Growth, Aging, and the Future of East Asian Current Account Imbalances

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Abstract

For decades, East Asia has run large current account surpluses, resulting in financial outflows to deficit regions such as North America. The persistent imbalances have sparked criticism about the adverse impact on employment in deficit countries. However, the macroeconomic factors that have driven East Asian surpluses are now changing. Crucially, populations in a number of countries are rapidly aging, with potentially important effects on rates of saving and investment. We evaluate prospects for the region’s current account balances in the context of a national transfer accounts framework. We present initial scenario results and discuss important sources of remaining uncertainty.

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1. Introduction

For decades, East Asia has played a particular role in the pattern of global imbalances. With high rates of saving relative to investment, the region has run large current account surpluses, amounting to roughly half of the global total in recent years. (See Figure 1.) The surpluses have been balanced by financial outflows to deficit regions such as North America and many developing economies.

The pattern of persistent imbalances has sparked criticism abroad, particular in the United States. During the mid-2000s housing boom, there were complaints that a global saving glut from Asian economies and oil exporters was fueling an excessive capital inflow and contributing to the bubble that preceded the global financial crisis (Bernanke 2005, 2007). Throughout the past several decades, first with Japan and later Germany and China, US politicians have railed against foreign trade surpluses as an indication of unfair trade practices that export unemployment to the US and hollow out American industry. These arguments have reached a fever pitch recently with the Trump Administration’s imposition of tariffs aimed at reducing bilateral US trade deficits.

The macroeconomic factors that have driven East Asian surpluses are now changing. Crucially, populations in a number of countries are growing more slowly and are rapidly aging, with potentially important effects on rates of both saving and investment. Patterns of economic growth are also changing. China is decelerating and shifting toward a more consumption-based growth model. Outside the region, many European countries—and in less dramatic fashion the US—are also aging and slowing, while developing regions with younger populations are experiencing a shift toward larger working age populations. Globally, then, the configuration of factors that has driven current account patterns is shifting in ways that might lead to a very different picture in coming decades.

The demographic and economic factors that contribute to current account imbalances are complex. Demography matters, because it affects how many people are in young and old periods of life where they are net borrowers, compared with the number who are able to save. The volume of saving across countries depends on the differing extent of reliance on non-market familial transfers. On the investment side, countries with rapidly growing labor
forces and who are catching up in productivity will need more capital formation, compared with aging and slowing ones. And public policy matters. How developed are public support systems, and is that changing? Are current fiscal paths sustainable, or will significant retrenchment be necessary down the road? The problem is global, since one country’s deficit must be matched by other countries’ surpluses. If demographic and other factors are a source of imbalance, economic adjustments will have to occur to bring saving and investment back into balance on a world-wide scale.

[Figure 1 about here]

In this paper, we use the national transfer accounts (NTA) framework to evaluate prospects for the East Asian region’s current account balance. National transfer accounts describe in detail the age composition of a country’s flows of income, consumption, saving, and public and private transfers (United Nations, 2013; Lee and Mason, 2011). The accounts have been estimated for a large number of countries, including most of the region’s and the world’s largest economies. With appropriate assumptions, the accounts can be projected forward, to see how prospective changes in age structures are likely to affect national rates of saving, and with the addition of an investment model, potential paths for the current account balance.

We outline a strategy for modeling saving, investment, and current account balances in the NTA framework, and we present initial scenario results. As we will see, the prospective path of trade imbalances depends on things that are known with some confidence, such as the size and age composition of populations, and others that are highly speculative, such as potential behavioral changes in labor force participation, private saving propensities, technology, and changes in the size and financing of the public sector. Because of this, the simulations are most useful as a way of identifying key influences on future trade imbalances, rather than as forecasts of future current account paths.

2. East Asia’s current account surplus from a macroeconomic perspective

While discussions of trade imbalance naturally begin with consideration of the determinants of exports and imports, they necessarily reflect conditions at the macro level
(Krugman, Obstfeld and Melitz, 2018). From a trade perspective, the current account equals the net receipts from goods and services exports \((X - M)\) plus net income from foreign assets (NFI) and net unilateral transfers (NTR). For country \(j\) at time \(t\):

\[
CA^j_t \equiv X^j_t - M^j_t + NFI^j_t + NTR^j_t
\]  

(1)

The counterpart of a surplus of exports over imports is a financial outflow (FO) of national saving (S) in excess of the demand for funds for domestic capital investment (I):\(^1\)

\[
CA^j_t \equiv FO^j_t \equiv S^j_t - I^j_t
\]  

(2)

Note that national saving includes both private household and corporate saving and public saving or dissaving arising from government surpluses or deficits.

