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ASIAN DEMOGRAPHY AND FOREIGN CAPITAL DEPENDENCE

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ABSTRACT

Ansley Coale and Edgar Hoover were right about Asia. Rising fertility and declining infant mortality have had a profound impact on Asian savings, investment and foreign capital dependency since Coale and Hoover wrote in 1958. We argue that: Much of the impressive rise in Asian savings rates since the 1960s can be explained by the equally impressive decline in youth dependency burdens; Where Asia has kicked the foreign capital dependence habit is where youth dependency burdens have fallen most dramatically; Aging will not diminish Japan's capacity to export capital in the next century, but little of it will go to the rest of Asia since the rest will become net capital exporters, at least if demography is allowed to have its way. These conclusions emerge from a model which rejects steady-state analysis in favor of transition analysis, and extends the conventional focus of the dependency rate literature on savings to investment and net capital flows.

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Outline

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Thanks!

I. Linking Demographic Change and World Capital Markets in Asia

As this century draws to a close, it seems appropriate to take one last look at an hypothesis that has generated hot debate ever since Ansley Coale and Edgar Hoover (1958) wrote about it almost forty years ago, and for that part of the world where they thought it mattered most -- Asia. The thesis is simple enough: rising fertility and falling infant mortality create economies full of young households and young governments burdened with high (child) dependency rates who are therefore unable to save more than a small share of their household incomes or tax revenues. While the hypothesis has had its empirical ups and downs since 1958, nobody seems to disagree that it has had its greatest success in Asia and that 20th century economic history of the region offers the greatest variance in the demographic variables that matter most to the hypothesis. This paper uses that history to say something about foreign capital dependency in the present century and the next.

What does a child dependency burden cost? Obviously the answer depends both on the number of children (their quantity) and expenditures per child (their quality): households tend to substitute quality for quantity as their incomes rise. While we don't have very good evidence on dependency burden costs for Asia, we do know what the figure was for the United States in 1992: one-seventh of GDP (Haveman and Wolfe 1995, Table 1). We also know that about two-thirds of this was a burden on parents (including the opportunity costs of mother's time), while one-third was a burden on governments (most of which was education). These burdens seem big enough to worry about, even for an economy in which children are a small share of the total population.

While the literature on the dependency rate hypothesis is enormous, it has three surprising limitations. First, typically it stops after testing the hypothesis. Rarely does it take the next step, namely to use the econometrics to decompose the sources of savings rate changes through time or across countries. Second, the dependency rate models use steady-state behavior to analyze a problem of transitional dynamics. Third, and perhaps most important, the focus has been almost exclusively on domestic savings. Rarely has anyone asked whether dependency rates (or other demographic variables correlated with them) might have a significant impact on domestic investment. Hardly ever has anyone explored the impact of these demographic events on excess investment demand, and thus on net capital inflows. As Alan Taylor and one of the present authors argued when trying to explain the massive late 19th century capital flows out of the demographically old Europe and in to the demographically young periphery, one might even view them as intergenerational transfers from old to young (Taylor and Williamson 1994; see also Taylor 1995). Can the same be said about Asia since the 1950s?

This paper will seek answers to questions like: How much of the impressive rise in Asian savings rates can be explained by the equally impressive decline in dependency burdens? How much of the fall in external capital dependency throughout much of Asia can be explained by the same demographic forces? How much of the difference in savings rates and external capital dependency between sluggish South Asia and booming East Asia can be explained by their different dependency burdens? Will the young Asian tigers full of productive adults have become net capital exporters by the year 2025? What about the old Asian tigers who may by then have become glutted with retired adults?

Before we get to the answers, we need to clear away some important underbrush. The next section will survey the evidence on the evolution of the dependency rate in Asia: It establishes whether or not there was a demographic revolution somewhere around the 1950s when the region moved abruptly away from a pre-industrial demographic equilibrium. It also assesses the magnitude of the dependency rate changes by comparing them with the experience of other countries at comparable stages of development. Section III documents the evolution of domestic savings, investment and foreign capital flows as shares of GDP. Is foreign capital dependency at least crudely correlated with the evolution of dependency burdens over time and across regions in Asia? Section

IV explores the theory relevant to the dependency rate debate, while the next section relies heavily on the previous work of one of the present authors (Higgins 1994, 1995) to estimate the impact of dependency rate changes on Asian savings, investment and thus net capital flows. These econometric results are then used in Section VI to identify the role of dependency rates in accounting for changes in Asian savings, investment and capital flows since the 1950s. Section VII explores their likely role in shaping changes by the year 2025.

So, does Asian history suggest that heavy child dependency burdens tend to create heavy foreign capital dependency? As Asian countries aged and their child dependency burdens fell, did they tend to break their foreign capital dependency habit? Will Asian foreign capital dependency diminish still further as dependency burdens continue to fall in the next century?

II. A Revolutionary Change in Asian Dependency Rates Since the 1930s?

The Demographic Past

Coale and Hoover argued in 1958 that the sharp decline in infant mortality initiated in the 1930s implied a huge future increase in the Asian youth dependency rate, especially if reinforced by the persistence of high birth rates. They were, of course, correct. With only two precocious exceptions, Sri Lanka (1955-59) and Japan (1950-54), Asia surged to peak youth dependency rates in the 1960s and 1970s. The modal country peaked in the 1960s. All of this evidence on changing Asian dependency rates in the second half of this century are summarized in Table 1.

In none of these countries did the elderly dependency rate matter, a future influence only hinted at by the region's economic and demographic leader, Japan, as her share 65 and older began to rise noticeably in the 1970s. With this exception, the "old" share has been mostly irrelevant to Asia in this century. It will, of course, become very relevant to the older tigers as they enter the next century.

The youth dependency rates were much higher in developing Asia than they were in the developed countries. While the OECD "young" share averaged about 26% during the baby boom in the 1950s,[1] the peak rates in Asia were in many cases 20 percentage points higher, two of the most extreme examples being from the area about which Coale and Hoover were writing in 1958 -- Bangladesh and Pakistan (both about 46%). At their respective peaks, the youth dependency burden was far higher in Asia than in Europe and North America. It was also far higher than in Japan at her peak (1950-54, 34.7%). Furthermore, what limited data we have in Table 2 confirm that the surge in the Asian youth dependency rate has been largely a phenomenon of the second half of the 20th century. With the exception of Taiwan and Malaya, there was no persistent secular increase in the youth dependency rate in Asia prior to the onset of the Pacific War. It seems to have been relatively stable at high levels prior to 1941, reflecting some demographic equilibrium. Asian history has been in dynamic transition ever since.

Asian youth dependency rates had become enormous by the 1960s, far higher than they were in late 19th century Europe when the latter reached its peak (e.g., the United Kingdom in 1881, 36.5%: Taylor and Williamson 1994, Appendix Table A1). However, they were not exceptional when compared to the experience of newly settled regions in the late 19th century. Alan Taylor and one of the present authors (Taylor and Williamson 1994, pp. 352-3) also document enormous youth dependency rates in the New World when they started modern economic growth: the United States, 41.5% in 1851; Canada, 56% in 1851; Australia, 42.2% in 1871; and Argentina, 45.2% in 1869. As Robert Fogel (1991) has shown, however, these large mid-century New World dependency rates were driven by labor supply responses in labor scarce areas of recent settlement -- early marriage, many births within marriage and high infant survival in an environment of quality nutrition. In contrast, we know that the Asian experience in this century was driven by exogenous declines in infant

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[1] Eighteen OECD members, excluding Australia and Japan: Mitchell (1978, 1983, 1992).

mortality associated with the diffusion of modern health technologies from center to periphery. Yet the result was the same: high youth dependency rates. Furthermore, those youth dependency burdens correlate well with heavy foreign capital dependency in both cases. The capital flows from mature Europe to the adolescent New World were enormous: Argentina, Australia and Canada, for example, were hugely dependent on foreign capital to fulfill their accumulation requirements. The same seems to have been true of Asia. Is the correlation spurious?

Table 1 also documents the large decline in the youth dependency rate in Asia from its peak. Some of the declines from peak have been absolutely spectacular, especially given that they were compressed within two or three decades. The biggest drop has been amongst the old and new tigers in East and Southeast Asia: Hong Kong, -20.6 percentage points; Singapore, -20.2; Taiwan, -18.8; Korea, -18.0; Japan, -16.7; Thailand, -14.7; and China, -13.6. The smallest drop has been among the slow growers in South Asia: Myanmar, -4.3 percentage points; India, -4.1; Bangladesh, -2.7; Pakistan, -1.1; and Nepal, -0.3. With the exception of Sri Lanka (-9.9 percentage points), the intermediate cases are all in Southeast Asia: Malaysia, -7.7 percentage points; Indonesia, -7.3; and the Philippines, -5.6. The old and new tigers underwent this drop in their youth dependency rates over twenty-five years, half the time it took most late 19th century industrializing countries to record less spectacular reductions: Argentina 1869-1920, -8.2 percentage points; Australia 1871-1921, -10.5; Canada 1861-1911, -9.4; the United States 1850-1900, -7.3; and the United Kingdom 1881-1931, -12.7 (Taylor and Williamson 1994, Appendix Table A1).

Even by the standards of history, Asian dependency rate changes in the late 20th century <u>have</u> been revolutionary.

The Demographic Present

So, how does Asia look today? Table 3 reports the evidence for 1990-92. This time the figures are given for the prime age group (aged 25-59).

The range across Asia is very large, almost 21 percentage points between rich Singapore and poor Bangladesh. The rich city states of Hong Kong and Singapore are most favored with more than half of their populations in prime ages (50.8 and 51.8 percent). Japan (48.9), Korea (47.3) and Taiwan (45.5) are close. At the other extreme, poor Pakistan and Bangladesh are the least favored with less than a third of their populations in prime ages (31.3 and 31.4 percent). Nepal (34.1) and the Philippines (35.3) are close. The remaining countries fall somewhere in between. The dependency burden varies enormously in Asia today, and it looks like it must have inhibited economic convergence in the region.

Furthermore, there has been no dependency rate convergence in Asia over the past three decades. Compared with the richer countries in East Asia, the poorer countries in South Asia already had higher dependency burdens and lower prime age shares in the 1960s, but the demographic distance between the two grew even bigger by the 1990s.[2]

The Demographic Future

Now look at the demographic future. The UN projections in Table 3 imply considerable demographic convergence up to 2025. The prime age share will rise in the poorest parts of Asia: the canonical example being Bangladesh whose prime age share will rise from 31.4 to 46.1 percent, an increase of 14.7 percentage points. The prime age share will fall in the richest parts of Asia: the canonical cases being Japan and Singapore whose shares will fall by 5.3 and 6.8 percentage points. The range between the lowest and highest prime age share will drop from 20.6 to 6.8 percentage points between 1990 and 2025, and almost all of that convergence will take place between 2005 and 2025. How might this dramatic demographic convergence influence Asia's economic future?

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[2] This potential impact on convergence and divergence for the Asian Pacific Rim was also suggested in Williamson (1993).

III. Foreign Capital Dependency in Asia Since the 1950s

The GDP shares for domestic savings, investment and net capital flows are reported in Table 4. We use the current account balance (CAB) to measure capital flows, negative numbers documenting net inflows and foreign capital dependency. Some of these CAB shares are enormous, and almost all of the double-digit figures are where the youth dependency rates have been largest, South Asia: e.g., Bangladesh 1980-89, Pakistan 1975-1989, and Sri Lanka 1980-1992. The countries which have been most successful in shaking off the foreign capital dependency habit also seem to be the ones which have undergone the most dramatic decline in dependency rates (where youth is not heavily offset by aging, as in Japan): e.g., the fall in the CAB share was 12.4 percentage points between 1965-69 and 1985-89 for Korea, 26.9 between 1970-74 and 1990-92 for Singapore, and 22.3 between 1955-59 and 1985-89 for Taiwan.

