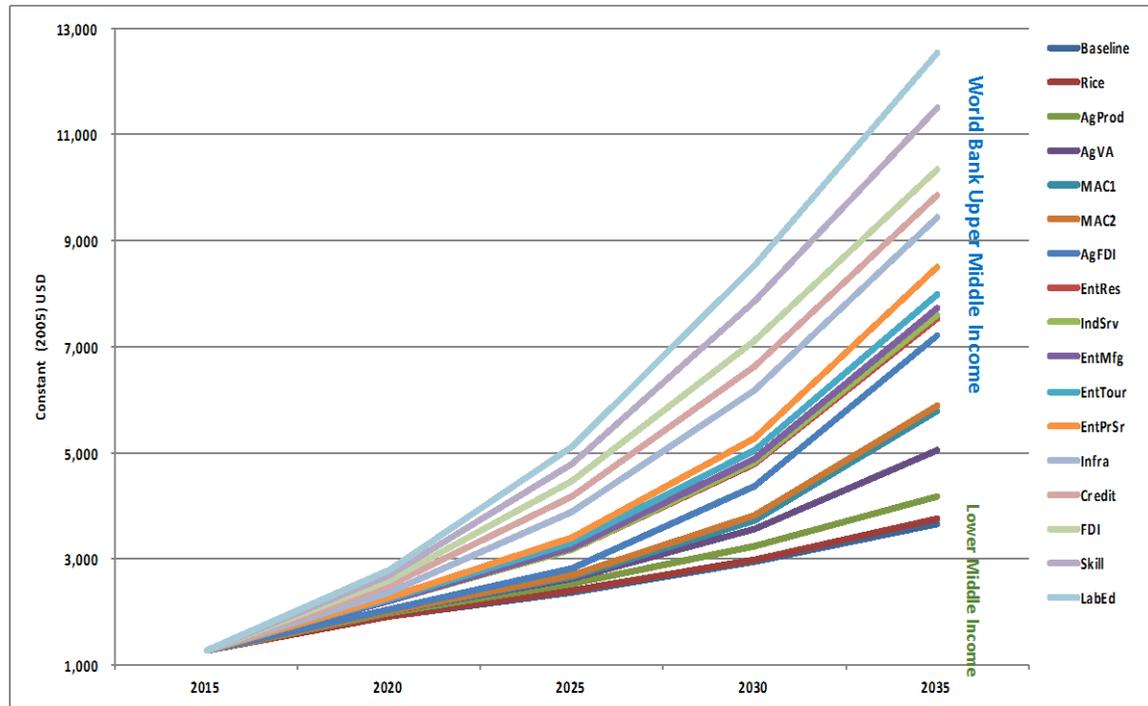
Source: Penn World Tables, 2016.

This redistribution of domestic value-added, sometimes the product of social consensus and sometimes the result of difficult bargaining, has completed the upper middle-income transition for all OECD economies, in Asia and elsewhere. Myanmar can follow this course, but its institutional environment must support this and facilitate transition from the low-wage, “factory economy” model of low-income, export competition to modern, productivity and incentive-based employment practices that draw their long-term competitiveness from innovation and ever increasing product quality.

Can Myanmar do it? Our assessment of growth potential suggests that it can. Moreover, the scenario results in terms of per capita income (Figure 10) show that the country could attain upper middle-income status within two decades. Note also that this would not require

faultless execution of all 16 policy initiatives in these scenarios, but could result from a combination of partially fulfilled policy packages even earlier. For example, Figure 10 shows that the agrifood development component alone would deliver middle-income status, although this would probably be less inclusive and balanced as a national strategy. In any case, these results indicate that the rewards of transition to sustained prosperity are within reach of a government that can commit to long-term, disciplined institutional reform and market-oriented modernization.

Figure 10: Real GDP Impacts of Policy Packages
(percentage change from Baseline values in 2035)



Household Level Results

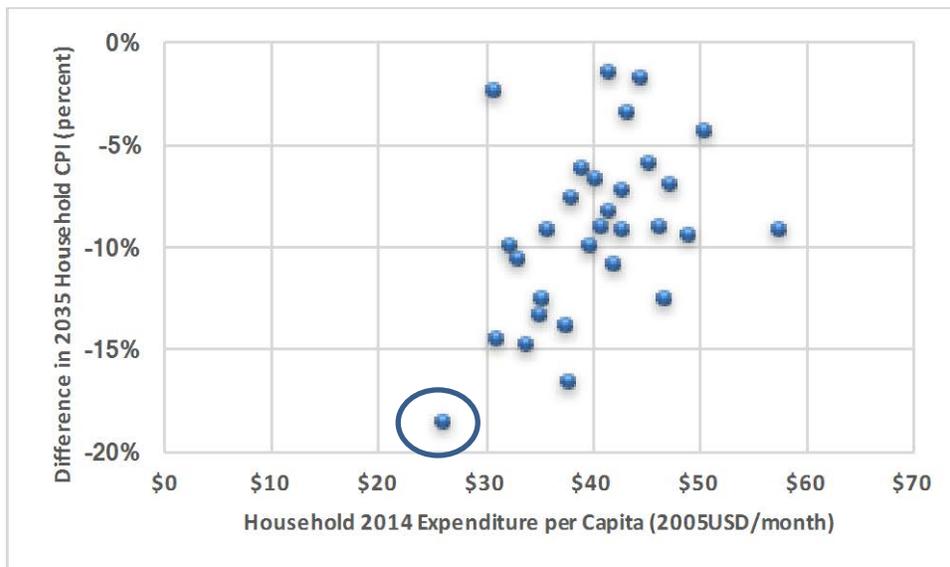
As indicated in Appendix 2 below, we have been updating the Myanmar CGE to assess more detailed distributional characteristics of growth. One important extension has been to disaggregate the Baseline data set of household expenditures from the 2014 national living standards survey. This data set disaggregates household expenditure by province and rural-urban status, but it unfortunately does not identify detailed income and employment characteristics. We continue trying to improve calibration of the latter, but expenditure data still permit some welfare assessment in addition to economy-wide real income, consumption, and wage changes. For example, the model calculates consumer price indices (CPIs) for each household type with respect to Baseline consumption and purchaser prices.

Considering welfare effects, purchasing power for households is driven by income and price changes. In Figure 11 and Figure 12 we see the dramatic potential for household income growth across the country. Monthly per capita real expenditure is on the horizontal axis, measured at base year (2014) levels in 2005 U.S. dollars (USD). Using our detailed household

expenditure information, we can assess price effects on purchasing power in much greater detail (i.e., for rural and urban households for each province).

In the figures below, the vertical axis measures changes in household-specific CPIs,⁸ as percent deviations from Baseline values in 2035. Some economic growth processes leave the poor behind as inequality and commodity prices are driven up with average incomes and resource constraints. Figure 11 shows that this need not happen if a primary development target is investment in agrifood productivity. As embodied in the AgFDI scenario, these supply-oriented reforms lower real consumption costs for all households, but especially for the poor who spend the largest share of their income on essential food commodities. For example, as circled in the figure below, households spending less than USD 30 per month see the largest reduction in their household cost-of-living index, a decline of more than 20 percent, as a result of the AgFDI scenario. Thus the AgFDI strategy is both pro-food security and pro-poor, meeting two essential conditions for national security and inclusiveness.

Figure 11: Household Cost-of-Living Changes are Pro-Poor
Impact of the AgFDI Scenario

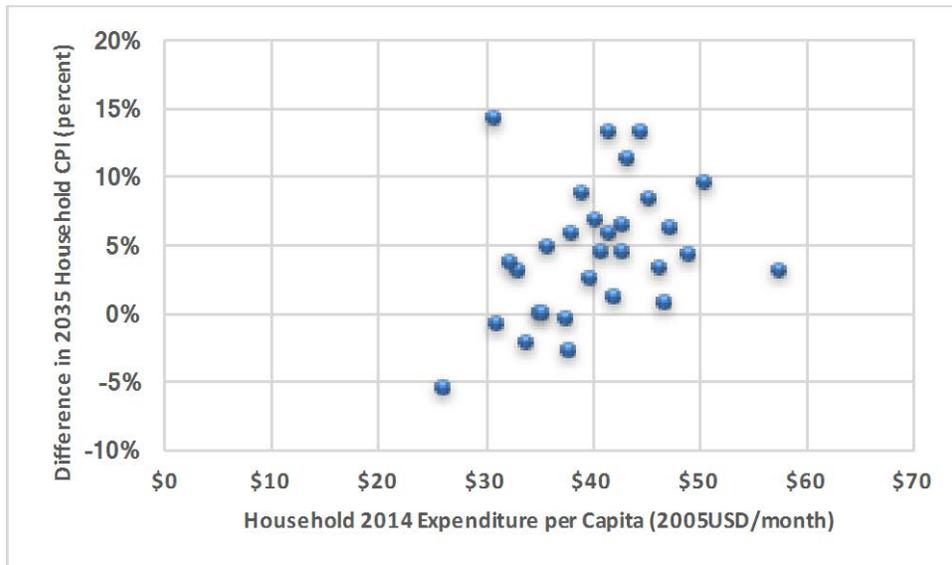


In Figure 12, which depicts the cumulative impacts of the full set of policies, cost-of-living impacts are largely positive, not negative as seen in Figure 11. Resource constraints drive up average prices, reflected in modestly higher CPIs for the majority of households. However, it should be emphasized that these increases are negligible compared to the income and real wage gains recorded for the same policies (last row of Table 4 and Figure 10). In any case, as Figure 12 makes clear, household price effects measured by the CPI are still pro-poor

⁸ The term household-specific CPI refers to Consumer Price Indices, calculated with annual average retail prices, weighted by expenditure shares for each individual household type. For example, low income household CPI's will be sensitive to food price variation, since over half their expenditure is on these essential commodities.

(positively correlated with Baseline incomes) and actually increase real purchasing power for most of the lowest income groups.

Figure 12: Household Cost of Living Changes – Aggregate Impacts of All Scenarios



5. Conclusions and Extensions

This report presents estimates of Myanmar's long-term growth prospects. Considering a total of 16 different policy scenarios for inclusion in the country's overall reform and development strategy, our results suggest that this resource-rich economy can deliver sustained and inclusive prosperity to its people within a generation. Indeed, our forecasts offer a variety of pathways that, if supported by determined policy commitment and institutional reform, can bring Myanmar to upper middle-income status within two decades.

The most potent catalysts for dynamic and inclusive growth in Myanmar are four:

1. Parallel commitment to agrifood sector development as well as traditional, labor-intensive manufacturing. Our estimates suggest that agrifood and enterprise development can make roughly equal contributions to long-term growth.
2. Sustained commitments to higher labor productivity, including ambitious private sector skill development.
3. Determined commitments to enterprise development and financial reforms, including equitable domestic capital allocation, more open capital accounts, and modernization of domestic financial services.
4. Broad-based expansion of productive infrastructure development and improved domestic and international market access, with comprehensive and determined commitments to national economic integration and border/regional trade facilitation.