Alternatively, the current account balance can be viewed as reflecting the difference between national income \((Y)\) and domestic spending (i.e. absorption, \(C + I + G\)), which flows out to the rest of the world as net exports:

\[
CA^j_t \equiv Y^j_t - (C^j_t + I^j_t + G^j_t)
\]  

(3)

By definition, the net current account is zero globally:

\[
\sum_j CA^j_t \equiv 0 + SD_t
\]  

(4)

That is, the sum of all national deficits equals the sum of all national surpluses. (Alternatively, the sum of all financial inflows equals the sum of all financial outflows.) As a practical matter, measurement error means that there is often a large statistical discrepancy, \(SD\), on a global basis.

The East Asian region has consistently run a regional current account surplus and financial account deficit, as illustrated in Figure 1. From the macroeconomic perspective, this reflects consistently high national saving rates that have exceed rates of investment. Demography has played an important role. Japanese current account dynamics have been

\(^1\) The financial outflow includes net private purchases of foreign assets (financial account deficit), capital transfers, and any official reserve transactions. The latter are generally small for floating exchange rate countries like the US and Japan, but they have often been very large for China.
most closely studied. (Gangnes and Mason, 2016, provide a review.) In the 1970s and 1980s, falling fertility and the entry into middle age of the Baby Boom generation supported high Japanese household saving rates (Horioka, 1991; Mason and Ogawa, 2001), and population aging has contributed to the decline of saving recently, even if estimates of the impact vary considerably (Anderson et al., 2014; Chen et al., 2007; Braun et al., 2009). On the investment side, there is evidence that weaker labor force growth and lower rates of return on capital have contributed to slowing investment. (Fukao and Kwon, 2006, review a number of studies.) Research for China has also found important demographic effects on household saving (for example Modigliani and Cao, 2004), as do Horioka and Terada-Hagiwara (2012) for a panel of Asian developing countries.

Not all factors are demographic, of course. Rapid economic growth in East Asia may have boosted saving as consumption lagged income and households saved in anticipation of higher future living standards (Adams and Prazmowski, 1996). Cyclical weakness has affected both saving and investment in Japan (for example Hamada, 2007, and Iwasaki and Okada, 2012), as have one-time events, such as the 2011 Great Tohoku earthquake and tsunami that necessitated massive energy imports. In the medium term at least, swings in the public budget balance can be as much about economic over or underperformance as changing demographics. Underdeveloped social safety nets may have artificially raised saving to meet retirement needs, while inadequate local financial markets funneled much of that capital abroad (İmrohoroğlu and Zhao, 2017). For China, Yang (2012) argues that institutional factors that emphasized net exports and favored industry and government over households led to high corporate and government saving. Ma and Yi (2010) see an important role for Chinese structural reforms in pension systems, housing, and other areas. The Peoples’ Bank acquisition of dollar reserves, likely related to currency management, represented a significant support for the current account during the 2000s. Horioka and Terada-Hagiwara (2012) find that the level of income and the extent of financial development influence saving rates in a sample of Asian developing economies.

The future path of East Asian current account balances will depend, then, on the evolution of macroeconomic conditions that will drive relative changes in national saving and investment. Because important features of the underlying demographics are already in
place, it is possible to anticipate the likely impacts of these developments on saving and investment.

Life-cycle theory predicts that rates of saving will decline as a larger share of the region’s population ages and moves out of the labor force. However, there are some important potential offsets, including the effect of longer life expectancy on saving needs, increases in labor force participation, particularly by women, or a rebound in fertility from the currently very low levels that we see in many countries. Given fiscal pressures, there could also be policy changes that reduce or delay public pension and healthcare benefits, leading to increased saving and later retirements.

On the investment side, rates of fixed investment will fall as the capital stock needed to supply a declining labor force drops. Slower household formation will also hold down residential investment. Aging may reduce the quality of the labor force, reducing the return to labor, but it may also provide new incentives for investment in labor-augmenting technology and the substitution of capital for labor in an increasingly labor-scarce economy.

There is no clear consensus on the relative magnitude of the effects of population aging on saving and investment, either for the East Asian region or more generally. It is clear that a global view is needed, since one region’s deficit must be matched by another region’s surplus. From a financial perspective, countries and regions where saving is abundant relative to investment will tend to run surpluses, exporting capital to parts of the world where saving is relatively scarce.

There are a limited number of papers that look at prospects for global patterns of capital flows in coming years. A useful survey is Bosworth et al. (2004), especially pp. 38-40. They conclude that studies generally find that capital will flow from countries that are more rapidly aging to those that are earlier in the demographic transition, both within the OECD and from the OECD to the developing world. These flows will decline as the process of aging advances in the developing world. Abstracting from savings, Lueth (2008) generates investment paths and resulting capital flows for 176 countries. He finds a continuing role for Japan as a capital exporter to younger countries like the US and increasingly developing countries. China will also become a major capital exporter. However, other studies find that saving will decline more than investment in aging countries,
and this generates a very different pattern of global capital flows. IMF (2004) has current account balances for Japan and Europe moving into deficit, with rising inflows from other developed countries and increasingly from the developing world. Batini et al. (2006) lies somewhere between these cases, with capital outflows from Japan to other countries declining, but the country remaining in positive current account territory. (Neither of these two model-based analyses breaks out other Asian economies.)