The classic correlation is revealed by Korea's recent history. In the early 1970s, Korea was concerned by its heavy dependence on Japanese financing and commissioned World Bank papers to explore why it was that Korea saved so little (Williamson 1979). By the late 1980s, Korea had doubled its savings rate and was a net capital exporter. Over this same period, the dependency rate fell by more than 12 percentage points, and at least one commentator has argued persuasively that the correlation is not spurious (Kang 1994).

Table 5 reports the same data as Table 4, but it is now aggregated up to the three regions. The table offers two such aggregations, one unweighted and one weighted by population. The two might well have implied very different time series since China is such a dominant component of East Asia, India of South Asia, and Indonesia of Southeast Asia. Yet, the differences are less notable than the similarities. The unweighted regional averages suggest the following: The investment rate has boomed almost everywhere in Asia since the early 1950s, rising by an impressive 12.8 percentage points in East Asia, by a steamy 20.7 percentage points in Southeast Asia, and by a more sedate 8.7 percentage points in South Asia. In spite of this enormous surge in investment rates, East Asia has been growing out of foreign capital dependence over the past four decades, the CAB share falling from -4.9 percent in 1955-59 to 2.4 percent in 1990-92, for a total fall of 7.3 percentage points. Southeast Asia, however, has grown out of foreign capital dependence much more slowly and less markedly -- a delayed weaning from foreign capital dependence if you will, consistent with the more spectacular investment boom there. Oddly enough, where the investment boom has been the most modest, foreign capital dependence has been the most persistent: South Asia has not grown out of foreign capital dependence at all, the CAB having risen almost without interruption since the 1950s.

Now, how much of this experience can be explained by dependency rates?

IV. The Life Cycle Model and the Dependency Rate Debate

Coale and Hoover's (1958) dependency hypothesis was based on a simple but powerful intuition: rapid population growth from falling infant mortality and rising fertility swells the ranks of dependent young, and that demographic event increases consumption requirements at the expense of savings. Nathaniel Leff's (1969) study a decade later appeared to place the youth-dependency hypothesis on a solid empirical footing. But later research by Arthur Goldgerger (1973), Rati Ram (1982) and others failed to confirm the dependency hypothesis, and thus cast doubt on the validity of the empirical methods employed in the earlier studies.

Theoretical developments also seemed to shake the foundations of the dependency hypothesis, although it turns out that the theory failed to deal with transitions implied by the demographic transition studied by Coale and Hoover. James Tobin's (1967) life-cycle model held that the national savings rate should <u>increase</u> with faster population growth. The reason is simple at least in that model: faster population growth tilts the age distribution toward young, savings households and away from older, dissaving ones. But Tobin's steady-state model tilts the age distribution in that way only because it is a world restricted to active adults and retired dependents; it would imply a very different tilt if young dependents were part of Tobin's world. The representative-agent elaboration of Solow's neoclassical growth model pointed in the same direction as Tobin's, with faster population growth raising savings rates in response to augmented investment demand (Solow 1956; Cass 1965; Phelps 1968). But these models assume fixed labor participation rates, and by implication assume no change in the dependency rate, exactly what one would assume in a model of steady state behavior, but inconsistent with the facts of demographic change. In effect, both models sacrifice the rich population dynamics implicit in Coale and Hoover's predictions about the Asian demographic <u>transition</u>.

The tension between the dependency rate and life-cycle models was addressed in the 1980s by Maxwell Fry and Andrew Mason (1982) and Mason alone (1988). These authors developed what they called a "variable rate-of-growth effect" model to link youth dependency and national savings rates. Their new model rests on the premise that a decline in the youth dependency rate may induce changes in the <u>timing</u> of life-cycle consumption. If consumption is shifted from childrearing to later, non-childrearing stages of the life-cycle, aggregate savings rise with a strength that depends directly on the growth rate of national income. As a result, the model argues that the savings rate depends on the <u>product</u> of the youth-dependency ratio and the growth rate of national income (the "growth-tilt effect"), as well as on the dependency ratio itself (the "level effect").

Under the aegis of this new model, the dependency hypothesis has enjoyed something of a <u>renaissance</u>. Drawing on cross-section data for about 50 countries, Mason (1988) isolates a negative relationship between youth dependency and savings rates after controlling for the interactive effect of dependency and income growth. Susan Collins (1991) reports similar results using the variable rate-of-growth effect model to study savings rates for a smaller cross section of developing countries. Alan Taylor and Jeffrey Williamson (1994) apply it to a century of savings behavior in Canada, Australia and Argentina, finding suggestive evidence of demographic origins for late 19th century capital flows.

Despite these empirical successes,[3] we believe that Mason's model does not provide an adequate theoretical framework for understanding Asian savings rates and capital dependency during the post-war era. First, the variable rate-of-growth effect model describes only the steady-state relationship between dependency and savings rates -- a shortcoming derived from its life-cycle ancestry.[4] Yet the rapid pace of demographic change in Asia over the past half century surely supports the presumption that the observed surge in the savings rate since the 1960s reflects out-of-steady-state behavior! Second, the variable rate-of-growth effect model focuses exclusively on the link between dependency and savings rates, ignoring the determinants of investment demand (but see Auerbach and Kotlikoff 1992). Yet saving is determined independently of investment only under perfect capital mobility, that is, for a small, open economy facing an exogenous world interest rate. In any other setting, the observed savings rate depends on both domestic savings supply and investment demand (e.g., Feldstein and Horioka 1980; Obstfeld 1986; Feldstein and Bacchella 1991; Frankel 1991). By abstracting from demographic influences on investment demand, the variable rate-of-growth model provides no guidance concerning the effects of demographic change on the residual that matters in this paper, net capital flows.

To confront these issues, a simple, neoclassical growth model, inhabited by an overlapping generations population, is outlined here. The model admits demographic effects on both savings supply and investment demand, and through the use of simulation, we are able to study the evolution of these variables

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[3] Continuing skepticism is illustrated by Hammer (1986) and Kelley (1988), but see Deaton and Paxson (1995a,b).

[4] The variable rate-of-growth effect model assumes steady-state population and productivity growth (Mason 1987). Rather inconsistently, the youth dependency rate is allowed to vary, although it is simply an increasing function of the steady-state population growth. We show below that the model's qualitative implications remain unchanged when the correspondence between population growth and youth dependency is acknowledged.

outside of steady state. Our model should be viewed as a generalization of, rather than an alternative to, the variable rate-of-growth effect model; indeed, we are able to interpret the latter as an open-economy, steady-state version of our own.

Model Specification

The model's demographic structure allows for three periods of life — youth, the "prime of life" and old age. The adult population at time t consists of $N_{1,t}$ prime-age adults in the labor force, $N_{2,t}$ retired elderly, and $N_{0,t}$ dependent young. The population of dependent young is determined by $N_{0,t} = n_t N_{1,t}$, that is each prime-age adult bears n_t surviving offspring.

We assume that prime-age adults care about the welfare of their dependent offspring, but that elderly adults have no bequest motive.[5] Prime-age adults are endowed with one unit of time, which is inelastically supplied to the labor force.[6] Labor income is divided among current consumption, child support and savings for old age. The lifetime budget constraint of a representative prime-age adult at time t can then be written as:

$$W_t = C_{1,t} + \frac{C_{2,t+1}}{1 + r_{t+1}} + n_t C_{0,t} \tag{1}$$

where $C_{1,t}$ and $C_{2,t+1}$ refer, respectively, to consumption during the prime years and retirement, $C_{0,t}$ is consumption per dependent offspring and r_{t+1} is the interest rate on assets acquired at t and held until t+1.

Preferences are described by an additively separable utility function of the form:

$$V_t = \frac{C_{1,t}^{1-\theta}}{1-\theta} + (1+\rho)^{-1} \frac{C_{2,t+1}^{1-\theta}}{1-\theta} + n_t^{1-\epsilon} \gamma^{1/\theta} \frac{C_{0,t}^{1-\theta}}{1-\theta} \tag{2}$$

The substitutability of consumption across periods is described by $(1/\theta)$, the

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[5] This restriction is relaxed in Higgins (1995).

[6] Assuming that childrearing imposes a fixed time cost leaves the model's qualitative implications unchanged.

intertemporal elasticity of substitution; for $(1/\theta) > 1$, higher interest rates lead to increased savings. The pure rate of time preference is given by ρ. The parameter $0 \leq \epsilon \leq 1$, allows for the possibility that the weight of the young generation in the parental utility function is less than proportional to the number of children. The parameter $\gamma \leq 1$ allows for the possibility that a child can attain a given level of utility while consuming less than an adult.

Output is produced according to a constant returns to scale, neoclassical production function, $Y_t = F(K_t,L_t)$, where $L_t = A_tN_{1,t}$ represents the aggregate labor supply measured in efficiency units. Exogenous technological progress occurs at the rate g-1, so that $A_{t+1} = gA_t$. Using lower-case letters to represent variables defined per unit of effective labor input, we can write: $y_t = f(k_t)$. We rely on the standard assumption that the size of the capital stock in period t is determined by the savings and investment choices made at t-1, so that $K_{t+1} = K_t + I_t$.[7]

The capital intensity of production depends on the extent to which the economy is linked to the international capital market. We consider the polar cases of perfect and zero capital mobility as bounds. Under perfect capital mobility -- here understood to mean that domestic residents can borrow and lend in the international capital market at a given interest rate -- the marginal product of domestic capital must satisfy the arbitrage equation: $f'(k^*) = r^*$, where r^* is the world interest rate (assumed constant). This condition fixes domestic capital intensity and, given the working-age population, the aggregate capital stock. Prime-age adults lend in the international capital market when their savings are greater than the value of the capital stock required for the next period, and borrow when the opposite is the case. In contrast, if the economy is closed to capital flows, domestic savings supply and investment demand must be equal, with the marginal product of capital equated to the marginal rate of substitution in consumption between

[7] For simplicity, we abstract from depreciation. The more general expression would be: $f'(k^*) = r^* + \tau$. Introducing depreciation -- as is done in the simulation experiments reported below -- does not affect the model's qualitative implications.

the two periods of adult life. We discuss below the model's implications for the effects of demographic change under partial capital mobility, arguably the most relevant case for our Asian sample.

The Steady State

For an open economy, given constant fertility, savings will assume the following steady-state values as a share of GDP:

$$s(n^*) = \bar{s}(n^*) \frac{w(k^*)}{f(k^*)} (1 - \frac{1}{n^* g}) \tag{3}$$

where $\bar{s}(n^*)$ represents saving as a share of labor income. The expression above captures two distinct channels through which population growth affects the savings rate. Higher population growth boosts savings by increasing the population of prime-age adults relative to dissaving elderly; this effect is captured by the term: $1-(1/n^* g)$. At the same time, higher population growth lowers savings by increasing the youth-dependency burden; this effect is captured by the term: $\bar{s}(n^*)$, with $\bar{s}'(n^*) < 0$. It can be shown that a steady-state increase in population growth will reduce the savings rate for $(n^* g - 1)\,\bar{\varepsilon}_{s,n} > 1$, where $\bar{\varepsilon}_{s,n}$ represents the elasticity of savings as a share of labor income with respect to the fertility rate.[8]

The result above confirms the principal insight of the variable rate-of-growth effect model: lower youth dependency may increase the savings rate, but only for a rapidly-growing economy. At the same time, the result sheds light on the effects of changes in both the youth and elderly dependency ratios. The condition above is more likely to be satisfied for a country experiencing rapid population growth, with a decline in population growth raising savings

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[8] This elasticity depends on all the taste parameters defined above, but reaches a limit of (1-s)n*/(1+n*) if parameter values are chosen to maximize the sensitivity of savings to fertility. Recalling that n* is equal to 1 when each adult couple raises two children, the elasticity reaches an upper limit of 0.75 at a total fertility rate of 6 and a savings rate of zero. Plausible parameter values yield an elasticity of less than one-third even given very high fertility.

by reducing the youth dependency burden. The condition is more likely to be violated for a country experiencing slow population growth, with a decline lowering the savings rate by increasing the elderly share.