Perhaps most unique among these leading growth drivers is Myanmar's agrifood potential. Myanmar has a very strong comparative advantage in this sector, hindered today by very low productivity levels and dominant cereal production. Supply-side development strategies for agrifood, including product diversification, productivity growth, improvements in market access, and external investment partnership can transform the sector from subsistence to one of the primary drivers of long-term prosperity. Moreover, because the sector is the home to the majority of Myanmar's labor resources and the overwhelming majority of poor households, promotion of this sector is essential to inclusive economic progress.

What we see in this case is an enhanced Lewis growth trajectory, where low productivity labor can be released for urban and export industrialization, yet the resource potential of Myanmar's rural sector could support dynamic growth there as well. With the right combination of agrifood diversification and FDI partnerships, technology transfer, skill development, and external market access can propel growth of agrifood in parallel with industrialization. As in other Asian agrifood success stories (Thailand, etc.), comprehensive national strategies to improve market access and promote domestic and international investment can achieve self-directed poverty reduction for the country's rural poor, without the dislocation of large scale migration. To achieve this, three priorities must be incorporated into policy reforms:

1. Agricultural diversification

2. Secure property rights for smallholder majorities
3. Productivity growth and facilitation of market access

Although dynamic and inclusive growth in Myanmar will be distinctive for its reliance on agrifood development, more traditional “Asian Miracle” drivers, including manufacturing and service sector modernization, must also play a role. As is now well known, this requires aggressive engagement with external markets and investors, making it essential to facilitate three institutional commitments, all of which will be needed to make Myanmar’s economic reforms credible internationally:

1. Regional supply integration with open multilateralism
2. Capital account liberalization
3. Transparent property rights and enforceable contracts

The fundamentals discussed above establish a solid basis for a more productive and diversified economy, but to sustain this momentum and achieve upper middle income status, Myanmar needs to fulfill three more conditions:

1. Broaden commitments to skill-intensive development, including accelerated investments in formal education and training programs
2. Promote productivity-based compensation and employment practices
3. Promote financial reforms that facilitate broad-based, domestic enterprise investment, a climate hospitable to international investors, and more efficient risk management and household savings allocation.

The objective of this report was to offer macroeconomic estimates regarding policy options for relatively generic sector development strategies. These indicative results illustrate the country’s overall potential, but supporting the implementation phase for dynamic growth will require more detailed policy research. From this point, a variety of extensions to the present work would be beneficial, including but not limited to the following:

1. More detailed assessment of strategic sectors
2. Human resource and demographic conditions, including more detailed and timely data on initial conditions, migration issues, etc.
3. A simplified model for capacity building: less technical scenario tool/app with a graphic user interface

References

- Aghion, P. and P. Howitt. 2008. *The economics of growth*. Cambridge: Massachusetts Institute of Technology Press.
- Amiti, Mary and Beata S. Javorcik. 2008. "Trade costs and location of foreign firms in China." *Journal of Development Economics*, 85, 1–2 (February): 129-149.
- Anderson, James E. and Eric Van Wincoop. 2004. "Trade costs." *Journal of Economic Literature* 42, 3: 691-751.
- Arora, S. 1999. "Health and Long-Term Economic Growth: A Multi-Country Study." Ph.D. Dissertation, Ohio State University.
- Asian Development Bank. 2007. "ADB's Infrastructure Operations: Responding to client needs." Manila: ADB.
- Asian Development Bank Institute (ADBI). 2009. "Demand for Infrastructure Financing in Asia 2010–2020." ADBI Internal Report (prepared by Centennial Group Holdings). Tokyo: ADBI.
- Asterious, D. and G. M. Agiomirgianakis. 2001. "Human Capital and Economic Growth: Time Series Evidence from Greece." *Journal of Policy Modeling* 23: 481–89.
- Awokuse, Titus O. 2003. "Is the export-led growth hypothesis valid for Canada?" *Canadian Journal of Economics/Revue canadienne d'économique* 36, 1: 126-136.
- Bairoch, P. 1988. *Cities and Economic Development from Dawn of History to Present*. Chicago: University of Chicago Press.
- Balassa, Bela. 1978. "Exports and Economic Growth: Further Evidence." *Journal of Development Economics* 5, 2: 181-189.
- Balasubramanyam, Venkataraman N., Mohammed Salisu, and David Sapsford. 1996. "Foreign Direct Investment and Growth in EP and IS countries." *The Economic Journal*: 92-105.
- Barker, D. J. P., ed. 1991. *The Childhood Environment and Adult Disease*. Ciba Foundation Symposium. London: John Wiley and Sons.
- Barro, Robert J. "Economic growth in a cross section of countries." NBER Working Paper No. w3120. Cambridge, MA: National Bureau of Economic Research, 1989.
- _____ and J. Lee. 1994. "Sources of Economic Growth." Carnegie-Rochester Conference Series on Public Policy. Cambridge, MA: MIT Press.
- _____ and Xavier Sala-i-Martin. 1992. "Convergence." *Journal of Political Economy*: 223-251.
- Becker, Gary S. 1975. *Human Capital: A Theoretical and Empirical Analysis*. New York: Columbia University Press and National Bureau of Economic Research.

- Bhargava, A., D. T. Jamison, L. J. Lau, and C. J. L. Murray. 2001. "Modeling the Effects of Health on Economic Growth." *Journal of Health Economics* 20, 3: 423–40.
- Bhattacharyay, B.N. 2008. "Demand for regional infrastructure in Asia and the Pacific: 2010–2020." Background paper prepared for ADB/ADB I Flagship Study, Infrastructure for a Seamless Asia, Tokyo: ADBI.
- _____. 2010. "Institutions for Asian connectivity." ADBI Working Paper No. 220, Tokyo: ADBI.
- _____, M. Kawai, and R.M. Nag, eds. 2012. *Infrastructure for Asian Connectivity*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing.
- Bils, M. and P. Klenow. 2000. "Does Schooling Cause Growth?" *American Economic Review* 90, 5: 1160–83.
- Bloom, David E. and David Canning. 2000. "The Health and Wealth of Nations." *Science*. 287 (5456): 1207–209.
- _____ et al. 1998. "Geography, demography, and economic growth in Africa." *Brookings Papers on Economic Activity* 2: 207-295.
- _____, David Canning, and Jaypee Sevilla. 2004. "The effect of health on economic growth: a production function approach." *World Development* 32, 1: 1-13.
- _____ et al. 2010. "The contribution of population health and demographic change to economic growth in China and India." *Journal of Comparative Economics* 38, 1: 17-33.
- Borensztein, Eduardo, Jose De Gregorio, and Jong-Wha Lee. 1998. "How does foreign direct investment affect economic growth?" *Journal of International Economics* 45, 1: 115-135.
- Brooke, A., D. Kendrick, and A. Meeraus. 1992. *GAMS: A User's Guide*, Release 2.25. Danvers, MA.
- Calderón, César, and Luis Servén. 2005. "The Effects of Infrastructure Development on Growth and Income Distribution." World Bank Policy Research Working Paper 3643. Washington, DC: World Bank, June.
- Cameron, J. 2012. "Asia tackles infrastructure financing." Hong Kong, China: HSBC.
- Central Statistical Organization. 2003. *Statistical Yearbook*. Yangon, Myanmar: Ministry of National Planning and Economic Development.
- Chhor, Heang, et al. 2013. "Myanmar's moment: Unique opportunities, major challenges." McKinsey Global Institute, June.
- Coelli, T. J. and D. S. P. Rao. 2005. *Total Factor Productivity Growth in Agriculture: A Malmquist Index Analysis of 93 Countries, 1980–2000*. John Wiley & Sons, New York.
- Coleman, David. 2013. "Twilight of the Census." *Population and Development Review* 38, 1 (February): 334-351, 338.

- Costa, D. L. and R. H. Steckel. 1997. "Long-Term Trends in Health, Welfare and Growth in the United States." In R. H. Steckel and R. Floud, eds. *Health and Welfare During Industrialization*. Chicago: University of Chicago Press.
- Dar, Atul, and Sal Amirkhalkhali. 2003. "On the impact of trade openness on growth: further evidence from OECD countries." *Applied Economics* 35, 16: 1761-1766.
- Dasgupta, P. 1993. *An Inquiry into Well-Being and Destitution*. Oxford: Oxford University Press.
- De Long, J. Bradford, and Lawrence H. Summers. "Equipment investment and economic growth." No. w3515. Cambridge, MA: National Bureau of Economic Research, 1990.
- De Mello, Luiz R. 1999. "Foreign direct investment-led growth: evidence from time series and panel data." *Oxford Economic Papers* 51, 1: 133-151.
- Easterlin, R. A. 2000. "The Worldwide Standard of Living since 1800." *Journal of Economic Perspectives* 14, 1: 7-26.
- Eaton, J. and S. Kortum. 1996. "Trade in ideas Patenting and productivity in the OECD." *Journal of International Economics* 40, 3: 251-278.
- Egretau, R. 2012. "The Burmese Jade Trail: Transnational Networks, China and the Relative Impact of International Sanctions on Myanmar's Gems." In N. Cheesman et al., eds. *Myanmar's Transition: Openings, Obstacles and Opportunities*. Singapore: Institute of Southeast Asian Studies.
- Eichengreen, Barry, Dunghyun Park, and Kwanho Shin. 2013. "Growth Slowdowns Redux: New Evidence on the Middle-Income Trap." NBER Working Paper No. 18673. Cambridge, MA: National Bureau of Economic Research, January.
- Esfahani, Hadi Salehi. 1991. "Exports, imports, and economic growth in semi-industrialized countries." *Journal of Development Economics* 35, 1: 93-116.
- Färe, Rolf et al. 1994. "Productivity Growth, Technical Progress, and Efficiency Change in Industrialized Countries." *The American Economic Review*. 84(1): 66-83. March.
- Felipe, J. 2013. *Asia's Transformation: Where to, How, and How Fast? Report for Key Indicators 2013*. Economic Research Department, Asian Development Bank. Manila.
- Florio, Massimo. 1997. "The Economic Rate of Return of Infrastructures and Regional Policy in the European Union." *Annals of Public and Cooperative Economics* 68, 1: 39-64.
- Fujita, K. and I. Okamoto, eds. 2009. *The Economic Transition in Myanmar after 1988: Market Economy versus State Control*. Singapore: National University of Singapore Press.
- Ghartey, Edward E. 1993. "Causal relationship between exports and economic growth: some empirical evidence in Taiwan, Japan, and the US." *Applied Economics* 25, 9: 1145-1152.
- Goletti, F. 1999. "Agricultural Diversification and Rural Industrialization as a Strategy for Rural Income Growth and Poverty Reduction in Indochina and Myanmar." MSS Discussion Paper No. 30. Washington: International Food Policy Research Institute.