Our research addresses these issues by exploiting the rich information available in national transfer accounts about age variation in private consumption and asset accumulation, taxation, public outlays, and intergenerational transfers. Combined with investment modeling, the NTA framework can be used to project saving and investment across a wide range of countries, given anticipated demographic change. For countries where the forward-looking modelling has proceeded the furthest, including three East Asian countries, we are able to explore alternative scenarios, particularly involving public expenditure and finance. A broader, but more limited, global projection framework also allows us to look at the East Asian region in a global context, and to evaluate the overall direction of saving-investment balances at the global level.

3. Modeling demographic impacts on saving, investment, and the current account in the national transfer accounts framework

3.1. National Transfer accounts.

Many important policy issues involve economic and social impacts of demographic change. These include, for example, the effects of declining youth dependency on economic development and of aging on public finances. National Transfer Accounts (NTA) have been developed to provide a comprehensive system of age-based accounting. These accounts, which can be viewed as satellite accounts to the System of National Accounts (SNA), articulate the age disaggregation of national accounts and provide estimates of public and

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3 Here we provide only a brief sketch of NTA principles. A detailed description of the NTA framework is provided in United Nations (2013). An overview and wide range of applications related to aging are included in Lee and Mason (2011). Our presentation draws heavily on Mason et al. (2015).
private transfer flows within and between generations. NTA accounts have been developed for 60 countries, and simplified estimates have been made for another 106 countries.

At the core of the NTA account is the economic lifecycle. There are extended periods at the beginning and end of life when consumption exceed labor income.\(^4\) These lifecycle *deficits* must be met by a transfer of resources across age groups, either through private or public transfers or the use of assets. This feature of the generational economy is captured in a basic flow identity, which holds for an individual, a generation, or a national economy:

\[
C(x) - YL(x) = T(x) + RA(x)
\]

where \(C\) is consumption, \(YL\) labor income, \(T\) net transfers, and \(RA\) asset-based reallocations, all classified by age \(x\). Consumption is the value of all goods and services whether public or privately produced. Labor income is the pre-tax value of labor earnings, including an estimate of self-employment income accruing to household and the value of the labor of unpaid family workers. The gap between consumption and labor income, the lifecycle deficit, measures the extent to which each age group is producing enough through its labor to meet its material needs.

To illustrate, the per capita lifecycle profile of consumption and labor income by age for China 2002 is shown in Figure 2. All values in the figure are expressed relative to the per capita labor income of persons 30-49, called YoLYs (for years of labor income). The age pattern of labor income rises starting at around age 10, reaches a peak at about age 40 and then declines. The most distinctive feature of consumption is the high peak in the late teens which reflects high levels of public and private spending on education in China. Adult consumption (after the early 20s) is relatively flat with a slight decline at older ages. Adults between the ages of 23 and 59 have life cycle surpluses while those 22 and younger or 60 and older have lifecycle deficits.

\(^4\) Franco Modigliani and co-authors developed the theoretical interpretation of this regularity as the result of intertemporal planning by households, as well as much of the early empirical testing. See Modigliani and Brumberg (1954, 1990), Ando and Modigliani (1963). A nice overview is given in Deaton (2005).
The lifecycle deficit is balanced by transfers and asset-based reallocations of resources between periods. Both public and private transfers are distinguished. Public transfers consist of transfer inflows and outflows distinguished by their purpose – education, health, pensions, and other public transfers. Private transfers are predominantly familial transfers and include estimates of transfers within households, intra-household transfers, as well as transfers between households, non-profit institutions, and the rest of the world.

For our purposes, of primary importance are asset-based reallocations. For persons of a given age, asset-based reallocations are equal to the excess of asset income over saving. Inflows are generated by asset income or dis-saving generating resources in excess of labor income. The resources could be used, for example, to fund consumption in excess of labor income during retirement. Or, if parents’ labor income is insufficient to fund their own consumption plus the net transfers they make to younger and older individuals, asset-based reallocations fill in. Asset-based reallocations can also generate outflows: interest expense for example, and saving. Both public and private asset-based reallocations are estimated.

The reallocation system for China is shown in Figure 3 with public transfers, private transfers, and asset-based reallocations (public and private combined) distinguished. Transfers are net values, meaning that they are equal to transfers received by members of the age group less transfers paid by the age group. The life cycle deficit for children is funded almost entirely by transfers. Private transfers are much more important than public transfers for children. Transfers are also very important for the elderly, with public transfers very large for younger elderly and private transfers large for older elderly. Assets are generating net positive inflows for the young elderly, that is, their saving is exceeded by their asset income. Saving exceeds asset income for the old elderly but the values are small.