The steady-state investment rate is given by:

$$i(n*) = (n*g-1) \frac{k*}{f(k*)} \tag{4}$$

so that that $i'(n^*) = g\, k^*/f(k^*)$: faster population growth always leads to an increase in the investment rate. Thus, for a rapidly-growing economy, higher steady-state fertility brings a lower savings rate but a higher investment rate, creating a tendency toward current account deficits. For a slow-growth economy, savings and investment both increase. However, it can be shown that the latter effect dominates (at least in the neighborhood of the steady-state), so that higher fertility always reduces the current account balance.

For the closed economy, savings supply and investment demand must be equal. Using this equilibrium condition, it can be shown that higher fertility brings an increase in the savings rate when:

$$n^* g + (n^* g - 1)\, \lambda_L\, \varepsilon_{k,n} > 0 \tag{5}$$

where λ_L is labor's income share and $\varepsilon_{k,n}$ is the elasticity of steady-state capital intensity with respect to population growth. This elasticity depends on the various taste and technology parameters, but it is always negative for $1/\theta \geq 1$, that is, so long as higher interest rates do not lower savings. Our closed-economy model thus allows for the possibility that the savings (and investment) rate may fall with an increase in fertility, in effect generalizing the basic insight of the variable rate-of-growth effect model to a closed-economy setting. Given Cobb-Douglas technology, and setting $1/\theta = 1$, we find that saving falls with higher population growth for $(n^* g - 1)\, \bar{\varepsilon}_{s,n} > 1$, the same condition derived above for the open economy. Allowing the household savings propensity to rise with the interest rate would narrow the range of growth rates over which the national savings might decline.

Transitional Dynamics

Although the steady-state analysis is suggestive, it leaves a notable gap: the behavior of savings and investment outside of the steady-state. This gap is especially unfortunate given our belief that the large swings in savings and investment observed in Asia since the 1950s are due primarily to transitional dynamics! We rely on simulations to facilitate the dynamic analysis of empirically plausible patterns of demographic change. A simulated "demographic transition" in which fertility rises (or infant mortality falls) for several generations before returning to a new, lower steady-state level, provides an attractive experiment because such a pattern roughly describes the demographic history of most nations in Asia.

To be more precise, suppose that the economy follows a steady-state growth path up to period t-1, and experiences rising fertility (or falling infant mortality) over periods t and t+1 (Chart 1). Fertility then declines gradually during the subsequent periods, returning to its previous level by t+3 and falling to a new, and lower, steady-state value by t+4. As a result, the population's age distribution follows a cyclical pattern, reaching its new steady-state at t+5. The share of dependent young rises sharply during t and t+1, declining gradually in the following periods. The share of prime-age adults falls at first, but rises for a time past its new, higher steady-state level. The share of elderly declines for the first three generations, before rising for the following three. The time paths followed by savings and investment are simulated relying on a set of plausible parameter values.

For an open economy, savings fall at the beginning of the transition due to the increased dependency burden, but follow the prime-age population upward during the two succeeding generations, declining gradually thereafter. Investment jumps during the initial generations of the transition (t and t+1) due to higher labor-force growth, and follows the downward path of fertility during the subsequent periods, reaching a new, lower steady-state at t+4. The current account balance follows the path implied by the evolution of savings and investment, moving into deficit for t through t+2, but swinging into surplus by t+3. The surplus declines thereafter, but even so, the current account balance remains positive in the new steady state, as investment falls more sharply than savings.

How would a closed economy respond to similar demographic shocks? Saving (and hence investment) falls in reponse to the intitial fertility increase, but rises over the next two generations in response to the increasing prime-age and declining elderly share. After its initial raise, however, the savings rate declines over several generations to a new, lower steady-state level which reflects the diminished pace of labor-force growth. Even so, rapid labor-force growth during the middle generations of the transition (t+1 and t+2) causes a prolonged rise in the marginal product of capital and hence interest rates; these variables attain lower values in the new steady state. Note that demographic shocks in a closed economy may cause shifts in savings supply and investment demand which are at least partly offsetting, modulating the amplitude of any change in the equilibrium quantity. Thus, the quantitative swing in the savings rate is much smaller for the closed economy model than for the open-economy model in Chart 1.

The dynamic patterns described above are surprisingly insensitive to parameter choice. For both the open and closed economy, any plausible set of values yields an initial decline in the savings rate (the dependency effect dominates), followed by a subsequent rise (the growth-tilt effect dominates) and later decline (the growth-tilt effect dominates, but works in the opposite direction).

These simulation results offer two principal lessons. First, simple patterns of demographic change may induce complex and even counterintutive savings dynamics. After all, for both the open- and closed-economy models, savings rises between t+1 and t+2 even as the youth dependency ratio falls and the share of prime-age rises (a pattern made possible because the share elderly is falling quickly). This observation highlights the need to make use of _all_ the information contained in the population age distribution, rather than focusing on the youth and elderly dependency ratios, and draws attention to the importance of out-of-steady-state behavior in understanding the empirical links between demographic change and savings rates.

Second, the demographic "center of gravity" for investment demand can be expected to be earlier in the age distribution than that for savings supply, with investment demand most closely related to the share of young (through its connection with labor-force growth), and savings supply most closely related to the mature adult share (through its connection with retirement needs). Thus, in an open economy, a shift in the population age distribution towards younger ages should produce a tendency towards current account deficits and foreign capital dependency. In a closed economy, the younger center of gravity would cause the observed (i.e. equilibrium) savings rate to appear positively related to relatively young aspects of the age distribution.

It is not immediately clear whether the open- or closed-economy model provides the better guide in exploring the impact of demographic dependency on foreign capital dependency. True, the two models seem to imply roughly similar savings dynamics. But what about foreign capital dependency? The fact that many Asian countries have, since the 1950s, relied so heavily on capital imports might appear to create a strong _prima facie_ case against the closed-economy assumption. However, the real issue is whether investment is constrained by domestic savings. If the economy faces a binding constraint on capital inflows, equilibrium in the domestic capital market will depend on both local savings supply and investment demand, and demographic dependency will alter the market outcome in a way qualitatively similar to a closed economy. For example, an increase in fertility under such conditions would lower the supply of savings at a given interest rate, leading to an equal decline in savings and investment, leaving the volume of capital inflows unchanged. Under weaker restrictions on foreign mobility, dependency rate changes will effect equilibrium in the domestic capital market in a way which would display features of both the closed- and open-economy models. Suppose, for example, that potential borrowers must pay a risk premium in order to attract foreign capital, and that the premium rises with the desired inflow. A dependency-rate-induced fall in the domestic supply of savings at a given interest rate would then be only partly offset by increased capital inflows, forcing up the interest rate and causing a decline in investment. A positive link between youth dependency and capital dependency would be observed, but it would be weaker than the one generated under full capital mobility or under perfect world capital markets.

V. Estimating Dependency Rate Effects in Asia

This section estimates the links between youth and old-age dependency and national savings and investment rates for Asia in the late 20th century. The results point to substantial demographic effects, with increases in both youth and old age dependency bringing about lower savings rates. The estimates indicate that the "demographic swing" in the savings rate has been quite large, exceeding eight percentage points over the last four decades for much of Asia. The results also point to differential demographic effects on savings supply and investment demand. Higher youth dependency depresses savings more than investment, inducing capital inflows, while higher elderly dependency depresses investment more than savings, inducing capital exports. The estimated impact of the demographic swing in the current account balance share in GDP exceeds five percentage points for much of Asia and, given expected demographic trends, it is likely to be larger still over the coming decades. But we are getting ahead of our story.

Econometric Specification

We follow the dependency literature in treating changes in national savings (and investment) rates as the result of changes in demographic variables, growth in national income and interactions among these variables. Following Bradford DeLong and Lawrence Summers (1991) as well as Alan Taylor

(1995), we also add the relative price of investment goods to control for their possible effects on savings supply or investment demand. Thus, the equations estimated are of the form:

$$s_{i,t} = \beta_{0,i} + \beta_1 s_{i,t-1} + \beta_2 Z_{i,t} + \beta_3 g_{i,t} + \beta_4 Z_{i,t} g_{i,t} + \beta_5 RPI_{i,t} + u_{i,t} \quad (6)$$

where $s_{i,t}$ is the dependent variable in country i at time t, $\mathbf{z}_{i,t}$ refers to a vector of demographic variables, $g_{i,t}$ is the growth rate of national income and $RPI_{i,t}$ represents the relative price of investment goods.[9]

$\mathbf{z}_{i,t}$ is constructed by using a quadratic polynomial to represent 15 population age shares: 0-4, 5-9, ... , 65-69 and 70+. This technique for incorporating demographic information into macroeconomic equations was introduced by Ray Fair and Kathryn Dominguez (1991): it captures the information contained in the entire age distribution while maintaining a parsimonious parameterization (Appendix). It appears to be an improvement over the more conventional econometric assessment of dependency rate effects. To see how the technique works, consider replacing $\mathbf{z}_{i,t}$ in equation (6) with the population age shares. A simple F-test for the significance of the 14 included age shares (one being omitted because they sum to unity) could then be used to test the general proposition that "age structure matters." But the problem with this approach is that the various elements of the age distribution are

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[9] The savings, investment and current account shares are based on national accounts data taken from the International Financial Statistics. The relative price of investment goods (RPI) and the growth rate of aggregate GDP (g) are derived from the Penn World Tables, Mark 5.6 (1995). Demographic data are from the United Nations (1992). Taiwan represents the sole exception to the above, with national accounts and demographic data derived from the Statistical Yearbook of the Republic of China. As for variables used as instruments below, real output per worker and per capita (RGDPW and RGDPL, respectively) are measured at purchasing power parity from the Penn World Tables; the purchasing power parity for GDP (P) comes from the same source. OPEN refers to exports plus imports as a share of GDP, and is taken from national account sources.

The current account is measured as the sum of the trade balance and net factor income. National savings is measured by adding gross investment to this total. Note that our measures of both national savings and the current account exclude private and official transfers, and, thus, are not strictly correct. However, these definitions were chosen because data concerning transfers come from balance-of-payments sources generally unavailable before 1970. The difference in measured savings or current account shares is almost always quite small, and appears not to affect our results.

highly correlated, so that the regression results would be plaugued by multicollinearity, making it difficult to isolate the contribution of any particular element. The dependency literature deals with this problem by estimating age coefficients for one or at most two age shares.

The polynomial representation employed here implies a less restrictive approach. First, we require that the 15 age-distribution coefficients, α_1, ..., α_{15}, sum to zero.[10] Second, we require that they lie along a second-order polynomial, so that:[11]

$$\alpha_j = \gamma_0 + j\gamma_1 + j^2\gamma_2 \qquad (j = 1, \ldots, 17) \tag{7}$$

Given the zero restriction, there are now only two independent population coefficients to estimate (γ_1 and γ_2). Constraining the α_j in this fashion leads to the construction of two new variables (Z_1 and Z_2), which are complicated geometric averages of the population age shares. Given the estimated γ_j, the implied α_j can easily be recovered. (See Appendix for details.)

The models estimated here are of the "fixed-effects" variety: the intercept term is allowed to vary across countries, but the slope coefficients are treated as common to all countries. This procedure in effect transforms the data into deviations from their country-specific means, so that the estimates are based on the time-series variation in the data. Such a specification is natural given our focus on the evolution of national savings and investment rates <u>over time</u>. Moreover, this procedure has the advantage of controlling for persistent idiosyncratic factors which affect the average

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[10] The α_j must be restriced in this manner because the population age shares sum to unity and an intercept term is included in the regression equation. Requiring that they sum to zero means that the constant term is not affected if the age distribution does not affect the dependent variable.