- Gornall, J., R. Betts, E. Burke, R. Clark, J. Camp, K. Willett, and A. Wiltshire. 2010. "Implications of Climate Change for Agricultural Productivity in the Early Twenty-First Century." *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*. September 27: 1471-2970.
- Gramlich, Edward. 1994. "Infrastructure Investment." *Journal of Economic Literature* 32, 3: 1183–1184.
- Grossman, G. and E. Helpman. 1991. *Innovation and Growth in the Global Economy*. Cambridge, MA: MIT Press.
- Grossman, Michael. 1972. *The Demand for Health: A Theoretical and Empirical Investigation*. New York, NY: Columbia University Press.
- Haddad, L. J. and E. B. Howarth. 1991. "The Impact of Nutritional Status on Agricultural Productivity: Wage Evidence from Philippines." *Oxford Bulletin of Economics and Statistics*. 53, 1: 45–68.
- Hausman, Ricardo, Lant Pritchett, and Dani Rodrik. 2005. "Growth Accelerations." *Journal of Economic Growth* 10: 303-329.
- International Labor Organization (ILO). Various. *Yearbook of Labour Statistics, 2000-2010*. Geneva.
- Iscan, T. 1998. "Trade Liberalization and Productivity: A Panel Study of the Mexican Manufacturing Industry." *Journal of Development Studies* 34, 5: 123–48.
- Iyar, S. and C-J. Dalgaard 2005. "Total Factor Productivity Revisited: A Dual Approach to Development Accounting." *IMF Staff Papers* 52: 82-102.
- Jeong, H. and R. M. Townsend. 2007. "Sources of Total Factor Productivity Growth: Occupational Choice and Financial Deepening." *Economic Theory*. 32: 179–221.
- Jikkham, P. and S. Bunyamane. 2013. "Pledging scheme 'aids rich'." Bangkok: Thailand Development Research Institute. 5 August. Available online at <http://tdri.or.th/en/tdri-insight/pledging-scheme-aids-rich/>.
- Johnson, P. and S. Nicholas. 1997. "Health and Welfare of Women in the United Kingdom, 1785–1920." In R. H. Steckel and R. Floud, eds. *Health and Welfare During Industrialization*. Chicago: University of Chicago Press.
- Jones, Charles I. 1995. "Time series tests of endogenous growth models." *The Quarterly Journal of Economics*: 495-525.
- Kalemli-Ozcan, Sebnem, Harl E. Ryder, and David N. Weil. 2000. "Mortality decline, human capital investment, and economic growth." *Journal of Development Economics* 62, 1: 1-23.
- Kanbur, Ravi and Andy Sumner. 2012. "Poor Countries or Poor People? Development Assistance and the New Geography of Global Poverty." *Journal of International Development*, 24: 686–695.

- Kee, Hiau Looi, A. Nicita, and M. Olarreaga. 2009. "Estimating trade restrictiveness indices." *The Economic Journal* 119, 534: 172–99.
- Knowles, Stephen, and P. Dorian Owen. 1995. "Health capital and cross-country variation in income per capita in the Mankiw-Romer-Weil model." *Economics Letters* 48, 1: 99-106.
- Komlos, J. 1995. *Biological Standard of Living on Three Continents: Further Essays in Anthropometric History*. Boulder, Colorado: Westview Press.
- Kremer, Michael. 1993. "Population growth and technological change: one million BC to 1990." *The Quarterly Journal of Economics*: 681-716.
- Kubo, K. 2013. "Real Exchange Rate Appreciation, Resource Boom and Policy Reform in Myanmar." *Asian-Pacific Economic Literature* 27, 1: 110-26.
- Kudo, T. 1988. "Industrial Policies and the Development of Myanmar's Industrial Sector in the transition to a Market Economy." In K. Fujita et al., eds. *The Economic Transition in Myanmar after 1988: Market Economy versus State Control*. Singapore: National University of Singapore Press.
- Lawrence, R. Z. and D. E. Weinstein. 1999. "Trade and Growth: Import-Led or Export-Led? Evidence from Japan and Korea." NBER Working Paper No. 7264. Cambridge, MA: National Bureau of Economic Research.
- Lawson, S. and R. Dragusanu. 2008. "Building the world: mapping infrastructure demand." Global Economics Paper No 166, New York: Goldman Sachs.
- Lee, Hiro, and David Roland-Holst. 1998. *Economic Development and Cooperation in the Pacific Basin: Trade, Investment, and Environmental Issues*. Cambridge: Cambridge University Press
- Leibenstein, H. 1957. *Economic Backwardness and Economic Growth: Studies in the Theory of Economic Development*. New York: Wiley and Sons.
- Lewis, W. Arthur. 1954. "Economic Development with Unlimited Supplies of Labour." *The Manchester School* 22 (2): 139–91.
- Li, Xiaoying, and Xiaming Liu. 2005. "Foreign direct investment and economic growth: an increasingly endogenous relationship." *World Development* 33, 3: 393-407.
- Lichtenberg, F. R. 1992. "R&D Investment and International Productivity Differences. NBER Working Paper No. 4161." Cambridge, MA: National Bureau of Economic Research.
- Lim, H. and Y. Yamada, eds. 2013. "Economic Reforms in Myanmar: Pathways and Prospects." BRC Research Report No. 10. Bangkok, Thailand: Bangkok Research Center, Institute of Developing Economies-Japan External Trade Organization.
- Limao, N., and A. Venables J. 2001. "Infrastructure, geographical disadvantage, transport costs, and trade." *World Bank Economic Review* 15, 3: 451–79.
- Lucas, Robert E. 1988. "On the mechanics of economic development." *Journal of Monetary Economics* 22, 1: 3-42.

- Maddison, A. 1995. *Monitoring the World Economy 1820–1992*. Paris: OECD Development Center Studies.
- Mankiw, N. Gregory, David Romer, and David N. Weil. 1990. “A contribution to the empirics of economic growth.” No. w3541. Cambridge, MA: National Bureau of Economic Research.
- Marin, D. 1992. “Is the Export-Led Growth Hypothesis Valid for Industrialized Countries?” *Review of Economics and Statistics* 74, 4: 678–88.
- Martin, W., and A. Mattoo. 2008. “The Doha Development Agenda: What’s on the table?” World Bank Policy Research Working Paper No. 4672. Washington, DC: World Bank.
- Marwah, K. and A. Tavakoli. 2004. “The Effect of Foreign Capital and Imports on Economic Growth: Further Evidence from Four Asian Countries.” Canada: Carleton Economic Papers.
- _____ and L. R. Klein. 1996. “What are Some Prospects for India’s Joining the Asian Growth Process?” In R. Hooley, et al., eds., *Asia Pacific Economic Cooperation: Theory and Practice. Research in Asian Economic Studies* (Part B), Vol. 7. JAI Press.
- Mayer, D. 2001. “The Long-Term Impact of Health on Economic Growth in Latin America.” *World Development*. 29, 6: 1025–33.
- Mazumdar, Joy. 2001. “Imported machinery and growth in LDCs.” *Journal of Development Economics* 65, 1: 209-224.
- McKeown, T. 1976. *The Modern Rise of Population*. London: Edward Arnold Publishers.
- McNeill, W. H. 1998. *Plagues and Peoples*. New York: Anchor.
- Mincer, J. 1974. *Schooling, Experience and Earnings*. New York: Columbia University Press.
- Myanmar Department of Population and UNFPA. 2013. “The 2014 Population and Housing Census: What You Need to Know.” http://countryoffice.unfpa.org/myanmar/drive/Handbook_English_14Nov_WEB.pdf.
- _____ and UNFPA. 2015. “The 2014 Population and Housing Census.” http://countryoffice.unfpa.org/myanmar/drive/Handbook_English_14Nov_WEB.pdf.
- Myint, C. C. 1996. “Input–Output Analysis and its Application to Myanmar Economy (1989–90).” Unpublished M. Econ thesis. Yangon Institute of Economics, Myanmar.
- Myint, H. 1971. “The Inward and Outward-Looking Countries of Southeast Asia.” In H. Myint, ed. *Economic Theory and the Underdeveloped Countries*. Oxford: Oxford University Press.
- Narayan, S., P. K. Narayan, S. Mishra. 2010. “Investigating the Relationship between Health and Economic Growth: Empirical Evidence from a Panel of 5 Asian Countries.” *Journal of Asian Economics* 21, 4: 404–11.

- National Economic and Social Advisory Council (NESAC). 2016. "From Rice Bowl to Food Basket: Three Pillars for Modernizing Myanmar's Agricultural and Food Sector, A New Vision for Myanmar's Agricultural Development." White Paper. Yangon: NESAC, April.
- Nelson, Richard R. and Edmund S. Phelps. 1966. "Investment in humans, technological diffusion, and economic growth." *American Economic Review* 56, 1/2: 69-75.
- Norojono, Olly, David Roland-Holst, and Guntur Sugiyarto. 2014. "Macroeconomic Effects of Road Corridor Investment in Kazakhstan." *Transportation Research Record: Journal of the Transportation Research Board of the National Academies*, No. 2162, 90-97.
- Obwona, Marios B. 2001. "Determinants of FDI and their Impact on Economic Growth in Uganda." *African Development Review* 13, 1: 46-81.
- OECD. 2010a. *OECD Statistical Compendium*. Paris.
- _____. 2010b. *Southeast Asian Economic Outlook 2010*. Paris: Development Centre.
- _____ and the World Bank. 2013. "Indicators of Skills for Employment and Productivity: A Conceptual Framework and Approach for Low-Income Countries." Prepared in collaboration with ETF, ILO and UNESCO. Paris.
- Pedroni, Peter. 1999. "Critical values for cointegration tests in heterogeneous panels with multiple regressors." *Oxford Bulletin of Economics and Statistics* 61.s 1: 653-670.
- Penn World Tables. 2016. Available online at <http://cid.econ.ucdavis.edu/pwt.html>.
- Persson, Torsten and Guido Tabellini. 1994. "Is Inequality Harmful for Growth?" *American Economic Review* 84: 600-621.
- Plummer, M.G., P.J. Morgan, G. Wiagnaraja, eds. 2016. *Connecting Asia Infrastructure for Integrating South and Southeast Asia*. New York: Elgar.
- Podrecca, Elena, and Gaetano Carmeci. 2001. "Fixed investment and economic growth: new results on causality." *Applied Economics* 33, 2: 177-182.
- Rebelo, S. 1991. "Long-Run Policy Analysis and Long-Run Growth." *The Journal of Political Economy* 99, 3: 500-21.
- Reher, D. 1995. "Wasted Investments: Some Economic Implications of Childhood Mortality Patterns." *Population Studies* 49, 3: 519-36.
- Richards, Donald G. 2001. "Exports as a determinant of long-run growth in Paraguay, 1966-96." *Journal of Development Studies* 38, 1: 128-146.
- Rivera, Berta, and Luis Currais. 2004. "Public health capital and productivity in the Spanish regions: A dynamic panel data model." *World Development* 32, 5: 871-885.
- Rodrik, Dani. 2013. "Unconditional Convergence in Manufacturing." *The Quarterly Journal of Economics*, 165-204.
- Roland-Holst, David. 2003. *Global Supply Networks and Multilateral Trade Linkages: A Structural Analysis of East Asia*. Tokyo: Asian Development Bank Institute.