Private saving or dissaving, then, is driven by the desire to meet consumption needs at different life stages (note there is considerable consumption smoothing in Figure 2), as well as to meet desired transfers to younger and older individuals. National saving involves also the net saving of the public sector, the difference between public transfer outflows from the private sector (taxes) and public transfer inflows, including public cash transfers and all
in-kind transfers, that is, public consumption. As for the private sector, these transfer flows are identified for each age group, so that there is a pattern of taxes and transfers over the lifespan. Generally, there are net inflows of public transfers to young and old for youth education and old-age public pensions, and net outflows from prime-aged adults.

A public transfer deficit or surplus, not at each age but in total, must be balanced by public asset-based reallocations. If taxes are insufficient to fund transfers, the deficit must be funded by relying on public asset income, if sufficient, or public borrowing. If taxes exceed public transfer inflows, the surplus can be devoted to paying interest expense on public debt, if any, and to public saving if revenues are sufficient.

Changes in the age structure of the population over time will alter aggregate values across the economy, holding fixed age profiles of economic variables. For example, declining fertility rates will reduce the number of people in young age groups and raise the number of working age, raising total and per capita labor income and reducing the need for downward transfers, producing a (first) demographic dividend for developing countries. The rapid aging that is now taking place in many developed and some developing economies places relatively more people in older age groups, increasing the need for both public and private transfers and potentially creating burdens on living standards and the sustainability of public finances. But it may also increase saving levels as prime-aged earners prepare for needed asset-based reallocations. This could raise resources for human and physical capital accumulation in what has been referred to as the second demographic dividend (Lee and Mason, 2010; Mason and Lee, 2007. Mason and Kinugasa, 2008, estimate the dividend effects on Asian saving rates.)

Figure 4 shows how the support ratio—the ratio of effective workers to consumers—for China has and is expected to evolve over time as these transitions unfold. Of course, the age profiles of income, consumption and public transfers and taxes may also evolve over time, reflecting changing preferences, institutions, or financing opportunities or constraints.

The capital account of the national accounts has not been articulated in the NTA. As a result, the NTA does not provide an accounting for the manner in which capital investment is affected by changes in the age distribution. However, there are clearly ways that evolving
demographics may affect investment. Changes in the size of the labor force alone will drive changing needs for physical capital to equip the work force. A smaller number of children might lead to greater investment in human capital per child a la Becker’s (1973) quality-quantity tradeoff. Aging societies might invest in more physical capital as they substitute capital for increasingly scarce labor. And, as we note above, demographic changes that alter saving may affect resources for investment, although, in a global setting with international capital mobility, national saving and investment need not be equal, as financial capital can flow from surplus to deficit economies.

3.2. Projecting the NTA: Saving, investment, and the Current Account

The NTA system is an accounting structure, and core relationships like the lifecycle flow relationship (5) are accounting identities. As our discussion above suggests, in order to generate projections, it is necessary to model behavioral elements of the NTA and government policy or to make explicit assumptions about the future paths of NTA components. In what follows, we outline two different model structures that we use to project NTA-based values for saving, investment, and the current account balance.

The first approach, using what we refer to here as the NTA/World Bank model,\(^5\) incorporates a substantially detailed modeling framework where the private sector responds endogenously to demographic change and changes in public policy. (See Mason et al. 2015, 2016a, and 2016b.) The framework, which has been implemented for a limited number of countries,\(^6\) was designed specifically to look at the relationship between population aging and the size and structure of government. Exogenously assumed public policies govern taxes and spending and indirectly determine public saving and debt. Age groups then respond to changes in the population age structure and public policy, allocating resources among consumption, private transfers, and saving.

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\(^5\) The model was developed under the NTA/World Bank project, *Aging and the Changing Nature of Intergenerational Flows in Developing Countries*.

\(^6\) The economies include Brazil, China, Germany, Hungary, India, Japan, Mexico, Nigeria, South Africa, Thailand and the United States. For our analysis, we have omitted Nigeria because of problems with model convergence.
In the NTA/World Bank model, which is described in detail in Mason et al. (2015), economic growth depends on growth in the labor force and changes in the productivity of workers, whose labor income at each age shifts upward at an exogenous, but possibly time-varying, rate of productivity growth (see Appendix). The public sector model generates projections for public spending, revenues, deficits, debt and more detailed components, for example spending on education, health care, and public pensions, based on demographics, economic growth, and age profiles for public sector inflows and outflows. The model can be used to produce very long-run projections of many decades in length. The countries included in the model cover a range of economies at various stages of the demographic transition, from “young” low-to-moderate income countries like Mexico and South Africa to high-income but rapidly aging countries like Japan and Germany, and China, which has been called the first country to become “old before rich.”

In the projections, normalized age profiles of income, public consumption, and taxes are held fixed or exogenously varied, while other profiles—private consumption, saving and transfers—are endogenous. As we discussed above, this will lead to changes in aggregate variables as the number of individuals of a given age evolves over time, that is, the effects of changing age composition. The approach also incorporates more complex effects of age structure on age patterns of private consumption, transfers, and saving. Other effects are not incorporated, for example increasing rates of female labor force participation or changing retirement ages. The analysis is therefore best viewed as an attempt to capture purely demographic effects, holding all other such factors fixed.