[11] This implies that the relationship between saving (or investment) and the population age shares changes smoothly and exhibits a single global maximum or minimum.

value of savings or investment in a particular country.[12] Details concerning the various specification tests can be found in Tables 6 and 7.[13]

A lagged dependent variable (LDV) specification was chosen in order to control for autocorrelation in the savings or investment rates.[14]

A central issue is whether our empirical model can be estimated consistently by OLS. Previous studies do not address this issue in spite of the clear possibility that some of the explanatory variables are themselves endogenous. Simultaneity bias might arise, for example, if savings and income growth are subject to common shocks over the business cycle. A high savings rate might encourage the supply of investment goods, lowering their relative price (a possibility which finds empircal support in DeLong and Summers 1991). To test for the consistency of OLS, we rely on the Durbin-Woo-Hausman test.[15] The test weighs the greater efficiency of OLS (under the null that it is consistent) against the possibility that OLS is biased. We reject the null hypothesis of OLS in favor of 2SLS at the 1% level for the investment and current account balance equations, and narrowly fail to reject OLS at the 10%

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[12] Standard specification tests easily reject the null alternatives of random-effects or simple common-intercept specifications. The random-effects procedure offers potentially greater efficiency, as it exploits both the cross-section and time-series variation in the data. However, the procedure may produce biased estimates (Greene, 1993, pp. 479-480). We rely on the Hausman test to choose between the two specifications. Under the null, random-effects estimates are unbiased and efficient, and fixed-effects estimates are unbiased but inefficient. Under the fixed-effects alternative, the random effects estimates are biased. We reject the consistency of the random effects specification at the 1% confidence level for the savings, investment and current account equations.

[11] Simple Chow tests reject the null alternative of a common intercept for all countries at the 1 percent level for the savings and investment equations, and narrowly fail to reject the null alternative for the current account equation. To maintain a common specification across equations, we include country-specific intercepts in all three.

[14] Durbin's H-test confirms that adding the LDV as a regressor removes any serial correlation from the estimated regression equations. We also explored "openness" variables, but they failed to add any explanatory power.

[15] The test procedure is described in Davidson and MacKinnon (1995, pp. 237-242). The test is implemented by forming fitted values of the possibly endogenous variables by regressing them on the instruments. The dependent variable is then regressed on the full set of explanatory variables and as well as the fitted values. Under the null that OLS is consistent, the fitted values should fail a standard F-test for statistical significance.

for the national savings equation. These results would appear to provide compelling evidence for relying on instrumental variables.

This decision has substantive implications. Relying on OLS, we find that the interactive effects ($z_{i,t}$ and $g_{i,t}$) are jointly significant at the 5% level for national savings, at the 1% level for investment but far short of significant for the current account balance. Relying on 2SLS, the interactive terms are not significant at the 10% level for any of the three equations. Although the variable rate-of-growth model (plausibly) implies that the interactive effects should be important, the finding that they are not in late 20th century Asia is shared by some evidence from other times and places (Taylor and Williamson 1994; Taylor 1995; Higgins 1995). Our doubts about including interactive terms in our basic model are reinforced by the extreme sensitivity of the corresponding parameter estimates to minor changes in model specification. For example, in the national savings equation, the interactive effects are individually and jointly significant at the 5 percent level using both an LDV and AR1 specification -- and yet the coefficient estimates are of opposite sign. Treating the data as five-year averages yields estimates which are individually and jointly insignificant, and quite different in magnitude from either of the two above. In contrast, estimates of the direct demographic effects are quite similar under all three specifications.

The initial specification tests described above are performed individually for the savings, investment and current balance equations. We then construct our benchmark estimates using 3SLS, treating the savings and investment equations as elements of a simultaneous system. This procedure implicitly yields estimates of demographic effects on capital flows via the identity: National Savings = Investment + Current Balance.[16] The statistical significance of these demographic effects can be tested by imposing the restriction that the coefficients of Z1 and Z2 are equal for the savings and investment equations. The 3SLS procedure offers the advantage of greater

[16] For any of the explanatory variables, the implicit coefficient for the current account balance is the difference between the estimated coefficients in the savings and investment equations.

efficiency, given the likelihood that disturbances to the savings and investment equations are contemporaneously correlated.[17]

Estimation Results

Our benchmark estimates indicate that changing age distributions have had a statistically significant impact on Asian savings and investment rates (Table 6). For the national savings equations, the two demographic variables are individually and jointly significant at the one-percent level. For the investment equation, one demographic variable is significant at the one-percent level and the other at the five-percent level; the two variables are jointly significant at the one-percent level. The results also confirm a link between demography and foreign capital dependency. We are able to reject, at close to the one-percent level, the null hypothesis of equality for the coefficients of the demographic variables in the savings and investment equations.

Using the parameter estimates for the demographic varibles, Chart 2 reveals the relationship between Asian age distributions and the three national income shares: savings, investment and the current account balance. The coefficients plotted there are the change in each of the three shares associated with a unit increase in the log age shares, that is they assess the impact of changes in the age share ceteris paribus. Chart 2 shows clearly that youth and old-age dependency have a depressing effect on savings, with the largest impact for ages 0-10 and ages above 64. Moreover, the coefficients appear to be consistent with the "hump" savings pattern predicted by the life-cycle hypothesis, attaining their highest values during mid-life. But they reach a peak rather early in Asia, at age 35-39, declining sharply thereafter so as to become negative by age 55-59. Yet, the rather young "center of

[17] In fact, the 2SLS disburbances for the savings and investment equations have a correlation coefficient of .52, easily significant at the 1 percent level. Thus, a percentage-point disturbance to the savings rate implies a 0.27 percentage-point increase in the investment rate (the "retention coefficient" in Feldstein-Horioka terms), with the rest going to capital exports. Taylor (1994) uses a similar method to explore the extent of international capital mobility.

gravity" found for the savings rate is what might have been expected if Asia has been only imperfectly integrated into the world capital market.[18]

The implicit age distribution coefficients for the investment equation appear at first glance to be quite similar to those for savings. To bring the differences into relief, the implicit age distribution coefficients for the current account balance are plotted in the bottom half of Chart 2. The coefficients are clearly negative for the early portion of life (up to age 39), indicating that the young-adult-induced increase in investment demand (transmitted via both employment and infrastructure needs) outweighs its induced increase in savings supply. This implies that relatively young nations pass through a relatively long period of foreign capital dependency which includes periods of child, adolescent and young adult gluts. The coefficients turn positive after age 40 as the induced fall in investment demand is way ahead of the induced fall in savings. Relatively young nations (like those in Asia) are net capital importers and relatively old nations are net capital exporters: if global capital markets let it happen, capital in the late 20th century tends to move between nations like an intergenerational transfer.

In-Sample Effects and Out-of-Sample Projections

The results described above will be used in the rest of the paper to construct estimates of the impact of the changing dependency burden on Asian savings, investment and net capital dependency. The estimates refer to demographically-induced deviations of, say, a country's savings rate from the country average for the full sample period. In particular, the demographic

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[18] Savings supply and investment demand are separately identified in the empirical models developed here only to the extent that countries can borrow and lend on the international capital market without constraint and at a given world interest rate. In the absence of perfect capital mobility, the estimates for savings will reflect a mix of the separate demographic influences on both savings and investment -- a lesson made clear by the simulation model developed above. In this setting, an increase in the share of young adults, who presumably save little, might lead to an increase in the equilibrium quantity of savings by causing an outward shift in the investment demand schedule. Similarly, an increase in the share middle-aged might actually reduce savings if any outward shift in savings supply is more than offset by an inward shift in investment demand.

effect on the savings rate for country i at time t is calculated as:

$$Demographic\ Effect_{i,t} = \frac{\beta_{Z1}}{1-\beta_{LDV}}(Z1_{i,t} - \overline{Z1}_i) + \frac{\beta_{Z2}}{1-\beta_{LDV}}(Z2_{i,t} - \overline{Z2}_i) \qquad (8)$$

where β_{Z1} and β_{Z2} are the estimated coefficients for Z1 and Z2, $\overline{Z1}_i$ and $\overline{Z2}_i$ are the country i averages for these variables and β_{LDV} is the estimated coefficient of the lagged dependent variable. Calculating demographic effects in this way flows naturally from our fixed-effects specification, which transforms the data into deviations from country-specific means. To capture the long-run effect of changes in the demographic variables, $1-\beta_{LDV}$ appears in the denominator.

We next construct projections of the effects of expected changes in the dependency burden on savings, investment and capital flows. We use the expected values of the population age shares for 2005, 2015 and 2025 to construct the implied values of Z1 and Z2. The effect of changes in country i's age structure on its savings rate between, say, 1990 and 2025 is then given by:

$$\Delta NSAVE_i = \frac{\beta_{Z1}}{1-\beta_{LDV}}(Z1_{i,2025} - Z1_{i,1990}) + \frac{\beta_{Z2}}{1-\beta_{LDV}}(Z2_{i,2025} - Z2_{i,1990}) \qquad (9)$$

The same procedure, of course, is followed for investment and the current account balance.

To express demographic effects on capital flows in 1990 dollars, we begin with the changes in GDP shares calculated above and the 1990 dollar value of GDP. We then set labor-force growth equal to the expected growth in the economy's working-age population, and assume that output per worker will grow at a constant rate of 3 percent per annum.

VI. Did Dependency Rates Drive Asian Capital Flows in the Past?

This section uses the model estimated in the previous section to assess the impact of dependency rates on Asian savings, investment and capital flows in two ways: First, we ask how much of the observed change in these variables between 1950 and 1992 can be explained by changes in the dependency burden. That is, we isolate the impact of the Asian demographic transition on these three aspects of accumulation over much of the late 20th century by applying observed demographic changes to the estimated beta coefficients derived in the previous section. Second, we ask how much of the good or poor accumulation performance of countries and regions in Asia since the 1950s has been due to heavy or light dependency burdens using the same decomposition procedure. For example, how would South Asia have performed had she had the lighter dependency burdens of East Asia? Or, how would Japan have performed had she had the heavier dependency burden of Bangladesh?

Dependency Rate Impact Over Time

Following equation (8), the impact of the demographic transition on accumulation performance through time is calculated relative to the mean values over the full late 20th century epoch. Thus, the figure SAVING in Table 8 tells us the effect of changes in population age shares on the savings rate as it deviated around the 1950-1992 mean. Another way of stating this is that savings rates would have been X percent higher or lower during a given period if the population age shares had remained constant at their 1950-1992 means. The best way to read Table 8 is in terms of the implied demographic transition or demographic swing effect.

According to our estimates in Table 8, East Asia's savings rate was 8.4 percentage points above its 1950-92 average in 1990-92 due to her transition to a much lighter dependency burden. Similarly, East Asia's savings rate in 1970-74 was 5.2 percentage points below its 1950-92 average due to the heavy dependency rate burden at that time. The total demographic swing was an enormous 13.6 percentage points over these twenty years, accounting for <u>all</u> of the total rise in the savings rate in East Asia over this period (6 percentage points: Table 5). The figures for Southeast Asia are similar, but not quite so dramatic. Southeast Asia's savings rate was 7.9 percentage points higher in

1990-92 than its 1950-92 average due to its lighter dependency burden late in the 20th century. And Southeast Asia's savings rate was 3.6 percentage points lower in 1970-74 due to the heavier burden at that time. The total demographic swing was 11.5 percentage points, accounting, once again, for all of the total rise in the savings rate in Southeast Asia after 1970 (10.3 percentage points: Table 5). The region with the slowest demographic transition (but biggest dependency burden) has been South Asia, so the far more modest changes in the savings rate there are predictable: the weak dependency rate impact on the savings rate (an induced 3 percentage point rise: Table 8) accounts for all of the weak rise in the savings rate (1.1 percentage points: Table 5).

Of course the upswing of the Asian demographic transition started earlier, perhaps in the 1930s, but the historical national accounts are not good enough to measure its impact earlier than 1950. Yet, between 1950-54 and 1970-74 the rising dependency rate served by itself to lower the savings rate in East Asia by 6.1 percentage points, to lower it by 3.5 percentage points in Southeast Asia, and to lower it by 3.3 percentage points in South Asia.