- _____. 2008. "China's Real Exchange Rate and Implications for East Asian Regional Trade and Investment Flows." In B. Fleisher, N. Hope, A. Pena, and D. Yang, eds., *Policy Reform and Chinese Markets*. London: Elgar.
- _____. 2009. "Infrastructure as a Catalyst for Regional Integration, Growth, and Economic Convergence: Empirical Evidence from Asia." In Zhai Fan, ed., *From Growth to Convergence: Asia's Next Two Decades*. New York: Palgrave Macmillan.
- _____. 2015. "A Dynamic General Equilibrium Forecasting Model for Myanmar." Berkeley, CA: Department of Agricultural and Resource Economics, University of California, Berkeley.
- _____, Douglas Brooks, Jean-Pierre Verbiest, and Fan Zhai. 2010. "Asia Integration and the Region's Long-term Economic Growth Prospects." In Linda Yueh, ed., *The Future of Asian Growth and Trade*. London: Routledge, pp. 321-350.
- _____ and Cyn-Young Park. 2015. "Myanmar: Long-Term Scenarios for Sustained Macroeconomic Growth." ADB Economics Working Paper Series No. 429. Manila, April.
- Romer, Paul M. 1986. "Increasing returns and long-run growth." *Journal of Political Economy*: 1002-1037.
- Rosen, S. 1976. "A Theory of Lifetime Earnings." *Journal of Political Economy* 84, 3: 545-67.
- Sachs, Jeffrey D., et al. 1995. "Economic reform and the process of global integration." *Brookings Papers on Economic Activity* 1: 1-118.
- Sandberg, L. G. and R. H. Steckel. 1997. "Was Industrialization Hazardous to your Health? Not in Sweden!" In R. Floud and R. H. Steckel, eds., *Health and Welfare During Industrialization*. Chicago: University of Chicago Press.
- Schneider, Patricia Higinio. 2005. "International trade, economic growth and intellectual property rights: A panel data study of developed and developing countries." *Journal of Development Economics* 78, 2: 529-547.
- Schultz, T. Paul. 1997. "Assessing the Productive Benefits of Nutrition and Health: An Integrated Human Capital Approach." *Journal of Econometrics* 77, 1: 141-58.
- _____ and A. Tansel. 1996. "Wage and Labor Supply Effects of Illness in Cote D'Ivoire and Ghana: Instrumental Variable Estimates for Days Disabled." *Journal of Development Economics* 53, 2: 251-286.
- Schultz, Theodore W. 1960. "Capital formation by education." *Journal of Political Economy*, 68: 571-583.
- _____. 1961. "Investment in Human Capital." *American Economic Review* 51, 1 (March): 1-17.
- _____. 1971. *Investment in Human Capital: The Role of Education and Research*. New York: Free Press.

- Scrimshaw, N. S. and G. J. E. Gordon, eds. 1968. *Malnutrition, Learning and Behavior*. Cambridge, MA: MIT Press.
- Self, S. and R. Grabowski. 2004. "Does Education at All Levels Cause Growth? India, a Case Study." *Economics of Education Review* 23, 1: 47–55.
- Sharma, Subhash C., Mary Norris, and Daniel Wai-Wah Cheung. 1991. "Exports and economic growth in industrialized countries." *Applied Economics* 23, 4: 697-708.
- Sheehey, Edmund J. "Exports and growth: additional evidence." *Journal of Development Studies* 28, 4: 730-734.
- Socialist Republic of the Union of Burma, Ministry of Home and Religious Affairs, Burma 1983. *Population Census*. Rangoon: Immigration and Manpower Department, June.
- Spurr, G. B. 1983. "Nutritional status and physical work capacity." *American Journal of Physical Anthropology* 26, S1: 1-35.
- Steckel, R. H. 2003. "Stature and the Standard of Living." *Journal of Economic Literature* 33, 4: 1903–40.
- _____ and R. Floud. 1997. *Health and Welfare during Industrialization*. Chicago: University of Chicago Press.
- Strauss, John, and Duncan Thomas. 1998. "Health, nutrition, and economic development." *Journal of Economic Literature* 36, 2: 766-817.
- Suhariyanto, K. and C. Thirtle. 2001. "Asian Agricultural Productivity and Convergence." *Journal of Agricultural Economics* 52, 3: 96–110.
- Tahilyani, N., T. Tamhane and J. Tan. 2011. "Asia's \$1 trillion infrastructure opportunity." McKinsey and Company, 11 March.
- Teal, Francis and Markus Eberhardt. 2010. "Productivity Analysis in Global Manufacturing Production." Economics Series Working Papers 515. University of Oxford, Department of Economics.
- Thein, M. 2004. *Economic Development of Myanmar*. Singapore: Institute of Southeast Asian Studies.
- Trajtenberg, M. 1990. *Economic Analysis of Product Innovation*. Cambridge: Cambridge University Press.
- Turnell, S. 2009. *Fiery Dragons: Banks, Moneylenders and Microfinance in Burma*. Copenhagen: NIAS Press.
- United Nations Development Program. 2009. "Integrated Household Living Conditions Survey in Myanmar: 2004-5." Quantitative Survey and Technical Report, June.
- _____. 2011. "Integrated Household Living Conditions Survey in Myanmar: 2009-10." Technical Report. Yangon, June.

- United Nations Population Fund, United Nations Department of Economic and Social Affairs, UN-HABITAT, and International Organization for Migration. 2013. "Population dynamics in the post-2015 development agenda: Report of the global thematic consultation on population dynamics." United Nations.
- United States Bureau of Labor Statistics. 2015. "Population Data for East and Southeast Asia," Technical Bulletin, Washington.
- Wang, Jenn-Hwan. 2007. "From Technological Catch-up to Innovation-Based Economic Growth: South Korea and Taiwan Compared." *Journal of Development Studies* 43, 6: 1084–1104.
- Webber, Don J. 2002. "Policies to stimulate growth: should we invest in health or education?" *Applied Economics* 34, 13: 1633-1643.
- Westerlund, J. 2006. "Testing for Panel Cointegration with Multiple Structural Breaks." *Oxford Bulletin of Economics and Statistics* 68, 1: 101–32.
- Wheeler, David. 1980. "Basic needs fulfillment and economic growth: A simultaneous model." *Journal of Development Economics* 7, 4: 435-451.
- Wilbur, William I., and Mohammed Z. Haque. 1992. "An investigation of the export expansion hypothesis." *Journal of Development Studies* 28, 2: 297-313.
- Wilson, J.S., C. Mann, and T. Otsuki. 2003. "Trade facilitation and economic development: A new approach to measuring the impact." *World Bank Economic Review* 17, 3: 367–89.
- World Bank. 1993. *World Development Report 1993: Investing in Health*. New York: Oxford University Press.
- _____. 2013. *World Development Report 2013: Jobs*. Washington, DC: World Bank.
- _____. *World Development Indicators*. <http://data.worldbank.org/data-catalog/world-development-indicators> (accessed January 2015).
- Yamada, Hiroshi. 1998. "A note on the causality between export and productivity:: an empirical re-examination." *Economics Letters* 61, 1: 111-114.
- Yepes, T. 2004. "Expenditure on infrastructure in East Asia region, 2006-2010." Background document prepared for the ADB–JBIC–World Bank East Asia Pacific Infrastructure Flagship Study. Washington, DC: World Bank.
- Young, Alwyn. 1995. "The Tyranny of Numbers: Confronting the Statistical Realities of the East Asian Growth Experience." *Quarterly Journal of Economics*, 110 (August): 641-80.
- Yu, T. T. 1976. *Input–Output Analysis and its Application to Myanmar Economy (1985–86)*. Unpublished M. Econ Thesis. Yangon Institute of Economics, Myanmar.
- Zeigler, R. S. and D. W. Puckridge. 1995. "Improving Sustainable Productivity in Rice-based Rainfed Lowland Systems of South and Southeast Asia." *Geojournal* 35, 3: 307–24.

Appendix 1. Model Summary

This paper uses a single-country prototype CGE model whose formal structure has been applied to over 50 countries. The base data set, a new social accounting matrix (SAM) for Myanmar estimated by the authors, is calibrated for 2010 across 32 economic sectors. The current version of the SAM has five factors of production (skilled and unskilled labor, capital, land, and natural resources), 36 rural and urban representative households disaggregated by province, and a single (rest of the world) trading partner. The sectoral definitions can be found in Table 6. The remainder of this section outlines briefly the main characteristics of production, consumption, and other analytical features of the model.

PRODUCTION

All sectors are assumed to operate under constant returns to scale and perfect competition. Production in each sector is modeled by a series of nested, constant elasticity of substitution (CES) production functions that are intended to represent the different substitution and complementarity relations across the various inputs in each sector. There are material inputs that generate the input/output table, as well as factor inputs representing value-added.

Three different production archetypes are defined in the model—crops, livestock, and all other goods and services. The CES nests of the three archetypes are graphically depicted in Figures 13-16. Within each production archetype, sectors will be differentiated by different input combinations (share parameters) and different substitution elasticities. Share structures are largely determined by base year data, and the elasticities are drawn from the econometric literature.

The key feature of the crop production structure is the substitution between intensive cropping versus extensive cropping, i.e., between fertilizer and land (Figure 13). Livestock production captures the important role played by feed versus land, i.e., between ranch-versus range-fed production (Figure 14). Production in the other sectors more closely matches the traditional role of capital/labor substitution, with energy introduced as an additional factor of production (Figure 15).

In each period, the supply of primary factors—capital, labor, and land—is usually predetermined. However, the supply of land is assumed to be sensitive to the contemporaneous price of land. Land is assumed to be partially mobile across agriculture sectors. Given the comparative static nature of the simulations that assume a longer-term horizon, both labor and capital are assumed to be perfectly mobile across sectors (though not internationally).