As we will see below, the results for public and private sector aggregates—including public and private saving—depend importantly on the assumptions made about the future course of government policy. Under a status quo scenario, existing normalized age profiles of taxes and transfers are assumed to persist over the projection period. However, this assumption may not be viewed as realistic, both for developing countries with currently underdeveloped public sectors or for advanced economies where the status quo is likely unsustainable. Alternative scenarios can have particularly large impacts on public saving, which will markedly affect current account balance projections.
The NTA system has no role for capital investment, and so it has not been previously incorporated in the NTA/World Bank model. We introduce a fairly simple model, assuming that investment is sufficient to maintain a target ratio of capital to output. Gross investment as a share of GDP is given by:

\[ i_t^r = k_t \left( \frac{\Delta Y_t}{Y_t} + \frac{\Delta k_t}{k_t} + \delta \right) \]  

(6)

where \( k \) is the capital/output ratio, \( Y \) is real output, and \( \delta \) is the annual rate of capital depreciation. Note that in principle we allow for trends in the capital/output ratio, which may be appropriate for some developing economies. For simplicity, in the current analysis we assume constant capital/output ratios based on the most recent year (2014) values from the Penn World Tables. The rate of capital depreciation is set at 5% for all countries, although this could be made country-specific. The model is not a growth model, and there is no feedback to economic growth from capital formation.

Demographic change will impact investment to the extent that it changes the rate of growth of the labor force (and therefore aggregate output.) Countries in the first demographic dividend stage of development, with rapidly growing labor forces, will support much higher rates of investment than those whose working age populations are in decline. As noted above, there are other non-modeled channels through which demographic change could affect investment, for example substitution from labor to capital that raises the desired capital/output ratio.

We use the NTA/World Bank model described above to produce projections of saving, investment, and the current account for ten countries. The model is particularly useful because it projects private and public saving separately, and it provides a detailed structure for evaluating the implications of alternative government policy regimes. However, while it covers a number of leading economies, it does not permit modeling of regional or global current account balances. For that, we need a model with significantly broader coverage.

Mason et al. (2017) report recent work to develop NTA projections for nearly all countries in the world, 60 for which NTA profiles have been completed by various NTA research groups around the globe and another 106 where profiles are estimated based on
country characteristics relative to other NTA countries. From here on, we will refer to this as the Multi-Country NTA model. Of necessity, the projection modeling is much more limited, which will also limit the range of issues it can address.

In the Multi-Country NTA model framework, the lifecycle is summarized using just two age profiles for each country, one for labor income and the other for consumption. Both are comprehensive measures. Labor income consists of earnings including benefits, self-employment labor income, and estimated labor income of unpaid family workers. This measure reflects age variation in labor force participation, unemployment, hours worked, and productivity. Consumption includes both private and public consumption by age, and attention has been taken to estimating public and private spending on education and health care as these components vary considerably by age. The labor income and consumption profiles and population by age are then used to generate a range of demographic indicators, including support ratios and measures of the first and second demographic dividends that we discussed above. In projecting the model forward, age profiles of labor income and consumption are held fixed. Non-labor income is taken as proportional to labor income. Together these assumptions imply that each age group within a country allocates available resources between consumption and saving at a time-invariant ratio. Aggregate values change as the age distribution of the population evolves. Both labor income and consumption profiles shift up by an exogenous rate of annual productivity growth. At present, this rate of growth is assumed to be a constant 1.5% for all countries, although this will be generalized in future research. Note that private and public saving cannot be separately broken out in this model. We model investment for each country as for the ten-country model above.

4. Preliminary projection results

We will begin by presenting results for the ten-country NTA/World Bank model. Figure 5 shows projected paths through 2065 for gross saving, investment, and the current account for each of the ten countries. The countries fall broadly into three categories:

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7 This research was developed by NTA researchers for the United Nations Population Division.

8 Model projections have been adjusted to line up with IMF historical values for a recent year, and these constant adjustments are then carried forward. These normalizations do not affect relative magnitudes of changes in saving, investment, and the current account.
relatively young developing countries still within the first demographic dividend stage (Brazil, India, Mexico, and South Africa), mature developed economies (Germany, Hungary, Japan, and the United States), and two rapidly-aging developing economies (China and Thailand). Notice that in young developing economies, saving rates are high and will continue to rise for decades. Saving rates will decline in the developed and rapidly-aging developing economies, in some cases markedly. Saving will decline at a more gradual rate in others, particularly in the United States.