Although the dependency rate literature rarely notes it, these demographic variables also had their impact on investment demand, and in the same direction: dependents generate lower investment demand than do mature adults who, in contrast, have to be equipped at work and transported to job site. But the demographic impact on Asian investment rates has been less dramatic in the recent past than on savings rates, as Table 8 shows, and as the previous section implied.

The net dependency rate effect would by itself have produced a long historic swing in foreign capital dependency in Asia over the past half century. During their periods of peak dependency burdens, all three regions were net importers of foreign capital -- demographic dependency has been associated with foreign capital dependency in this century. But the demographic transition -- when left to its own devices and not offset by other forces -- caused foreign capital dependency to wax and wane. In East Asia, the changing dependency rate served by itself to raise the (negative) current account balance share in GDP by 1.3 percentage points between 1950-54 and 1970-74, and then to lower it by 4.5 percentage points by 1990-92. Indeed, the declining dependency burden served by itself to cause East Asia to switch from a net capital importing position in 1970-74 (-1.5%) to a net capital exporting position in 1990-92 (+3%). Similarly, changing demographic dependency in Southeast Asia would by itself have produced the same swing in foreign capital dependency after 1950, although not quite as dramatic as in East Asia. We can see its influence in South Asia too, but it has been far more modest there since the demographic transition has also been more modest.

Certainly the dependency rate wasn't the only "fundamental" driving foreign capital dependency in Asia through time. Indeed, there may well have been offsetting forces at work, some of them related to changing policy towards foreign presence in local capital markets and some of them related to investment booms where the pace of development accelerated abruptly. No long-run model can expect to accomodate such short-run and medium term changes. Nevertheless, the proof is in the pudding: How much of the past performance can be explained by dependency rate changes? Demographic events explain <u>all</u> of the foreign capital dependency decline in Southeast Asia after the early 1970s (3.6 percentage point change between 1970-74 and 1990-92 predicted from Table 8 of the actual 2.2 percentage point change from Table 5); they explain <u>all</u> of the decline in East Asia (9.5 versus 3.7 percentage points); but they explain <u>none</u> of the rise in South Asia (1.1 versus -4.3 percentage points).

Table 9 displays the same 1950-1992 evidence as Table 8, but this time by country. To repeat, each of these GDP shares -- SAVING, INVESTMENT and CURRENT ACCOUNT BALANCE -- are calculated as the difference between the share implied by actual dependency burdens and that implied by average dependency burdens 1950-92. Furthermore, even though many of the countries in Table 9 do not supply savings information early in the postwar period, SAVING can still be calculated if we assume that the regression coefficients estimated in the previous section hold out-of-sample; for example, the only information we need to calculate *SAVING* for Bangladesh prior to 1970 are the demographic age distributions and the estimated beta coefficients. The same is true of investment and current account balance GDP shares.

The country entries in Table 9 retell the aggregate East Asian story with remarkably little deviance, but some country dependency rate effects are truly spectacular. Recall that East Asia as a whole reached a peak dependency rate impact in 1970-74, and the fall thereafter served to augment the savings rate by 13.6 percentage points. This dependency rate effect appears to have accounted for all of the great surge in savings rates in the region. Some East Asian countries reached their peaks well before 1970-74. In any case, while the subsequent fall in the dependency rate from peak to 1990-92 served to raise the savings rate in Japan by "only" 12.2 percentage points, it raised it by almost 26 percentage points in both Korea and Taiwan. The other East Asian countries fell in between these two extremes. The impact of dependency rates on investment rates was everywhere in East Asia somewhat less than on savings rates, so that declining dependency rates implied declining foreign capital dependency. From peak in 1950-54 to 1990-92, this demographic effect by itself served to cause Hong Kong's current account balance share to switch from -6.3 to +6.9 percent, the biggest impact East Asia witnessed, although Taiwan and Japan came close. Once again, other fundamentals were also at work driving the CAB share through time, but these dependency rate effects were powerful by themselves. Recall from Table 4 that the CAB share in Taiwan rose by 22.3 percentage points between 1955-59 and 1985-89; the declining dependency rate accounted for 9.6 percentage points of the rise, or more than four-tenths. The CAB share in Japan rose by 2.2 percentage points between 1955-59 and 1990-92, and the declining youth dependency rate accounted for all of it. Indeed, the dependency rate changes in Japan served to raise the CAB share by 9.1 percentage points, so there were powerful offsetting forces at work there which have retarded the switch to foreign capital independence over the past three or four decades.

Even the smallest impacts in East Asia were impressive: based on the dependency rate effects alone, Korea would have evolved from a CAB share of

-1.7 percent in 1955-59 to +5.4 percent in 1990-92; and China would have gone from a CAB share of -1.5 percent in 1970-74 to +2.9 percent in 1990-92. It turns out that between 1955-59 and 1985-89, the dependency rate effect accounted for about four-tenths of the rise in Korea's CAB share, an experience which replicated Taiwan's exactly. Between 1975-79 and 1990-92, all of China's rise in the CAB share was due to falling dependency rates (just like Japan), effects that were partially offset by other forces (like Japan, but with nowhere near the power).

What about Southeast Asia? Once again, the impact of dependency rate changes on savings outweighed their impact on investment, so that when left to their own devices declining dependency rates in Southeast Asia implied declining foreign capital dependency, just as in East Asia. While the impact was not quite as great in Southeast Asia, it was impressive enough. The standard East Asian story is replicated by Singapore's experience: due to dependency rate effects alone, the share of the current account balance in GDP would have switched from -1.7 percent in 1965-69 to +6.8 percent in 1990-92, for a total rise of 8.5 percentage points. Over the same period, the CAB share actually rose by 16.9 percentage points. Thus, between 1965-69 and 1990-92, the falling dependency rate accounted for about half of the rising CAB share in Singapore.

Southeast Asian differences appear elsewhere. In one sense, less interesting cases appear to be offered by Indonesia, where the dependency rate effects were serving by themselves "only" to raise the CAB share from -0.9 percent in 1970-74 to +2.4 percent in 1990-92; by Malaysia, from -1.1 percent in 1960-64 to +1.2 percent in 1990-92; by the Philippines, from -1.7 percent in 1970-74 to +1.5 percent in 1990-92; and by Thailand, from -1.3 percent in 1970-74 to +4.3 in 1990-92. In another sense, however, these four cases (new tigers among them) are the most interesting in Southeast Asia since dependency rate effects were completely swamped by other, offseting, forces. Falling dependency rates by themselves should have raised the CAB share among these young tigers, reducing their foreign capital dependency. Yet, as Table 4 shows, all four <u>increased</u> their foreign capital dependency, and some -- like Malaysia and Thailand -- did so dramatically. While these four Southeast Asian tigers (or, more accurately three, excluding the Philippines) were enjoying dependency rate changes which by themselves should have caused a weaning from foreign capital dependency, in fact the opposite took place. Rising foreign capital dependency was inconsistent with the moderating dependency rate influences. Other forces were pushing in the opposite direction -- like a steamy investment boom -- and they dominated.

Like Singapore, Bangladesh also obeys the East Asian laws of dependency motion. Between 1970-74 and 1990-92, the CAB share in Bangladesh went from -5.3 percent to -8.2 percent, for a net change of -2.9 percentage points. The model predicts that the CAB would have recorded a net change of -2.6 percentage points due only to worsening dependency rate effects. Thus, nine-tenths of the Bangladesh rise in foreign capital dependency can be attributed to dependency rate effects.

The rest of South Asia violates the East Asian laws of dependency motion. Pakistan (marginally) reduced its foreign capital dependence between 1955-59 and 1990-92, but, like Bangladesh, worsening dependency rate effects should have increased its foreign capital dependence. India (marginally) increased its foreign capital dependence between 1965-69 and 1985-89, but (marginally) improving dependency rate effects should have reduced its foreign capital dependence. Sri Lanka also behaved perversely, about as perversely as possible! Between 1950-54 and 1990-92, Sri Lanka's CAB share fell from +7.4 percent to -10.7 percent, for an enormous net change of -18.7 percentage points reflecting a dramatic regime shift towards foreign capital dependency. In contrast, improved dependency rate conditions would have generated by themselves a net change of +5.3 percentage points for a pronounced regime shift towards foreign capital independence.

Dependency Rate Impact Across Asia

The poor countries of South Asia carried bigger dependency burdens, implying bigger net domestic savings shortfalls and greater foreign capital dependency. The best way to illustrate that fact is to exploit the counterfactual: Suppose the fast-transition countries of East Asia had carried the heavier demographic burdens of South Asia? Suppose South Asia had carried the lighter demographic burdens of the fast-transition countries of East Asia?

The answers appear in Table 10, and for three points in time: early in the demographic transition, 1955-59; the middle, 1975-79; and towards the end, 1990-92. The table reports the share of the current account balance in GDP which was actually recorded under the actual dependency burden (ACTUAL). Following equation (9), Table 10 reports the share which would have prevailed had the country carried the dependency burden which characterized other parts of Asia (COUNTERFACTUAL), and the DIFFERENCE between the two. Even though national accounts data may make it impossible to document ACTUAL for some periods and countries, DIFFERENCE can always be calculated given the estimated within-sample beta coefficients and the dependency burdens. Panels A and D ask how South Asia would have behaved had it had the demographics of East Asia. Panels B and C turn the question around and ask how East Asia would have behaved had it had the demographics of South Asia.

To illustrate the first question, consider Panel A in Table 10: while Bangladesh was a significant net capital importer in 1975-79 (-5.3 percent of GDP), she would have been a net capital exporter (+5.1 of GDP) had she been favored with the lighter demographic burden which Japan carried at the same time. The switch between the actual and counterfactual demographic regimes implies a 12.6 percentage point change. This figure is enormous: if the dependency rate can really be taken as exogenous, and if the coefficients estimated in Section V are even close to the mark, this result suggests that much of South Asia's heavy dependence on foreign capital has been due to the fact that the dependency burden has been far higher there than in East Asian countries like Japan. And the period 1975-79 is not a bizarre outlier: it is even bigger for 1990-92 (reflecting demographic divergence between rich and poor Asian countries). Furthermore, Bangladesh is not a bizarre outlier: it is bigger for Pakistan. On the other hand, Japan might be considered the bizarre outlier in this comparison since the dependency burdens were quite low there by Asian standards. Thus, Panel D poses the same counterfactual question but replaces Japan's dependency rates by the average dependency rates for the fast-transition countries in East Asia as a group, excluding Japan.[19] The figures are a bit smaller, but they are still big.

The question can, of course, be posed the other way round. Panel B asks how Japan would have behaved had it had the dependency burden of Bangladesh, Pakistan and Thailand. Again the figures are enormous: in 1975-79, Japan would have switched from a modest net capital exporter (+0.7 percent) to a major net capital importer (-12.4 percent), a switch of 13.1 percentage points. The figure is even bigger for 1990-92. The same counterfactual is explored in Panel C for the rest of fast-transition East Asia, and the trio of Bangladesh, Pakistan and Thailand (with really big dependency rate burdens) are now replaced by the average for all South Asia. The figures are a bit smaller, but they are still big.

VII. Could Dependency Rates Drive Asian Capital Flows in the Future?

Economists project the next century at their peril, but what follows is not projection. Indeed, the title of this section has carefully chosen the phrase "Could Dependency Rates Drive Asian Capital Flows in the Future?" rather than "Will Dependency Rates Drive Asian Capital Flows in the Future?" There are just too many things that might offset the potential impact of demography on foreign capital dependency over the next thirty years. Global capital markets may retreat behind autarkic barriers, just as they did between 1914 and the early 1970s (Williamson 1996). China may open its doors wide to foreign capital, or slam them shut. Capital scarcity in world markets may rise or fall (Barro 1992). The steamy investment boom among the new Southeast Asian

[19] These include: China, Hong Kong, Korea, Singapore and Taiwan.

tigers may falter, or it may instead spread throughout South Asia. We have nothing to say about these important influences, and have seen how in the recent past they have had a big impact in delaying the switch to foreign capital independence in Southeast Asia and offsetting it entirely in South Asia. We admit that the real world in the year 2025 may look very different than the one we explore here.