The current model specification has an innovation in the treatment of labor resources. The Global Trade Analysis Project data set identifies two types of labor skills—skilled and unskilled.⁹ Under the standard specification, both types of labor are combined together in a CES bundle to form aggregate sectoral labor demand, i.e., the two types of labor skills are

⁹ See <https://www.gtap.agecon.purdue.edu/databases/v9/>. GTAP 9 now distinguishes five labor types.

directly substitutable. In the new specification, a new factor of production has been inserted, which we call *human* capital. It is combined with capital to form a physical *cum* human capital bundle, with an assumption that they are complements. On input, the user can specify the percentage of the skilled labor factor to allocate to the human capital factor.

Once the optimal combination of inputs is determined, sectoral output prices are calculated assuming competitive supply (zero-profit) conditions in all markets.

CONSUMPTION AND CLOSURE RULES

All income generated by economic activity is assumed to be distributed to a single representative household. The single consumer allocates optimally his or her disposable income among the consumer goods and saving. The consumption/saving decision is completely static: saving is treated as a “good” and its amount is determined simultaneously with the demands for the other goods, the price of saving being set arbitrarily equal to the average price of consumer goods.

Government collects income taxes, indirect taxes on intermediate and final consumption, production taxes, import tariffs, and export taxes and/or subsidies. Aggregate government expenditures are linked to changes in real GDP. The real government deficit is exogenous. Closure therefore implies that some fiscal instrument is endogenous in order to achieve a given government deficit. The standard fiscal closure rule is that the marginal income tax rate adjusts to maintain a given government fiscal stance. For example, a reduction or elimination of tariff rates is compensated by an increase in household direct taxation, *ceteris paribus*.

Each region runs a current account surplus (deficit) that is fixed (in terms of the model numéraire). The counterpart of these imbalances is a net outflow (inflow) of capital, subtracted from (added to) the domestic flow of saving. In each period, the model equates gross investment to net saving (equal to the sum of saving by households, the net budget position of the government, and foreign capital inflows). This particular closure rule implies that investment is driven by saving. The fixed trade balance implies an endogenous real exchange rate.

FOREIGN TRADE

The world trade block is based on a set of bilateral flows. The basic assumption is that imports originating in different regions are imperfect substitutes (Figure 16). Therefore in each region, total import demand for each good is allocated across trading partners according to the relationship between their export prices. This specification of imports—commonly referred to as the Armington specification—implies that each region faces a downward sloping demand curve for its exports. The Armington specification is implemented using two CES nests. At the top nest, domestic agents choose the optimal combination of the domestic good and an aggregate import good consistent with the agent’s preference function. At the second nest, agents optimally allocate demand for the aggregate import good across the range of trading partners.

The bilateral supply of exports is specified in parallel fashion using a nesting of constant elasticity of transformation (CET) functions. At the top level, domestic suppliers optimally allocate aggregate supply across the domestic market and the aggregate export market. At the second level, aggregate export supply is optimally allocated across each trading region as a function of relative prices.

Trade variables are fully bilateral and include both export and import taxes and/or subsidies. Trade and transport margins are also included; therefore, world prices reflect the difference between free on board (FOB) and cost, insurance and freight (CIF) pricing.

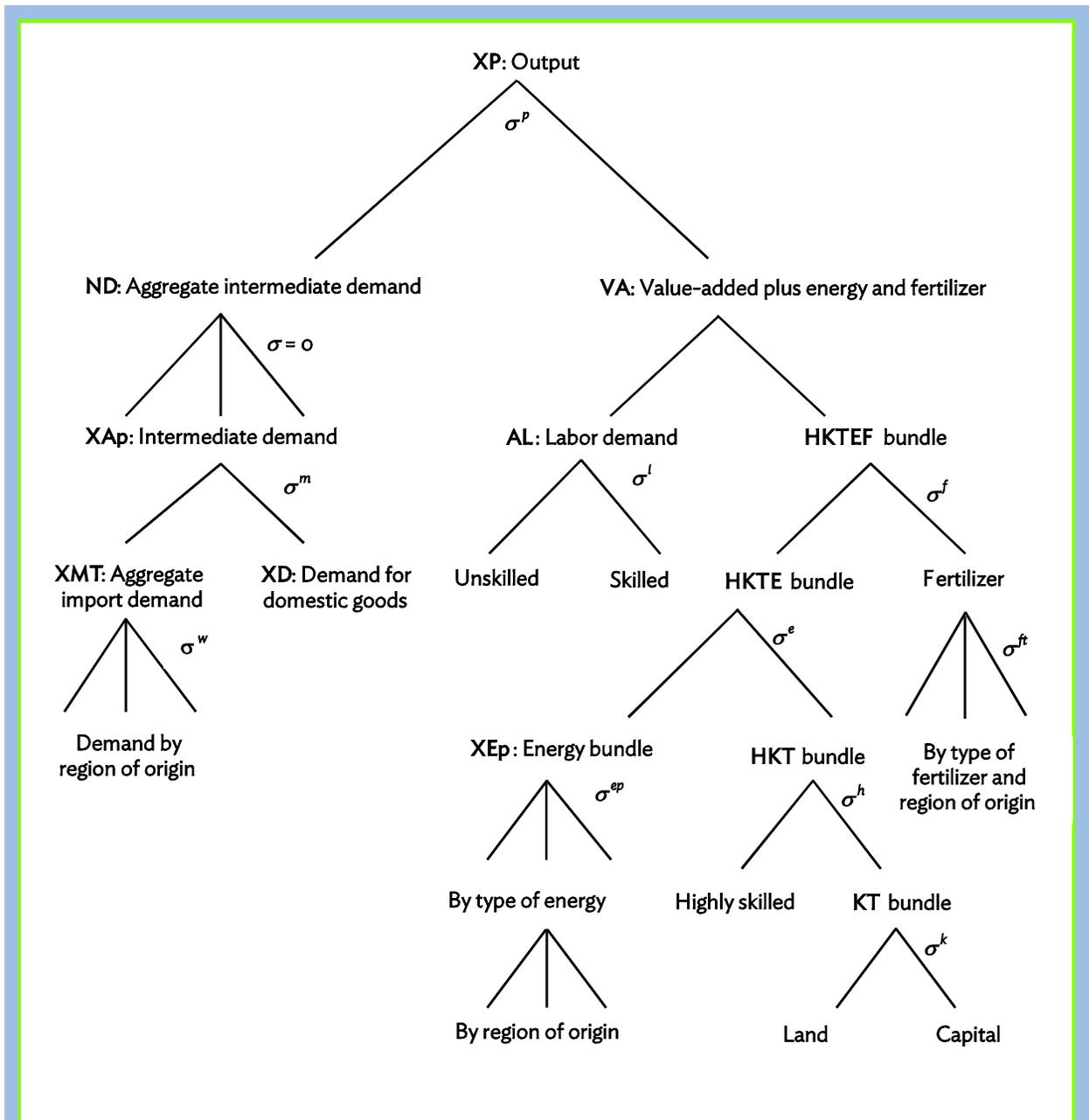
PRICES

The CGE model is fully homogeneous in prices, i.e., only relative prices are identified in the equilibrium solution. The price of a single good, or of a basket of goods, is arbitrarily chosen as the anchor to the price system. The price (index) of the manufacturing value added has been chosen as the numéraire, and is set to 1.

ELASTICITIES

Production elasticities are relatively standard and are available from the authors. Aggregate labor supply is dependent on an elasticity reflecting reservation wages for reserve labor in the rural sector and overseas. The capital stock is assumed to be fixed within periods, but to grow with savings/investment, net of depreciation, from year to year. Within years, new capital is assumed to be perfectly mobile between sectors, while old capital is sector-specific.

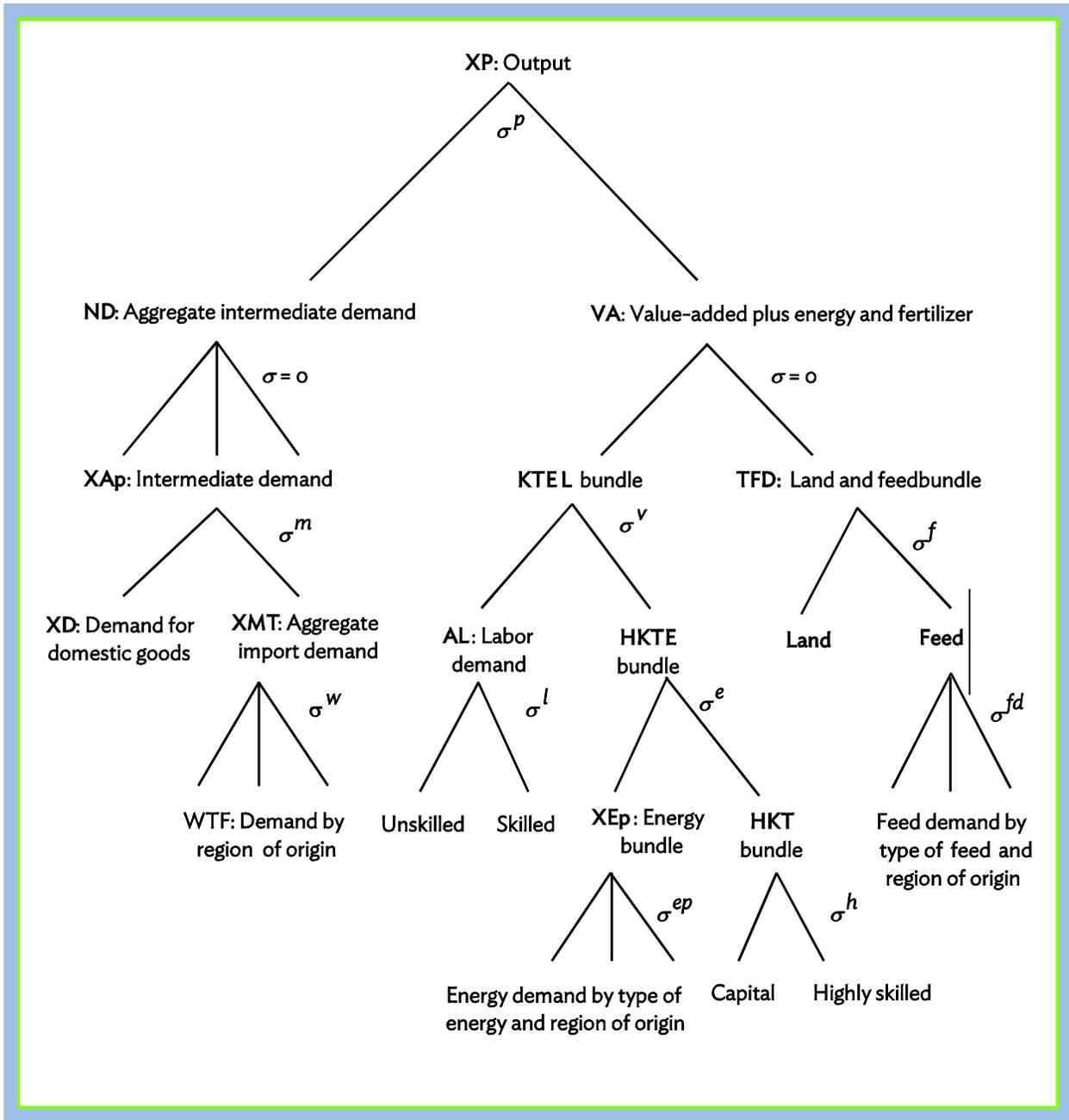
Figure 13: Production Function for Crops



AL = aggregate labor demand; HKT = demand for skill-intensive (high tech) capital, other capital and land; HKTE = demand for nonlabor factors other than fertilizer; HKTEF = demand for nonlabor factors of production; KT = demand for other capital and land; ND = demand for intermediate goods/services by origin; VA = value-added; XAp = intermediate demand by destination; XD = demand for domestic goods; XEp = demand for energy by sector; XMT = demand for imports; XP = sector real output.