[Figure 5 about here]

Investment rates are high in developing economies because of their rapid labor force growth and high transition rates of productivity growth. However, investment as a share of GDP will decline in coming decades as labor force growth slows and productivity converges to the developed-country average. As a result, given existing age profiles of income, consumption, and public sector inflows and outflows, current account balances will swing from deficits to surpluses over the next decade or two, and they will run very large surpluses by mid-century. Among the high-income countries, the US, Japan, and Hungary will see relatively small current account imbalances for the next two-to-three decades, before saving starts to fall well below a stable investment rate, and large current account deficits develop. Because the US is aging less rapidly, its move to deficits is less dramatic. Germany’s huge current account surplus will persist for some time, as will Thailand’s, before those countries, too, move to deficit. China is an interesting case where aging brings down both investment and saving at roughly similar rates, although the current account remains in substantial surplus throughout the half-century projection horizon. Needless to say, the magnitude and persistence of these current account imbalances would likely be unsustainable, and we will return to that issue below.

For both groups of countries—those swinging to surplus and those toward ever-larger deficits—it turns out that public sector fiscal balances play a very large role. For the deficit countries, this is straightforward: given existing age profiles of taxes and transfer inflows, budget paths become unsustainable over time, as, for example, public pension and healthcare demand surges and support ratios fall. For the young developing countries, current rates of public service provision are very low, as are net public transfers to the young
and the elderly. Carrying that structure forward, as the working population expands, tax receipts rise, while the rise in public outlays is modest, so the government surplus rises. (See Mason et al., 2015.)

Figure 6 shows a breakdown of saving into private and public saving for a country from each camp. In India, the public sector budget moves from a small deficit in 2015 to a surplus of about 5% of GDP by 2035. In Japan, the government budget plunges to 10% of GDP by 2045, growing ever larger thereafter. The movements in public saving are more than enough to offset or dominate movements in private saving.

[Figure 6 about here]

The changes in public saving flow from the assumption that age profiles of NTA variables are held fixed as the population age structure changes over time. The NTA/World Bank model can also be used to evaluate the implications of alternative potential paths for fiscal policy. Here, we introduce two scenario elements: 9

1. Transition public sector profiles. Normalized age profiles of public transfer inflows and outflows are gradually adjusted toward those of typical high-income countries that have high rates of net public transfers to the elderly, what we refer to as a social welfare profile. This entails a significant expansion in the size of government for most developing counties, and we limit the increase that can occur in taxes and public transfer inflows to no more than 30% of GDP.

2. Constraints on the size of government and of public debt. Taxes and public transfer inflows are capped at 45% of GDP. For the US, they are capped at 35%, reflecting the greater reliance on private asset accumulation to meet retirement needs in the US. Net public debt is capped at 90% of GDP for all countries except Japan, a figure that is sometimes viewed as a “problem” level for sovereign debt financing. Japan has been able to run considerably higher debt levels (in fact, exceeding 150% of GDP recently) with no apparent financing difficulty, so we

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9 See Mason et al. (2015) for details and a discussion of other possible fiscal scenarios.
set a higher 125% of GDP long-run constraint on Japanese public debt. The size of government constraint, if attained, is addressed immediately through cuts to taxes and/or spending; the public debt constraint is only imposed in the long run, and net debt may exceed this limit during the transition to the long run.

We combine these two elements into what we will call the “constrained” scenario. The particular values assumed for these scenarios are admittedly arbitrary. They are a useful way for us to explore the sensitivity of saving and current account projections to alternative fiscal policies, but we do not consider them forecast paths.

Figures 7 and 8 illustrate their effect on the two representative economies that we discussed above, India and Japan. In Figure 7, the effect on India of the transition to the social welfare public sector profile is illustrated. The normalized age profiles for transfer inflows and outflows (taxes) are shown in the two righthand charts. Note the large spike in inflows at young ages, related to education, and the flat profile at high ages corresponding to limited old age public transfers. In the top left chart, we see that as the population becomes more mature, public inflows fall and taxes rise, moving the public deficit into negative territory (that is, the budget turns to surplus). The result, shown in the bottom left, is rising public saving and a reduction in government sector debt (that is, an increase in public sector net wealth).

Comparing panel 2 of Figure 7, we see the effect of moving taxes and spending toward the social welfare target. The righthand charts show that the targets are implemented by gradually scaling upward the age profiles of inflows and taxes to approach the characteristics of target economies. This dramatically increases transfers to old aged individuals. Taxes rise the most on middle-aged residents. In the upper left chart, inflow and tax paths move upward and toward each other over time. Notice that net saving actually rises faster in this scenario than under the status quo, because taxes rise. Only late in the projection period—beyond the “hump”—does public saving begin to turn down.

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10 It is very possible that the United States could also support a debt level well above 90% of GDP, because of its particular role as the primary reserve currency country, its exceptionally deep financial markets, and the strong demand for ultra-safe US Treasury assets.
Figure 8, for Japan, shows the marked difference that fiscal constraints on public debt make for this rapidly-aging society. Without constraints (panel 1), public transfer inflows grow much faster than taxes, and wide deficits push net debt in the bottom left to 700%(!) of GDP by 2065. With constraints (panel 2), very large expenditure cuts must be realized to stay within the fiscal limits. Public saving can worsen for a time, but eventually moves upward so that public finances can converge to 125% of GDP eventually (beyond the final year, 2065, shown here).