What we intend to do is to assess the impact of demographic events alone on foreign capital dependency by the year 2025. What might the implications be of the demographic trends documented in Table 3? After harvesting the benefits of an enormous past decline in the youth dependency rate, how will Japan and the old East Asian tigers respond to a future rise in the elderly dependency rate? What will happen to foreign capital dependency in South Asia as Bangladesh, India and Pakistan enjoy a spectacular rise in the prime age share?

Our guess at the future is based the predictable demographic facts underlying Table 3 and the demographic beta coefficients estimated in Section V. Nothing else enters into the calculations, so Table 11 can only speak to the impact of future demographic events. But there certainly are some loud and interesting messages emerging from the table.

What about aging in Japan? It will serve to lower the savings rate, of course, but it will also lower the investment rate, and by a bit more. Thus, if demographic forces are permitted to have their say, Japan will <u>not</u> become a nation of old people unable to find the resources to export capital to the poorer parts of Asia. Actually, it looks like the CAB share will rise (modestly) by about 2 percentage points. But what distinguishes Japan is that the rise is so modest: it will be dramatic elsewhere in Asia.

South Asia will graduate from its current heavy dependency on foreign capital to complete independence by 2025. The CAB in Bangladesh will switch from -8.2 percent of GDP in 1990-92 to +1.4 percent in 2025, a total change of 9.6 percentage points, almost identical to the impact of the dependency rate fall which Japan recorded between 1950-54 and 1990-92. The decline is most dramatic between 2005 and 2015, but it persists throughout the three decades or so. India will undergo a similar trend, although the total impact will not be as great (a 7.8 percentage point drop in the CAB share). Pakistan and Sri Lanka will replicate Bangladesh almost exactly (9.9 and 9.1 percentage point declines in the CAB share, respectively). With the exception of Japan, the experience in East Asia will be similar: a CAB share rise of 9 percentage points in China and 10.7 in Korea.

The movement towards net capital export positions will be most dramatic in Southeast Asia. Between 1990-92 and 2025, the CAB share will rise by 10.5 percentage points in Indonesia, by 11.3 in Malayasia, by 10.5 in the Philippines, by 9.5 in Singapore, and by 11.7 in Thailand.

If demographic forces are allowed to have their way, capital flows over Asian borders will be very different three decades from today!

VIII. The Bottom Line: Coale and Hoover Were Right!

Ansley Coale and Edgar Hoover were right! Rising fertility and falling infant mortality have had a profound impact on Asian savings, investment and foreign capital dependency over the half century since 1950. While the dependency rate literature looks almost exclusively at domestic savings, this paper also looks at investment and the current account balance. This long inattention to the investment-dependency connection would seem strange to an economic historian trained in the 1960s by reading Simon Kuznets, Moses Abramovitz and Richard Easterlin who, after all, talked about population sensitive investment in the 19th century new world. The attention has paid off: we have gained considerable insight into Asian foreign capital dependency in the past, present and future. And we have done it with a model which rejects steady-state analysis in favor of transition analysis, a model which finally offers a compatible marriage between the demographic transition and the economic models used to explore its impact.

We find that: Much of the impressive rise in Asian savings rates since the 1960s can be explained by the equally impressive decline in youth dependency burdens. Where Asia has kicked the foreign capital dependency habit is where the youth dependency burden has fallen most dramatically. Much of the contrasting foreign capital dependency between South and East Asia can be explained by the size of the youth dependency burden and its persistence. Aging will not diminish Japan's capacity to export capital in the next century, but little of it will go to the rest of Asia, at least if dependency rates are allowed to have their way. Rather, the rest of Asia will switch to capital export positions: they will kick the foreign capital dependency habit, even in South Asia.

We have made many assumptions along the way: that world savings supplies do not alter incentives for capital flows over Asian borders; that world capital markets are relatively open; and that the demographic transition is exogenous to accumulation performance. The world capital market assumptions have been discussed at length in the paper, but the exogeneity of the demographic transition has not.

We have taken dependency rates as exogenous, as if the transition can be viewed solely as a response to the (exogenous) import of foreign health technology in the 1950s, a shock which sharply lowers infant mortality over a decade or two, thus inducing a half-century evolution in the age structure and in dependency rates. But that's much too simple, of course. With a lag, fertility rates have also fallen, and these have been driven, among other things, by economic success (and their fall limited by economic failure). Additional reductions in infant mortality have also been assured by economic success (or limited by economic failure). This paper ignores this important connection, and it may matter to our interpretation of the past.

We have also projected the future with the full knowledge that our assumptions about integrated world capital markets may be made irrelevant by some retreat back into pre-1970 autarchy, if not by all of Asia, by some important parts like China. Furthermore, we have ignored the possibility of any change in global capital supply that might influence incentives for capital flows over Asian borders in the future.

Subject to these important qualifications, the dependency rate hypothesis is alive and well in Asia. It has played an important role in the past half-century and probably will do the same over the next half-century.

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Table 1

Dependency Rates in Asia During the Second Half of the 20th Century (in %)

Country	Period	Young 0-14	Prime 25-59	Old 65+	Peak Young	Δ To Peak	Δ From Peak
Bangladesh	1950-54	37.16	37.69	3.66			
Bangladesh	1955-59	39.47	36.35	3.72			
Bangladesh	1960-64	41.91	34.60	3.71			
Bangladesh	1965-69	44.14	32.83	3.63			
Bangladesh	1970-74	45.60	30.94	3.54			
Bangladesh	1975-79	46.00	29.64	3.52	1975-79	+8.04	-2.72
Bangladesh	1980-84	45.99	29.36	3.28			
Bangladesh	1985-89	44.99	30.22	3.01			
Bangladesh	1990-92	43.28	31.43	2.88			
China	1950-54	34.96	39.66	4.53			
China	1955-59	37.82	37.97	4.70			
China	1960-64	39.42	37.18	4.66			
China	1965-69	40.00	35.51	4.36	1965-69	+5.04	-13.56
China	1970-74	39.62	34.42	4.35			
China	1975-79	37.87	35.70	4.53			
China	1980-84	33.18	38.41	4.95			
China	1985-89	28.43	40.79	5.50			
China	1990-92	26.44	43.65	5.99			
Hong Kong	1950-54	32.39	43.60	2.56			
Hong Kong	1955-59	37.58	43.55	2.64			
Hong Kong	1960-64	40.71	40.94	2.99	1960-64	+8.32	-20.64
Hong Kong	1965-69	34.03	37.70	3.54			
Hong Kong	1970-74	34.35	37.67	4.52			
Hong Kong	1975-79	28.44	40.03	5.83			
Hong Kong	1980-84	24.56	43.73	6.90			
Hong Kong	1985-89	22.14	48.08	8.08			
Hong Kong	1990-92	20.07	50.77	9.26			
India	1950-54	38.96	36.19	3.36			
India	1955-59	39.32	36.34	3.39			
India	1960-64	40.03	36.23	3.47			
India	1965-69	40.42	35.83	3.58	1965-69	+1.49	-4.10
India	1970-74	40.18	35.36	3.72		(+0.42)	
India	1975-79	39.30	35.32	3.92			
India	1980-84	38.19	35.81	4.13			
India	1985-89	37.19	36.53	4.35			
India	1990-92	36.32	37.34	4.60			
Indonesia	1950-54	39.08	34.75	3.83			
Indonesia	1955-59	39.43	35.16	3.52			
Indonesia	1960-64	40.76	35.43	3.24			
Indonesia	1965-69	41.89	35.27	3.08			
Indonesia	1970-74	42.16	34.37	3.11	1970-74	+3.09	-7.26
Indonesia	1975-79	41.60	33.81	3.25			
Indonesia	1980-84	40.07	34.60	3.45			
Indonesia	1985-89	37.47	36.10	3.73			
Indonesia	1990-92	34.90	37.65	4.10			

Table 1, cont.

Country	Period	Young 0-14	Prime 25-59	Old 65+	Peak Young	Δ To Peak	Δ From Peak
Japan	1950-54	34.70	38.05	5.08	1950-54	0	-16.72
Japan	1955-59	32.23	40.38	5.47		(-1.90)	
Japan	1960-64	28.50	42.94	5.94			
Japan	1965-69	25.17	45.08	6.58			
Japan	1970-74	24.14	47.23	7.39			
Japan	1975-79	24.04	49.06	8.35			
Japan	1980-84	22.74	49.65	9.55			
Japan	1985-89	20.29	49.31	10.88			
Japan	1990-92	17.97	48.86	12.42			
Korea, Rep.	1950-54	40.74	34.37	3.30			
Korea, Rep.	1955-59	40.40	34.28	3.53			
Korea, Rep.	1960-64	42.46	34.17	3.31			
Korea, Rep.	1965-69	42.78	34.55	3.28	1965-69	+2.04	-18.00
Korea, Rep.	1970-74	40.34	34.89	3.42		(+2.88)	
Korea, Rep.	1975-79	38.25	35.92	3.69			
Korea, Rep.	1980-84	32.39	39.09	4.00			
Korea, Rep.	1985-89	28.25	43.77	4.49			
Korea, Rep.	1990-92	24.78	47.27	4.99			
Malaysia	1950-54	41.55	33.61	4.73			
Malaysia	1955-59	43.63	32.72	3.93			
Malaysia	1960-64	45.63	31.76	3.34	1960-64	+4.07	-7.67
Malaysia	1965-69	45.54	31.12	3.30			
Malaysia	1970-74	43.59	31.12	3.53			
Malaysia	1975-79	40.98	32.66	3.69			
Malaysia	1980-84	39.07	34.26	3.88			
Malaysia	1985-89	38.45	35.71	3.72			
Malaysia	1990-92	37.96	37.15	3.79			
Myanmar	1950-54	38.57	38.46	3.28			
Myanmar	1955-59	40.29	37.34	3.36			
Myanmar	1960-64	41.12	35.60	3.46			
Myanmar	1965-69	41.12	34.23	3.61	1965-69	+2.56	-4.31
Myanmar	1970-74	41.00	33.75	3.77		(+3.72)	
Myanmar	1975-79	40.28	33.98	3.90			
Myanmar	1980-84	39.47	34.21	3.90			
Myanmar	1985-89	38.41	34.80	3.91			
Myanmar	1990-92	36.81	36.15	4.16			
Nepal	1950-54	38.73	34.56	4.39			
Nepal	1955-59	38.20	35.31	4.10			
Nepal	1960-64	38.82	36.03	3.76			
Nepal	1965-69	40.23	36.07	3.31			
Nepal	1970-74	41.95	35.16	3.13			
Nepal	1975-79	42.22	34.90	3.19	1975-89	+3.49	-0.29
Nepal	1980-84	41.64	35.02	3.02			
Nepal	1985-89	42.24	34.41	3.04			
Nepal	1990-92	41.94	34.09	3.15			
Pakistan	1950-54	39.14	34.60	5.14			
Pakistan	1955-59	42.10	33.51	4.56			
Pakistan	1960-64	44.81	32.37	3.94			
Pakistan	1965-69	46.27	31.12	3.44	1965-69	+7.14	-1.08
Pakistan	1970-74	45.96	29.97	3.08			
Pakistan	1975-79	45.03	29.90	2.93			
Pakistan	1980-84	44.47	30.61	2.84			
Pakistan	1985-89	45.03	30.97	2.75			
Pakistan	1990-92	45.88	31.27	2.74			

Table 1, cont.