Source: Authors.

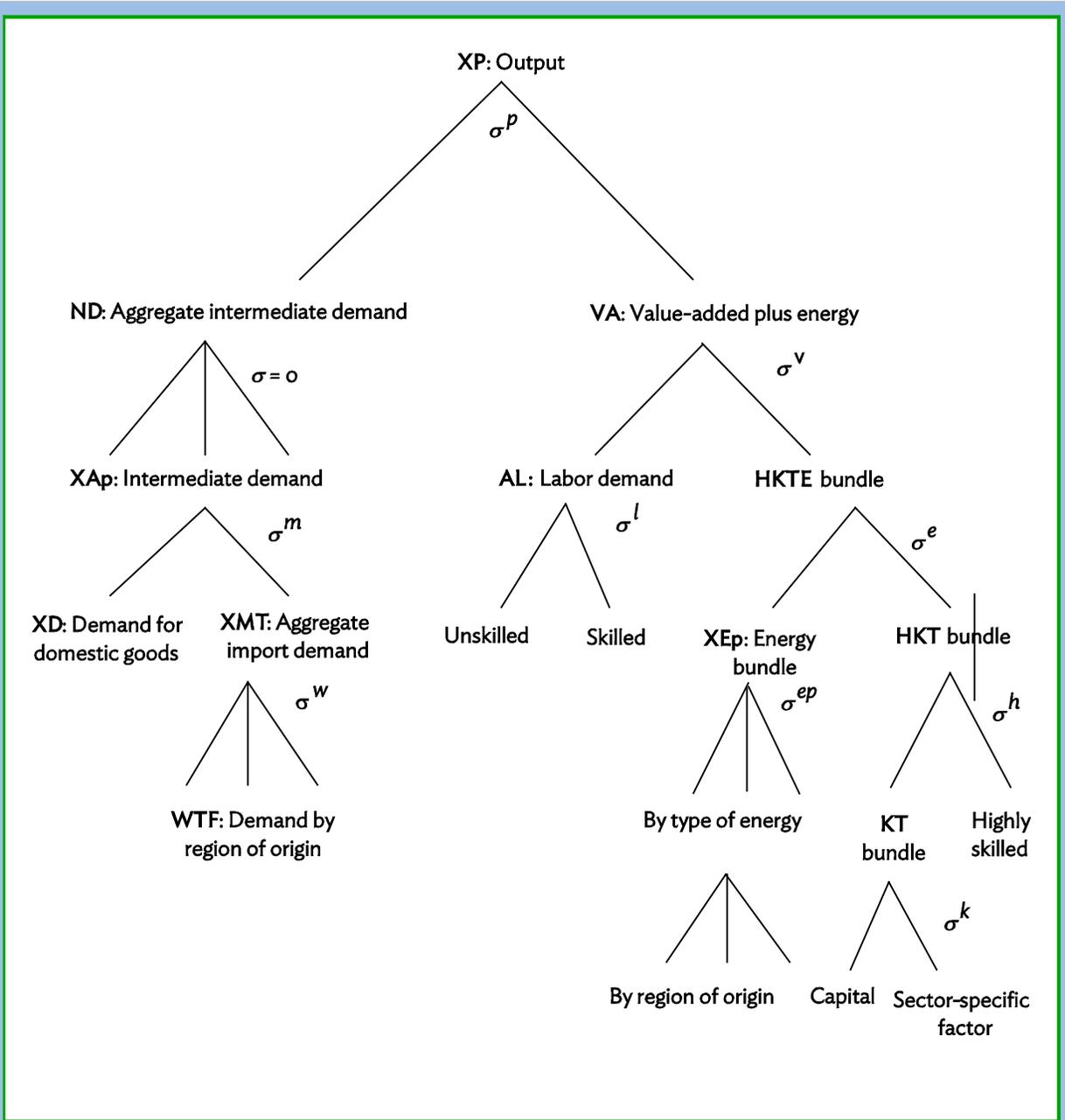
Figure 14: Production Function for Livestock



AL = Aggregate Labor Demand, HKT = Demand for Skill-intensive (high tech) Capital, other Capital and Land, HKTE = Demand for Non-Labor Factors other than Fertilizer, HKTEF = Demand for Non-Labor Factors of Production, KT = Demand for Other Capital and Land, ND = Demand for intermediate goods/services by origin, VA = Value Added, XAp = Intermediate demand by destination, XD = Demand for domestic goods, XEp = Demand for Energy by sector, XMT = Demand for imports, XP = Sector real output.

Source: Authors.

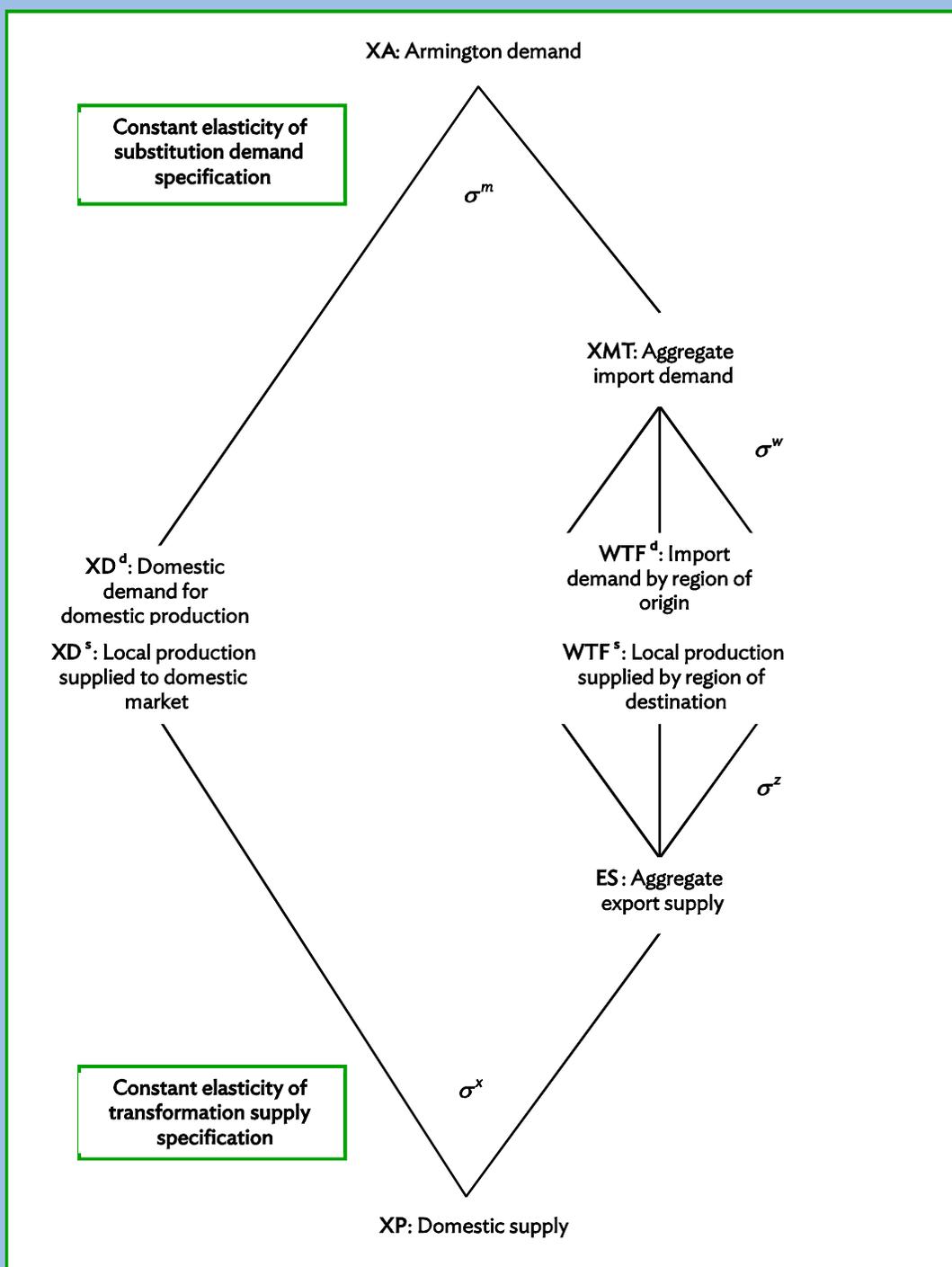
Figure 15: Production Function for Non-Agriculture



AL = aggregate labor demand; HKT = demand for skill-intensive (high tech) capital, other capital and land; HKTE = demand for nonlabor factors other than fertilizer; KT = demand for other capital and land; ND = demand for intermediate goods/services by origin; VA = value-added; WTF = trade in final goods; XAp = intermediate demand by destination; XD = demand for domestic goods; XEp = demand for energy by sector; XMT = demand for imports; XP = sector real output.

Source: Authors.

Figure 16: Trade Aggregation



ES = exports by commodity, WTF = trade in final goods, XA = aggregate demand by commodity, XD = demand for domestic goods, XMT = demand for imports, XP = sector real output.

Source: Authors.

Appendix 2. Overview of Myanmar Data Resources

In recent decades, data on socioeconomic performance of Myanmar have been fragmentary and subject to uncertain statistical standards. The urgent need for more reliable and timely data has attracted the attention of the current government, and in 2014 the Central Statistical Organization's annual Statistical Handbook established new and much higher standards for timeliness, consistency, and apparent accuracy. Strong political commitment to improve the standards of collecting, recording, and reporting is indicative of Myanmar's desire to participate in the global economic system. Recent official efforts to reduce statistical uncertainty manifests has been supported by a broad spectrum of bilateral and multilateral development partners.