Panel b of Figure 6, above, shows private, public, and national saving for India and Japan for these simulations. Here, we also add fiscal constraints for India, although they do not bind over the time period shown. Note the move to balance for Japan, which yields much higher national saving. For India, the effects are much smaller, suggesting that for young countries, high national saving will contribute to current account surpluses for many decades, even if their public sectors grow substantially in size.

Figure 9 shows saving, investment, and current account paths for each of the ten countries with convergence toward the social welfare profile and with government size and debt constraints. Note that for each of the three East Asian countries, higher public saving and national saving paths push current accounts to surplus territory, although for Japan this does not happen until after 2030. In fact, all ten countries eventually move strongly into surplus territory. We will return, below, to a discussion of the implications of wide-spread current account imbalances.

The next set of figures show an initial and very preliminary set of scenarios for the multi-country model. We report only regional aggregate balances.

Figure 10 shows regional totals for investment, saving, and the current account balance for four regions. The results are broadly consistent with the unconstrained country-specific results from the NTA/World Bank model. Eastern Asia and Europe remain in surplus for an extended time period, before falling into deficits as more and more of their populations move into low tax, high transfer periods of life. Southern Asia and Africa move to large surpluses as demographics favor higher total earnings and relatively lower overall public outlays for education. Southern Asia, which is further along in the
demographic transition than Africa, begins to see declining saving and moderately smaller current account surpluses after 2045. These scenarios do not feature fiscal constraints or target spending and tax profiles, so there is no constraint on running very large and persistent budget deficits or surpluses.

[Figure 10 about here]

The global pattern and overall balance on the current account is reported in Table 1. These figures are presented both as percentages of global GDP and percentages of regional GDP. For the shares of global GDP, of course, size matters. Northern America has the largest current account imbalance relative to the size of the global economy, with Europe not far behind once we get to the out years of the projection. The current account surpluses of Southern Asia and Africa, while large as percentage shares of their regional GDP, are relatively small on a global basis.11

There are several observations that are worth making about the regional and global figures in Table 1. First, regional current account imbalances are much larger than we have experienced historically. While particular regions have experienced very large current account gaps—the US deficit was 1.6% of global GDP in 2005 and 2006, and East and Southeast Asia combined roughly 1.3% in 2007—persistent deficits of this size are clearly unsustainable. Simply on empirical grounds, national rates of saving and investment are highly correlated (Feldstein and Horioka, 1980), so that current account gaps tend not to persist. From an economic standpoint, there are self-limiting aspects of current account imbalances, such as the implications for spending of international wealth redistribution, portfolio composition effects, and the enforcement by markets of intertemporal budget constraints (Adams and Gangnes, 1996).

[Table 1 about here]

Second, by 2065 the sum of current account balances is a massive deficit amounting to 7% of world GDP. Since the current account must balance globally, this cannot of course occur. If it is an accurate description of behavior, however, it suggests

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11 In fact, these preliminary estimates assume constant productivity growth for all countries. More realistic productivity paths that begin much higher for developing countries would of course increase their weight in global aggregates.
there will be a global shortage of saving relative to investment needs. Such a shortage would be expected to drive up global interest rates, inducing lower volumes of investment and a shift away from consumption toward saving. In this sense, while the particular configuration of these projections cannot emerge, it may give us useful information about the balance between the demand and supply of capital that could occur as aging drives down saving in many of the world’s regions.\textsuperscript{12}

Finally, we note two differences between these multi-country projections and the ten-country NTA/World Bank model scenarios. Here, there is no separate treatment of public and private consumption. As we saw, part of the change in national saving—both in the developed and developing world—came on the public side. A structure that allowed us to alter the path of public consumption relative to income could alter the regional saving paths considerably. In addition, the current version of this multi-country model assumes a common (low) rate of productivity growth. Accounting for current higher rates of growth in developing countries would maintain investment rates at a higher level for some time and would raise the weight of developing regions in the overall global current account picture.

5. Conclusion

This paper has looked at how changing demographics are likely to affect the current account balances of East Asian countries in coming years. Using information on existing age profiles of macroeconomic indicators in national transfer accounts, we have asked how demographic forces by themselves will affect the saving and investment flows that determine current account balances. We have generated fifty-year projections for China and Japan, as well as a number of other economies at various stages of the demographic transition. We have also generated regional and global balance projections. Given existing age profiles, the preliminary projections reported here generally show an eventual move to ever-larger

\textsuperscript{12} Higgins (1998) makes a similar observation—but in the opposite direction. His econometric analysis predicted a global current account surplus emerging by 2010, based on increased saving associated with lower youth dependency rates and declining investment as labor force growth slows.
current account deficits for East Asia and other advanced regions as they continue to age. Persistent surpluses are indicated for younger developing economies as larger shares of their populations move out of youth into prime working (and saving) ages.