Country	Period	Young 0-14	Prime 25-59	Old 65+	Peak Young	Δ To Peak	Δ From Peak
Philippines	1950-54	43.84	32.54	3.47			
Philippines	1955-59	44.37	31.73	3.18			
Philippines	1960-64	44.75	31.36	3.00			
Philippines	1965-69	45.17	30.73	2.84	1965-69	+1.33	-5.61
Philippines	1970-74	44.40	30.58	2.70		(+2.17)	
Philippines	1975-79	42.49	31.65	2.98			
Philippines	1980-84	41.70	32.72	3.40			
Philippines	1985-89	40.71	34.02	3.39			
Philippines	1990-92	39.56	35.33	3.42			
Singapore	1950-54	40.93	37.57	2.41			
Singapore	1955-59	42.19	36.49	2.16			
Singapore	1960-64	43.48	35.05	2.38	1960-64	+2.54	-20.22
Singapore	1965-69	41.74	33.97	3.04			
Singapore	1970-74	36.42	34.97	3.67			
Singapore	1975-79	30.55	38.60	4.37			
Singapore	1980-84	26.01	43.92	4.94			
Singapore	1985-89	23.95	48.97	5.38			
Singapore	1990-92	23.26	51.82	5.89			
Sri Lanka	1950-54	41.01	34.00	3.87			
Sri Lanka	1955-59	41.73	34.29	3.70	1955-59	+0.73	-9.90
Sri Lanka	1960-64	41.82	34.16	3.64		(+4.43)	
Sri Lanka	1965-69	41.65	34.08	3.66			
Sri Lanka	1970-74	40.88	34.28	3.81			
Sri Lanka	1975-79	37.72	35.57	4.18			
Sri Lanka	1980-84	34.82	37.77	4.48			
Sri Lanka	1985-89	33.53	39.47	4.88			
Sri Lanka	1990-92	31.84	41.12	5.41			
Taiwan	1950-54						
Taiwan	1955-59	44.27	34.23	2.47			
Taiwan	1960-64	45.20	34.82	2.55	1960-64	+0.93	-18.82
Taiwan	1965-69	42.67	35.14	2.76		(+4.70)	
Taiwan	1970-74	37.86	35.58	3.16			
Taiwan	1975-79	33.98	37.29	3.82			
Taiwan	1980-84	31.06	40.28	4.60			
Taiwan	1985-89	28.55	43.22	5.53			
Taiwan	1990-92	26.39	45.52	6.51			
Thailand	1950-54	42.65	32.42	2.97			
Thailand	1955-59	43.60	32.61	2.83			
Thailand	1960-64	45.33	32.31	2.82			
Thailand	1965-69	46.24	31.45	2.96	1965-69	+3.59	-14.74
Thailand	1970-74	45.67	30.53	3.01		(+7.14)	
Thailand	1975-79	42.94	31.52	3.21			
Thailand	1980-84	38.60	34.49	3.58			
Thailand	1985-89	34.94	37.34	3.75			
Thailand	1990-92	31.50	40.64	4.07			

Source: United Nations (1991).

Note "Δ to Peak" refers to change between earliest date, usually 1950-54, and peak. The figure in parentheses refers to change from 1931 or 1941 to Peak, where available from Table 2.

Table 2

Dependency Rates in Asia During the First Half of the 20th Century (% aged 0-14 and 65+)

	*c*1901	*c*1911	*c*1921	*c*1931	*c*1941	*c*1951
Burma						
0-14	37.2	37.8	36.2	37.4		
65+		3.4	3.2	2.8		
Total		41.2	39.4	40.2		
Ceylon						
0-14			39.4		37.3	39.7
65+			2.4		3.4	3.5
Total			41.8		40.7	43.2
China						
0-14						35.9
65+						4.4
Total						40.3
India						
0-14	38.6	38.5	39.2	40.0		37.5
65+		2.4	2.5	2.2		3.6
Total		40.9	41.7	42.2		41.1
Japan						
0-14			36.5	36.6	36.0	35.4
65+			5.3	4.8	4.7	4.9
Total			41.8	41.4	40.7	40.3
Korea						
0-14				39.9	41.9	41.7
65+				3.9	7.4	3.2
Total				43.8	49.3	44.9
Malaya						
0-14				31.4		43.9
65+						2.7
Total						46.6
Philippines						
0-14					43.0	44.2
65+					3.5	3.2
Total					46.5	47.4
Taiwan						
0-14	35.9	35.9	39.4	40.5	44.2	44.1
65+	2.4	2.4	2.5	2.4	2.7	2.5
Total	38.3	38.3	41.9	42.9	46.9	46.6
Thailand						
0-14				39.1	42.4	42.3
65+				0.0	2.8	2.6
Total				39.1	45.2	44.9

Sources: Bank of Japan (1966); Kwon (1975); Mitchell (1982).

Table 3

Prime Age Shares in Asia into the 21st Century, 1990-2025 (%25-59)

Country	1990-92	2005	2025	Δ 2025-1990
Bangladesh	31.43	36.21	46.09	+14.66
China	43.65	49.96	50.37	+6.72
Hong Kong	50.77	na	na	na
India	37.34	40.23	47.48	+10.14
Indonesia	37.64	44.08	49.52	+11.88
Japan	48.86	47.58	43.55	-5.31
South Korea	47.27	53.62	49.50	+2.23
Malaysia	37.15	41.70	49.23	+12.00
Myanmar	36.15	na	na	na
Nepal	34.09	na	na	na
Pakistan	31.27	33.42	44.97	+13.70
Philippines	35.33	39.92	47.52	+12.19
Singapore	51.82	53.39	45.04	-6.78
Sri Lanka	41.12	46.16	47.54	+6.42
Taiwan	45.52	na	na	na
Thailand	40.64	48.77	48.92	+8.28
Range: High-Low	20.55	20.20	6.82	

Source: United Nations (1991).

Table 4

Savings, Investment and Net Capital Flows in Asia as Shares in GDP (%)

Country	Period	Savings	Investment	Current Account Balance
Bangladesh	1950-54			
Bangladesh	1955-59		8.29	
Bangladesh	1960-64		12.73	
Bangladesh	1965-69		14.27	
Bangladesh	1970-74	2.61	7.92	-5.31
Bangladesh	1975-79	1.25	10.04	-8.79
Bangladesh	1980-84	1.50	14.41	-12.91
Bangladesh	1985-89	1.87	12.41	-10.54
Bangladesh	1990-92	3.88	12.10	-8.22
China	1950-54			
China	1955-59			
China	1960-64		20.10	
China	1965-69		21.07	
China	1970-74		27.45	
China	1975-79	30.33	30.16	0.16
China	1980-84	28.52	27.62	0.90
China	1985-89	33.16	34.78	-1.62
China	1990-92	35.51	33.21	2.29
Hong Kong	1950-54			
Hong Kong	1955-59			
Hong Kong	1960-64		28.99	
Hong Kong	1965-69		22.28	
Hong Kong	1970-74		24.07	
Hong Kong	1975-79		28.52	
Hong Kong	1980-84		31.59	
Hong Kong	1985-89		26.30	
Hong Kong	1990-92		28.37	
India	1950-54	9.92	11.14	-1.22
India	1955-59	12.83	16.07	-3.24
India	1960-64	13.48	16.76	-3.28
India	1965-69	13.88	16.64	-2.76
India	1970-74	16.91	18.16	-1.25
India	1975-79	20.77	21.33	-0.56
India	1980-84	18.94	22.17	-3.23
India	1985-89	20.95	24.75	-3.81
India	1990-92		24.56	
Indonesia	1950-54			
Indonesia	1955-59			
Indonesia	1960-64	6.14	8.77	-2.48
Indonesia	1965-69	1.70	8.31	-6.61
Indonesia	1970-74	17.81	19.28	-1.47
Indonesia	1975-79	24.15	24.33	-0.18
Indonesia	1980-84	27.54	27.29	0.24
Indonesia	1985-89	27.77	30.88	-3.11
Indonesia	1990-92			

Table 4, cont.

Country	Period	Savings	Investment	Current Account Balance
Japan	1950-54		25.25	
Japan	1955-59	28.39	28.09	0.30
Japan	1960-64	34.93	35.51	-0.58
Japan	1965-69	35.79	34.87	0.92
Japan	1970-74	38.15	37.14	1.02
Japan	1975-79	32.44	31.76	0.68
Japan	1980-84	30.91	29.88	1.03
Japan	1985-89	32.76	29.39	3.37
Japan	1990-92	34.55	32.09	2.46
Korea, Rep.	1950-54		13.85	
Korea, Rep.	1955-59	3.36	12.08	-8.73
Korea, Rep.	1960-64	4.83	13.94	-9.11
Korea, Rep.	1965-69	13.72	22.96	-9.24
Korea, Rep.	1970-74	17.30	25.34	-8.04
Korea, Rep.	1975-79	23.89	29.32	-5.43
Korea, Rep.	1980-84	22.90	29.68	-6.78
Korea, Rep.	1985-89	33.38	30.21	3.18
Korea, Rep.	1990-92		37.99	
Malaysia	1950-54			
Malaysia	1955-59	19.92	10.92	9.00
Malaysia	1960-64	20.78	17.09	3.68
Malaysia	1965-69	21.23	17.61	3.62
Malaysia	1970-74	23.69	24.87	-1.19
Malaysia	1975-79	28.51	26.06	2.45
Malaysia	1980-84	26.61	34.85	-8.24
Malaysia	1985-89	28.22	28.35	1.87
Malaysia	1990-92	27.89	34.09	-6.20
Myanmar	1950-54		12.38	
Myanmar	1955-59		15.37	
Myanmar	1960-64	2.37	12.22	-9.66
Myanmar	1965-69	4.90	13.26	-8.36
Myanmar	1970-74	6.64	12.05	-5.41
Myanmar	1975-79	12.04	14.75	-2.71
Myanmar	1980-84	14.43	19.94	-5.51
Myanmar	1985-89	9.37	12.76	-3.39
Myanmar	1990-92			
Nepal	1950-54			
Nepal	1955-59			
Nepal	1960-64		7.19	
Nepal	1965-69		4.66	
Nepal	1970-74	4.01	7.52	-3.51
Nepal	1975-79	12.38	15.89	-3.51
Nepal	1980-84	10.83	18.30	-7.46
Nepal	1985-89		21.83	
Nepal	1990-92			
Pakistan	1950-54		7.41	
Pakistan	1955-59	2.55	10.02	-7.59
Pakistan	1960-64	8.86	19.76	-10.89
Pakistan	1965-69	8.99	16.25	-7.26
Pakistan	1970-74	7.92	14.36	-6.44
Pakistan	1975-79	6.30	17.68	-11.38
Pakistan	1980-84	6.80	18.70	-11.90
Pakistan	1985-89	8.10	18.63	-10.53
Pakistan	1990-92	12.53	19.44	-6.92

Table 4, cont.

Country	Period	Savings	Investment	Current Account Balance
Philippines	1950-54	13.22	15.07	-2.02
Philippines	1955-59	13.73	16.46	-2.72
Philippines	1960-64	18.56	19.28	-0.72
Philippines	1965-69	19.80	21.24	-1.44
Philippines	1970-74	22.39	22.39	0.00
Philippines	1975-79	26.36	31.61	-5.25
Philippines	1980-84	21.61	27.20	-5.59
Philippines	1985-89	17.35	17.92	-0.57
Philippines	1990-92	20.50	22.83	-2.33
Singapore	1950-54			
Singapore	1955-59			
Singapore	1960-64		14.77	
Singapore	1965-69	16.46	23.79	-7.33
Singapore	1970-74	23.76	41.08	-17.32
Singapore	1975-79	32.74	39.87	-7.13
Singapore	1980-84	40.88	47.41	-6.53
Singapore	1985-89	43.22	38.30	4.92
Singapore	1990-92	49.22	39.61	9.61
Sri Lanka	1950-54	20.44	13.01	7.43
Sri Lanka	1955-59	15.66	14.41	1.24
Sri Lanka	1960-64	11.73	15.04	-3.30
Sri Lanka	1965-69	10.31	15.42	-5.11
Sri Lanka	1970-74	12.30	16.49	-4.18
Sri Lanka	1975-79	13.15	18.43	-5.28
Sri Lanka	1980-84	11.63	29.14	-17.51
Sri Lanka	1985-89	9.78	22.66	-12.88
Sri Lanka	1990-92	11.99	22.73	-10.74
Taiwan	1950-54		14.99	
Taiwan	1955-59	10.04	16.20	-6.16
Taiwan	1960-64	15.01	19.08	-4.07
Taiwan	1965-69	22.40	24.24	-1.84
Taiwan	1970-74	31.46	28.48	2.99
Taiwan	1975-79	31.96	30.04	1.92
Taiwan	1980-84	32.15	26.92	5.23
Taiwan	1985-89	36.76	20.66	16.10
Taiwan	1990-92		22.26	
Thailand	1950-54		12.80	
Thailand	1955-59	12.76	14.82	-2.05
Thailand	1960-64	16.29	18.12	-1.83
Thailand	1965-69	21.55	23.80	-2.25
Thailand	1970-74	23.92	24.99	-1.07
Thailand	1975-79	22.28	26.58	-4.31
Thailand	1980-84	19.11	25.35	-6.24
Thailand	1985-89	25.04	27.45	-2.40
Thailand	1990-92	33.45	41.14	-7.66

Source: See text.