Historically, Myanmar conducted few surveys and censuses. Any available data are commonly based on outdated standards and inconsistent measures. As a consequence, little reliable information exists today on economic and social conditions in the country. Myanmar's first domestic statistical agency, Central Statistics and Economic Department (CSED) was established in 1952 under the *Central Statistical Authority Act*, Act No 34. Its main function was to consolidate, analyze, and ensure the coordination of operations of all official bodies in the whole field of statistical operations. Over several years, a view that the CSED needed to be more effective led to various structural changes, which brought it under the supervision of the Ministry of Planning and Finance in 1974. Since then, the CSED has been reorganized as the Central Statistical Organization (CSO), and is currently administered by the Ministry of Planning and Finance.

Over the years, Myanmar's momentum to make nationwide statistical documentation a ubiquitous practice has been variable. Looking back to attain a better understanding of Myanmar's statistical undertakings, we observe that the Population and Housing Census of 1953 was one of the country's first national surveys. Its second survey, the Annual Survey of Manufacturers, was subsequently conducted by the CSED in 1955, 1963, 1971, and 1983–1984.

After the establishment of the State Peace and Development Council, which implemented economic reform measures to redress the deteriorating economic situation of the country, several more national surveys were conducted as a sign of the country's meek attempt to increase the breath of its statistical domain. The CSO introduced the Packaging Survey (conducted in 45 townships in 1993), and the Private Sector Industrial Survey (PSIS, conducted nationwide in 2003 and 2006). The information from these national surveys enabled Myanmar to reap certain benefits as the 2003 PSIS survey accentuated the need for the development of an industrial sector based on natural resources. This led to the establishment of the Kalay industrial zone at the Hlaing Thayar township in 2004.

Among Myanmar's list of surveys, the Household Income and Expenditure Survey (HIES) is the CSO's main nationwide special-purpose survey, carried out every five years since its introduction in 1989. Results from the HIES are used both as numeric weights for the calculation of Myanmar's Consumer Price Index (CPI) and for the calculation of its inflation

rates. In addition, the ratio of the percent of total household expenditure spent between food and nonfood items serves as the CSO's main index for Myanmar's standard of living. So far, the HIES has been conducted in 1989, 1997, 2001, and 2006 (the gap between 1989 and 1997 is illustrative of the lack of political dedication behind regular data consolidation, which eventually received renewed emphasis in the mid-1990s). Whenever the HIES is conducted by other ministries, CSO officials act as members of a "steering" committee that supervise and engage in further analysis.

Until 2014, one of the main issues with Myanmar's statistical consolidation is its consistency and an apparent inability to administer nationwide censuses with regularity. Given this statistical shortfall, Myanmar's current source of population data is the Vital Registration. Vital Registration statistics are compiled by the Department of Health, and processed by the CSO. In other words, national surveys on fertility and reproductive health conducted in 1991, 1997, 2001, and 2006 by the Department of Health are used as loose indicators to estimate the country's demographic growth. These indicators are complemented with demographic surveys conducted by various government departments, such as the CSO, the Department of Population, in order to provide a combined appraisal of the country's demographic climate. Thus, the quality of the country's statistics commonly rests on unreliable and opaque procedures.

Expanding the scope of its statistical surveillance (by increasing the number of different surveys), without standardized procedural measures and appropriate continuity in data consolidation is indicative of the grave uncertainties that can arise in Myanmar's data. Nevertheless, over the last decade, there have been renewed efforts to broaden Myanmar's national statistical domain. Most notably is its greater attention to industry and market censuses. The annual Industry Survey, the Informal Sector Survey, and the Wholesale Price Survey are several of the national surveys conducted by the CSO and the Planning Department. Currently, the CSO publishes the surveys listed in Table 5

Table 5: Primary Surveys Compiled and Published by the CSO (2014)

Survey	
1	Statistical Year Book (Annually)
2	Selected Monthly Economic Indicator (Monthly)
3	Agriculture Statistics of Myanmar (Every 4 years)
4	Livestock and Fishery Statistics of Myanmar (Every 4 years)
5	Forestry Statistics of Myanmar (Every 4 years)
6	Statistical Profile of Children and Women (Every 3 years)
7	Household Income and Expenditure Survey (Every 5 years)
8	National Mortality Survey (Every 10 years)
9	The Rural Development Survey (Every 2 years)
10	Nationwide Manufacturing Survey (NMS) (every three years)
11	The Manufacturing Census for the Private Industrial Zones (every three years)
12	Price Survey for Whole Sale and Retail Price (annual)
13	Informal Sector Survey (every two years)

These gradual increments of economic censuses serve as a partial solution to resolving the country's national statistical challenges. From the list above, it is evident that the time intervals between each report are relatively inconsistent. Therefore, it is also important that Myanmar improve on the regularity of reporting, reliability of statistical standards, and the accessibility of its official data. An assessment of the reliability of its official statistics in terms of coverage, accessibility, and regularity follows.

AGRICULTURAL STATISTICS

Sound agricultural statistics and information will possess an increasing importance in developing Myanmar's agriculture sector. So far, Myanmar has conducted four agricultural censuses since its independence. The first agricultural census was conducted in 1952, while the second agricultural census was administered in 1993. Its third agricultural census was launched in 2003 and was executed according to guidelines set by the Food and Agriculture Organization's (FAO) World Census of Agriculture 2000 program. Although Myanmar's participation in the FAO's World Census of Agriculture 2003 and 2010 rounds have significantly improved its agricultural statistics, it is still far from the prevailing international standards. Statistical data officially published by the Ministry of Agriculture, Livestock, and Irrigation is still limited in its quantity and scope. Furthermore, Myanmar's current mechanisms and common procedures of statistical collection fail to assure a high degree of reliability, timeliness, and accuracy. Therefore, forecasting and data analysis that requires agricultural data remains a relatively challenging endeavor.

NATIONAL ACCOUNTS STATISTICS

Although national accounts statistics are published annually, they are typically reported late and at irregular time intervals. Moreover, the accuracy of the reported national accounts does not provide a comprehensive economic overview due to the unavailability of standardized procedures in sampling its domestic private sector. Hence, the lack of proper mechanisms for data collection, coupled with the CSO's pressing resource constraints, impedes Myanmar's ability to conduct adequate data collection of an acceptable quality. These shortfalls impact its national accounts in several ways: i) Many services (such as restaurant dining, transportation, financial services) and processing goods are poorly estimated; ii) Taxes and subsidies on imported products are imprecisely recorded; iii) Domestic construction growth is based on the number of permits granted annually; and iv) GDP estimates do not completely account for informal sector activity (although there have been recent attempts to quantify the size of this growing sector).

EXTERNAL SECTOR STATISTICS

In addition to its regular reports of trade statistics to the United Nations (COMTRADE, UNCTAD), the World Bank, and IMF, Myanmar has several issues in the reporting of its balance of payments (BOP). Most immediate of these is the exclusion of imported official goods, such as military equipment, merchandise imports, and import-related FDI under joint venture agreements. Income, goods, and services, are not only recorded using inconsistent consolidation procedures (which fail to adequately account for the majority of the population), but also fail to account for transactions that occur between local residents and

foreigners. In addition, service and financial transactions that are not executed through official banking channels are not recorded, suggesting that a major gap may exist in financial statistics.

Besides the exclusion of the aforementioned variables from the BOP, several data entries are not properly measured. Proper classification of FDI, official reserves, external assets is lacking, and the evaluation of external debt not denominated in United States dollars is omitted. Therefore, the Index of Industrial Production data (which depends on the proper assessment of BOP flows) is highly questionable.

PUBLIC FINANCE AND PRICE STATISTICS

Currently, Myanmar does not report monthly or quarterly fiscal data. Most of its fiscal data is made available annually, with delays of varying time intervals (even 12-month delays have been fairly common). Reporting standards for public financial statistics are irregular as state-owned enterprises either record transactions on a cash or an accrual basis. Moreover, budgeted and actual expenditure estimates tend to vary significantly, resulting in unreliable debt statistics.

Until last year, for Myanmar's price statistics, the consumer price index (CPI) weights relied on the national household survey (HIES) conducted in 2006. These CPI weights only incorporated urban household expenditures, neglecting rural household expenditures. Implied rents of owner-occupied housing also seem to be excluded from the calculation of CPI weights, and the classification of various items have to be updated to meet international standards. Consumer prices indices in the present analysis, estimated independently by province and for urban and rural households, have been updated to the latest (2014) National Statistical Handbook from CSO.

INDUSTRIAL STATISTICS

Since 1992, the Myanmar government has established private industrial zones in Yangon, Mandalay, Taungyi, Monywa, and some other towns. Thus far, there are at least 26 industrial zones in the country. In the past few years, industrial survey questionnaires have been collected by the Planning Department at an increasing frequency. However, the availability of reliable industrial data is still problematic, as industrial record systems and their associated registries are largely manually operated. Manpower shortages for all levels of the statistical organization, particularly for ground-level data collection, have also contributed to irregularities in industrial data collection. These basic operational issues cause Myanmar to fall short in its ability to report comprehensive statistical reports such as industry Input–Output (I–O) tables (1995 being the last year it reported an official I–O table).

However, the greatest statistical void present in Myanmar's industrial data consolidation is from its private sector. Given that many business enterprises scattered throughout the country are relatively small in their operational scale and have not been officially registered, more exhaustive measures need to be implemented to capture their collective economic contributions. Monthly and quarterly manufacturing surveys need to be instituted so as to comprehensively tabulate public and private value-added towards GDP, indices of production, and to track trends in wages and salaries. Furthermore, industrial data should be

compiled in accordance with the International Standard Industrial Classification format, rather than merely an integration of 13 categories, which are currently applied.

MONETARY STATISTICS

The Central Bank of Myanmar (CBM) currently conducts monetary surveys on both public and commercial banks. Most of these surveys are reported in accordance with the Monetary and Financial Statistics Manual established by the International Monetary Fund through Standardized Report Forms. Although reporting standards are improving, greater investment to develop rigorous consolidation methods is still needed. Adopting market valuations of financial instruments, monitoring inter-bank accounts between commercial and public banks, using better technology to consolidate and share data (to minimize inconsistencies), and reviewing the accuracy of the CBM's balance sheet, will considerably increase the reliability of Myanmar's monetary statistics.

Since Myanmar's move into the global economy in 2010, the CSO and various other departments have fully recognized the importance of proper statistical consolidation. Among several plans to improve the quality and accessibility of its economic data, the CSO and other government agencies have made a concerted effort to increase the number of economic surveys and to review the procedural methods of several surveys presently conducted; many of these surveys will be monitored by international agencies to meet international reporting standards. Several of its new national surveys are described below.

NATIONWIDE MANUFACTURING SURVEY (NMS)

Presently, of the 7,000 enterprises within Myanmar's 26 industrial zones, 98% are privately owned. Thus, conducting the NMS in the private sector is an important goal for the CSO. The goal of mending the gaping private sector statistical void (in order to generate a complete assessment of manufacturing growth) requires a complete enumeration to be carried out for all private industrial zones. However, much improvement on NMS data has to be made as many indicators have inconsistent procedural methods. While much technical and financial assistance is still required to rectify these complications, the concerned authorities are now attempting to apply the Myanmar Standard Industrial Classifications for its next NMS.