At the same time, we know that age profiles are unlikely to persist in their current form in coming decades. In East Asia, as elsewhere, there may be behavioral changes in working and retirement ages, attitudes toward consumption and thrift, or changes in social norms regarding intergenerational transfers. Public policies may influence these changes; witness the push in China away from investment-led growth toward a more consumer-oriented economy. Societies may meet aging challenges by investing more in human capital or in labor-saving technology. And demography itself may change, for example in a rebound of fertility rates in East Asia from their current very low levels. One factor that will certainly change is the size and composition of government. For advanced economies, like Japan, existing patterns of spending and taxation will become unsustainable. For developing economies, as income rises there will be demand for more public services. We show that modifying government policy to address these issues can have very large impacts on national saving and can move current account paths well away from unconstrained paths. In particular, limits to the size of government would push most advanced economies away from current account deficits toward persistent surpluses.

Our analytical framework is limited in a number of respects. The treatment of the macroeconomy is particularly simple, consisting essentially of assumed paths for productivity growth, inflation, and other values. Investment is determined by capital needs, but there is no feedback from investment to economic growth. We do not account for international asset accumulation that results from financial flows, and which in turn affects future current accounts.\(^\text{13}\) Importantly, unlike global equilibrium models and some econometric approaches (for example IMF, 2004, Batini et al., 2006; Guillemette et al., 2018), we do not have a mechanism by which saving-investment imbalances are reconciled at the global level to generate a consistent pattern of current accounts across countries. To

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\(^{13}\) It is noteworthy that recently Japan’s current account is in surplus only because a large net income flow is offsetting a small deficit on goods and services trade.
some extent, these limitations reflect the very early stage of macro modeling work within the NTA framework, and we anticipate addressing a number of these issues in future work.
References


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Ma, G. and W. Yi (2010), China’s high saving rate: myth and reality, BIS Working Papers Number 312.


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Figure 1. Current account balance by region, percent of global GDP.

Note: Categories of surplus and deficit countries based on their position in 2007.
Source: Authors’ calculations based on IMF Balance of Payments and International Investment Position Statistics (BPO/IIP).
Figure 2. Per capita annual consumption and labor income by age, China, 2002.

Note: All values are expressed in YoLYs, the simple average of annual per capita labor income of persons 30 to 49. Source: Mason et al. (2015), page 3.
Figure 3. Per capita public transfers, private transfers, and asset-based reallocations by age, China, 2002.

Note: All values expressed in YoLYs, the simple average of annual per capita labor income of persons 30 to 49. Source: Mason et al. (2015), page 4.
Figure 4. Support ratio for China 1950-2050.

Source: United Nations (2013), Figure 1.3, page 11.
Figure 5. Projections of Saving, Investment, and the Current Account Balance (% of GDP)

Status Quo Scenario
Figure 6. Private, Public, and National Saving (Percent of GDP), Status quo and Social Welfare Scenario with Fiscal Constraints

a. Status Quo

b. Social welfare target with fiscal constraints
Figure 7. India, Status Quo and Social Welfare Scenarios

1. Status Quo Scenario.

2. Social Welfare Scenario

Source: Author’s calculations.
Figure 8. Japan, Status Quo Scenario and with Fiscal Constraints

2. Status Quo Scenario

2. With Fiscal Constraints

Source: Author’s calculations.
Figure 9. Projections of Saving, Investment, and the Current Account Balance (% of GDP) 
Social Welfare Scenario with Fiscal Constraints
Figure 10. Regional saving, investment, and current account balances, Multi-country model (% of regional GDP at 2010 PPP dollars)

Eastern Asia

Southern Asia

Africa

Europe
<table>
<thead>
<tr>
<th>Region</th>
<th>2015</th>
<th>2025</th>
<th>2035</th>
<th>2045</th>
<th>2055</th>
<th>2065</th>
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<td>0.4</td>
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<td><strong>B. As percent of Regional GDP</strong></td>
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Appendix

Productivity growth rate assumptions for NTA/World Bank model

Table A.2. Productivity growth, Actual and Projected

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<td>1.05</td>
<td>(0.48)</td>
<td>1.10</td>
<td>3.0</td>
<td>see note</td>
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</tr>
<tr>
<td>China</td>
<td>8.29</td>
<td>6.76</td>
<td>6.93</td>
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<td>see note</td>
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<td>1.5</td>
<td>1.50</td>
</tr>
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<td>(1.32)</td>
<td>1.60</td>
<td>2.0</td>
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<td>1.50</td>
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<td>India</td>
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</tr>
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Note. If productivity growth exceeds 1.5 percent in 2030, it declines linearly to 1.5 percent between 2030 and 2050.

Source: Mason et al. (2015), page 53. Growth of real output per effective worker is assumed to grow at rates shown in Table A.2. Values for 2011 and 2012 are based on actual values while projected values are based to varying degrees on long-term growth estimates from other studies. See their footnote for data sources.