DISTRIBUTIVE TRADE STATISTICS SURVEY

Distributive trade is of great interest to the government for forecasting purposes, as changes in the value of trade and its volume (especially in cross border trade) are regarded as important short-term indicators of economic activity. Therefore, the government plans to conduct several sample surveys of wholesale centers in large cities.

MASS MEDIA SURVEY

The prevalence of private sector mass media assets is increasing significantly from year to year. Growing mass media asset consumption includes items such as cellular phones, satellite televisions, computers, and media broadcasts. Information from this survey would bolster

attempts to track the consumption patterns and help assess the degree of domestic technological penetration.

HOUSING CONSTRUCTION SURVEY

The Ministry of Construction is planning to conduct a household construction survey to address the issue of housing shortages, especially in populous provinces, such as Yangon, where over a million residents still live in low-quality housing. Moreover, various rural–urban push–pull factors, resulting from Myanmar’s recent global economic engagement, have caused an influx of rural migrants—inevitably impacting the availability of housing and its prices.

The most recent international initiative to improve data collection in Myanmar is collaboration between local authorities and the Asian Development Bank (ADB). ADB has administered a \$1.2 million Technical Assistance Grant from the Japan Fund for Poverty Reduction. This grant aims to improve Myanmar’s technical, legal, and institutional frameworks by upgrading its statistics law, updating data collection procedures, ensuring the implementation of international standards, establishing proper compilation and dissemination methods.

In light of Myanmar’s historical and contemporary statistical uncertainties, and the rising importance of accurate statistics as reform strategies are under development, there is strong interest in developing the necessary infrastructure and technical knowhow to provide statistical information that meets international standards. Currently, Myanmar’s economic data stock is weakened by fragmented and unreliable information, reported at inconsistent time intervals. Moreover, alternate sources for the country’s statistics from international and independent bodies are scant, largely due to historic limitations of reporting commitments. Despite all these constraints, promising signs of improvement are evident as the current government continues to pursue its mandate for global market and institutional engagement.

SECTOR/COMMODITY DETAIL

The current Myanmar CGE model was calibrated to a 32-sector, input-output table, reflecting reliable data available at the present time. For sectors with high levels of informal activity in particular, data constraints remain a serious challenge, but we believe it is better to explicitly model these activities than to ignore them. The resources allocated to them, supply, demand, and trade levels, may be uncertain, but they are not zero.

HOUSEHOLD DISAGGREGATION

To better understand patterns of spatial, demographic, and functional incidence, we have disaggregated Myanmar households according to rural and urban residency in eighteen administrative regions. For each representative household group, expenditure and income patterns have been estimated using the 2009-10, nationally representative, Integrated Household Living Conditions Assessment (UNDP 2009, 2011), updated with more

aggregate data from National Income and Product Accounts and the 2014 National Census.¹⁰

The 36 household groups used in the current version of the model are defined in Table 2. Distinctions between rural and urban may vary globally, but the functional difference is primarily the agricultural basis of livelihoods. Unlike OECD economies, non-agricultural households are a negligible percentage of rural populations in Myanmar.

Table 6: Sectors for the 2014 Myanmar Input-Output Accounts

No.	Label	Definition
1	Rice	Paddy Rice
2	OthCrops	Other Crops
3	Livestock	Livestock
4	Forestry	Forest Products
5	Fishery	Fishery and Aquaculture
6	OilGasCoal	Oil, Gas, and Coal Extraction
7	OthMin	Other Mineral Mining
8	ProcFood	Processed Food
9	BevTobac	Beverages and Tobacco
10	Textiles	Textiles
11	Apparel	Apparel and Footwear
12	WoodProd	Wood Products
13	PapPub	Paper Products and Publishing
14	RefPet	Refined Petroleum Products
15	Chemical	Chemical Products
16	NonMetMin	Non-metal Mineral Products
17	MetalProd	Metal Products
18	Machinery	Machinery
19	TranspEq	Transport Equipment
20	Electronic	Electronics
21	OthMfg	Other Manufacturing
22	Electricity	Electric Power
23	GasDist	Distributed Natural Gas
24	Water	Water Supply
25	Construction	Construction
26	TranspServ	Transportation Services
27	Comm	Communication and IT Services
28	WhRetTrade	Wholesale and Retail Trade
29	FinInsRE	Finance, Insurance, and Real Estate

¹⁰ Technical details of the estimation are fully documented in Roland-Holst (2015a).

No.	Label	Definition
30	PubAdmin	Public Administration
31	HotResTour	Hotel, Restaurant, and Tourist Services
32	OthPrvServ	Other Private Services

Table 7: Households Disaggregated by Rural-Urban Status and Region

	Label	Locale	Region
1	HRUnion	Rural	Union
2	HRKachin	Rural	Kachin
3	HRKayah	Rural	Kayah
4	HRKayin	Rural	Kayin
5	HRChin	Rural	Chin
6	HRSagaing	Rural	Sagaing
7	HRTaninth	Rural	Tanintharyi
8	HRBagoE	Rural	Bago (East)
9	HRBagoW	Rural	Bago (West)
10	HRMagway	Rural	Magway
11	HRMandal	Rural	Mandalay
12	HRMon	Rural	Mon
13	HRYakhine	Rural	Rakhine
14	HRYangon	Rural	Yangon
15	HRShanS	Rural	Shan (South)
16	HRShanN	Rural	Shan (North)
17	HRShanE	Rural	Shan (East)
18	HRAyeyar	Rural	Ayeyarwady
19	HUUnion	Urban	Union
20	HUKachin	Urban	Kachin
21	HUKayah	Urban	Kayah
22	HUKayin	Urban	Kayin
23	HUChin	Urban	Chin
24	HUSagaing	Urban	Sagaing
25	HUTaninth	Urban	Tanintharyi
26	HUBagoE	Urban	Bago (East)
27	HUBagoW	Urban	Bago (West)
28	HUMagway	Urban	Magway
29	HUMandal	Urban	Mandalay
30	HUMon	Urban	Mon
31	HUYakhine	Urban	Rakhine
32	HUYangon	Urban	Yangon
33	HUShanS	Urban	Shan (South)
34	HUShanN	Urban	Shan (North)

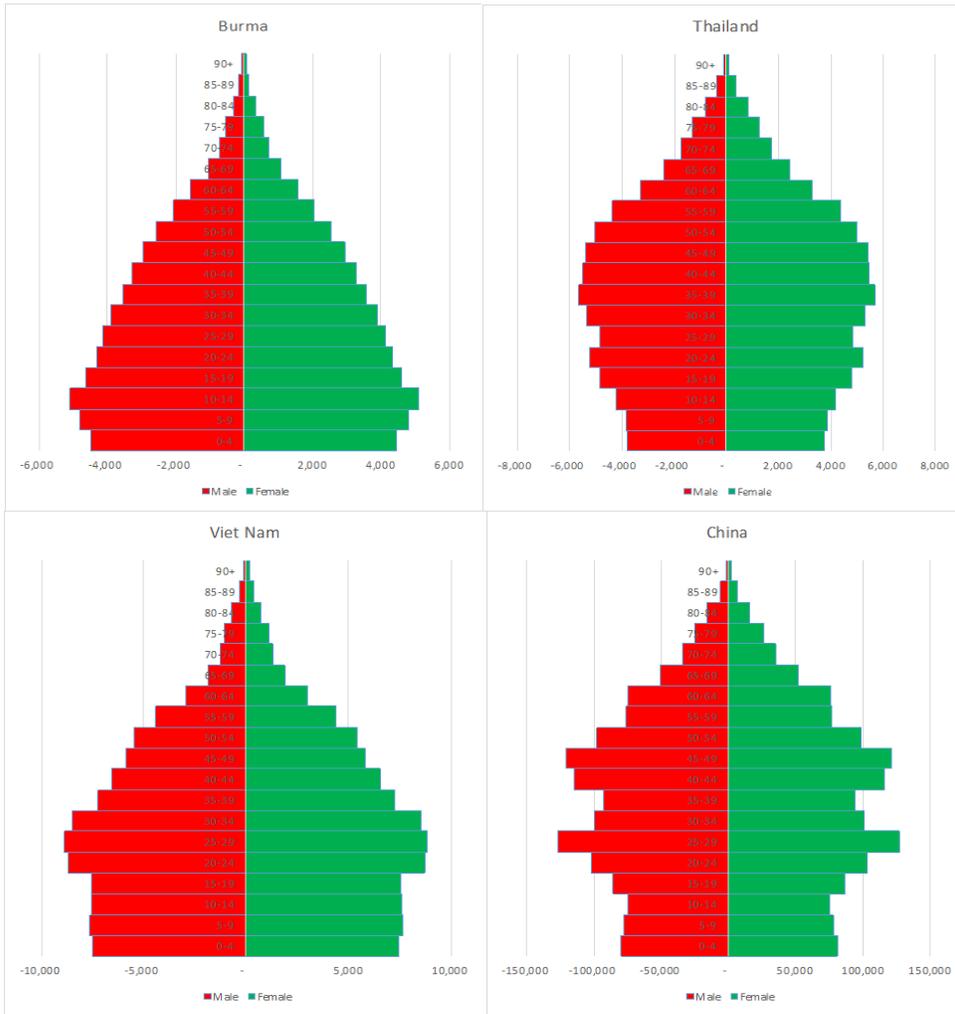
	Label	Locale	Region
35	HUShanE	Urban	Shan (East)
36	HUAyeyar	Urban	Ayeyarwady

DEMOGRAPHICS, LABOR, AND MIGRATION

Myanmar is one of the most ethnically diverse countries in Asia, especially for its size. Our spatial disaggregation of households captures proxies some of this diversity, but in general the economic model does not take account of ethnic or cultural demographic factors. Two very important demographic markers for economic analysis, however, are age and gender. While we do not incorporate gender differences in the current version of our labor market model, we feel it is essential to take account of the changing age structure of the population in terms of eligible workers. This has important implications for the nature of current employment but, through mechanisms of formal education and Technical and Vocational Education and Training (TVET), can have decisive impact on future labor force participation, productivity, and wages.

As Figure 17 indicates, Myanmar has a relatively young population for the region. Although this means high dependency rates in the short term, it promises a large opportunity for emerging human potential in the long run. It is axiomatic that the skills possessed by a country's population provide the fundamental determinants of prosperity and well-being. Developing skills is costly, however, so investments in skill building need to be made wisely. Obviously, policies toward public/private education and TVET could make a very big difference for Myanmar's long-term living standards, and we need a scenario framework that can take account of this.

Figure 17: Population by Age and Gender
(thousands)



Source: UNFPA (2015)