Table 5

Savings, investment and Net Capital Flows in Asia as Shares in GDP, by Three Regions, 1950-1992 (in %)

Country	Period	Savings	Investment	Current Account Balance
A. Unweighted country averages:				
East Asia	1950-54		18.03	
East Asia	1955-59	13.93	18.79	-4.86
East Asia	1960-64	18.26	23.53	-4.59
East Asia	1965-69	23.97	25.08	-3.39
East Asia	1970-74	28.97	28.50	-1.35
East Asia	1975-79	29.65	29.96	-0.67
East Asia	1980-84	28.62	29.14	0.09
East Asia	1985-89	34.01	28.27	5.26
East Asia	1990-92	35.03	30.78	2.38
South Asia	1950-54	15.18	10.99	3.10
South Asia	1955-59	10.35	12.83	-3.19
South Asia	1960-64	9.11	13.95	-6.78
South Asia	1965-69	9.52	13.42	-5.87
South Asia	1970-74	8.40	12.75	-4.35
South Asia	1975-79	10.98	16.35	-5.37
South Asia	1980-84	10.69	20.44	-9.75
South Asia	1985-89	10.01	18.84	-8.23
South Asia	1990-92	9.47	19.71	-8.63
Southeast Asia	1950-54	13.22	13.93	-2.02
Southeast Asia	1955-59	15.47	14.06	1.41
Southeast Asia	1960-64	15.44	15.61	-0.34
Southeast Asia	1965-69	16.15	18.95	-2.80
Southeast Asia	1970-74	22.31	26.52	-4.21
Southeast Asia	1975-79	26.81	29.69	-2.88
Southeast Asia	1980-84	27.15	32.42	-5.27
Southeast Asia	1985-89	28.32	28.18	0.14
Southeast Asia	1990-92	32.58	34.58	-2.01
B. Weighted by country population:				
East Asia	1950-54		23.03	
East Asia	1955-59	23.39	24.89	-1.51
East Asia	1960-64	28.44	21.76	-2.42
East Asia	1965-69	30.75	22.68	-1.40
East Asia	1970-74	33.22	28.39	-1.13
East Asia	1975-79	30.33	30.29	0.03
East Asia	1980-84	28.57	27.93	0.66
East Asia	1985-89	33.13	34.07	-0.98
East Asia	1990-92	35.41	33.24	2.31
South Asia	1950-54	10.14	10.88	-1.04
South Asia	1955-59	11.87	14.80	-3.58
South Asia	1960-64	12.54	16.31	-4.28
South Asia	1965-69	12.97	16.06	-3.47
South Asia	1970-74	14.14	16.47	-2.32
South Asia	1975-79	17.05	19.56	-2.52
South Asia	1980-84	15.70	21.06	-5.36
South Asia	1985-89	17.13	22.42	-5.29
South Asia	1990-92	8.58	22.65	-7.76

Table 5, cont.

Country	Period	Savings	Investment	Current Account Balance
B. Weighted by country population: (cont.)				
Southeast Asia	1950-54	13.22	13.96	-2.02
Southeast Asia	1955-59	14.13	15.04	-0.91
Southeast Asia	1960-64	10.80	12.65	-1.74
Southeast Asia	1965-69	9.51	13.92	-4.41
Southeast Asia	1970-74	20.08	21.35	-1.28
Southeast Asia	1975-79	24.53	26.30	-1.77
Southeast Asia	1980-84	25.01	27.51	-2.50
Southeast Asia	1985-89	25.46	27.63	-2.16
Southeast Asia	1990-92	29.81	33.81	-4.00

Source: See text.

Table 6

Dependency Effects on Savings and Investment: System Estimates

Explanatory Variables	**Dependent Variables**	
	National Savings	*Investment*
LDV	.809** (40.34)	.809** (40.34)
GROWTH	-3.54E-2 (.419)	.238** (3.10)
RPI	4.57E-2** (2.68)	1.44E-2 (.889)
Z1	.703** (3.40)	.566** (2.77)
Z2	-4.64E-2** (2.87)	-4.00E-2* (2.52)
F-Statistic, Marginal Sig.	$F_{2,880}$ = 22.55, M.S. < .001	$F_{2,880}$ = 9.66 M.S. < .001

Notes

1. Method of Estimation: Three-Stage Least Squares. Total observations: 916.
   System-Weighted R^2=.915.
2. Estimates for constant term and dummy variables not reported.
3. Absolute t-statistics are in parentheses. The F-statistics at the bottom of the table concern the joint significance of the two demographic variables.
4. Test for the equality of the demograhic variables across the two equations: $F_{2,880}$=4.43, with marginal significance level of .012.
5. The instruments include a constant and the dummy variables; contemporaneous values of Z1, Z2, and GLF; and lagged values of NSAVE, NI, GROWTH, RPI, GZ1, GZ2, P, RGDPW, RGDPL and OPEN.

Table 7

Dependency Effects on Some Elements of National Income: Equation-by-Equation Estimates

Explanatory Variables	**Dependent Variables**		
	National Savings	*Investment*	*Current Balance*
LDV	.816** (28.3)	.821** (31.2)	.757** (21.6)
GROWTH	-4.46E-2 (.498)	.234** (2.98)	-.225* (2.27)
RPI	4.42E-2* (2.47)	1.21E-2 (.722)	3.29E-2 (1.70)
Z1	.690** (3.24)	.527* (2.45)	6.58E-2 (.371)
Z2	-4.58E-2** (2.78)	-3.74E-2* (2.25)	8.72E-6 (.217)
R-Bar²	.937	.902	.722
Observations	458	458	458
F-Statistic, Marginal Sig.	$F_{2,439}$ = 10.72, M.S. < .001	$F_{2,439}$ = 4.89 M.S. = .008	$F_{2,439}$ = 3.68 M.S. = .026

Notes

1. Method of Estimation: Two-Stage Least Squares.
2. Estimates for constant term and dummy variables not reported.
3. Absolute t-statistics are in parentheses. The F-statistics at the bottom of the table concern the joing significance of the demograhic variables.
4. The instruments include a constant and the dummy variables; contemporaneous values of Z1, Z2, and GLF; and lagged values of NSAVE, NI, GROWTH, RPI, GZ1, GZ2, P, RGDPW, RGDPL and OPEN.
5. For each equation, the null hypothesis that the six overidentifying restrictions are valid is not rejected at the 10 percent level. The test is implemented by regressing the 2SLS residuals on the instruments. Under the null, the number of observations multiplied by the uncentered R^2 is distributed as a χ^2_6.

Table 8

The Impact of Dependency Rates in Asia by Three Regions 1950-1992 (in %)

Country	Period	Savings	Investment	Current Account Balance
East Asia	1950-54	0.96	1.16	-0.20
East Asia	1955-59	-2.14	-1.52	-0.62
East Asia	1960-64	-3.35	-2.37	-0.98
East Asia	1965-69	-4.88	-3.43	-1.44
East Asia	1970-74	-5.18	-3.71	-1.46
East Asia	1975-79	-2.48	-1.69	-0.80
East Asia	1980-84	2.38	1.84	0.55
East Asia	1985-89	6.30	4.35	1.95
East Asia	1990-92	8.38	5.37	3.01
South Asia	1950-54	1.79	1.80	-0.02
South Asia	1955-59	0.97	1.14	-0.17
South Asia	1960-64	-0.21	0.09	-0.30
South Asia	1965-69	-1.07	-0.73	-0.34
South Asia	1970-74	-1.51	-1.21	-0.30
South Asia	1975-79	-1.16	-1.05	-0.11
South Asia	1980-84	-0.49	-0.61	0.12
South Asia	1985-89	0.20	-0.16	0.36
South Asia	1990-92	1.49	0.73	0.76
Southeast Asia	1950-54	-0.14	-0.53	0.39
Southeast Asia	1955-59	-1.32	-0.98	-0.34
Southeast Asia	1960-64	-2.54	-1.68	-0.88
Southeast Asia	1965-69	-3.41	-2.28	-1.13
Southeast Asia	1970-74	-3.64	-2.42	-1.21
Southeast Asia	1975-79	-2.00	-1.32	-0.68
Southeast Asia	1980-84	0.88	0.63	0.25
Southeast Asia	1985-89	4.27	3.05	1.22
Southeast Asia	1990-92	7.90	5.54	2.36

Notes: See text for definition of the three counterfactuals. All figures are percentage shares of GDP.

Table 9

The Impact of Dependency Rates in Asia by Country 1950-1992 (in %)

Country	Period	Savings	Investment	Current Account Balance
Bangladesh	1950-54	12.09	9.28	2.82
Bangladesh	1955-59	9.18	6.73	2.45
Bangladesh	1960-64	4.66	2.96	1.69
Bangladesh	1965-69	0.62	-0.24	0.85
Bangladesh	1970-74	-3.09	-2.97	-0.12
Bangladesh	1975-79	-6.14	-4.96	-1.18
Bangladesh	1980-84	-7.78	-5.60	-2.18
Bangladesh	1985-89	-6.91	-4.19	-2.71
Bangladesh	1990-92	-4.38	-1.68	-2.70
China	1950-54	2.96	2.39	0.57
China	1955-59	-1.20	-1.12	-0.08
China	1960-64	-3.10	-2.45	-0.65
China	1965-69	-5.24	-3.88	-1.36
China	1970-74	-5.77	-4.23	-1.54
China	1975-79	-2.78	-1.85	-0.93
China	1980-84	2.62	2.20	0.43
China	1985-89	6.93	5.10	1.83
China	1990-92	9.28	6.40	2.88
Hong Kong	1950-54	-6.95	-0.64	-6.31
Hong Kong	1955-59	-6.40	-1.46	-4.94
Hong Kong	1960-64	-6.40	-2.86	-3.54
Hong Kong	1965-69	-5.23	-3.16	-2.07
Hong Kong	1970-74	-0.76	-1.04	0.28
Hong Kong	1975-79	3.47	0.78	2.69
Hong Kong	1980-84	6.58	2.44	4.14
Hong Kong	1985-89	9.13	3.52	5.61
Hong Kong	1990-92	10.94	4.03	6.90
India	1950-54	-0.39	0.52	-0.91
India	1955-59	-0.49	0.36	-0.85
India	1960-64	-1.00	-0.28	-0.72
India	1965-69	-1.26	-0.76	-0.50
India	1970-74	-1.16	-0.94	-0.22
India	1975-79	-0.36	-0.57	0.21
India	1980-84	0.80	0.09	0.71
India	1985-89	1.89	0.68	1.21
India	1990-92	3.28	1.52	1.76
Indonesia	1950-54	0.52	-0.15	0.67
Indonesia	1955-59	-0.43	-0.34	-0.09
Indonesia	1960-64	-1.44	-0.77	-0.67
Indonesia	1965-69	-1.82	-0.94	-0.88
Indonesia	1970-74	-2.34	-1.44	-0.91
Indonesia	1975-79	-2.07	-1.38	-0.70
Indonesia	1980-84	0.04	0.05	-0.01
Indonesia	1985-89	3.44	2.29	1.15
Indonesia	1990-92	6.85	4.47	2.38

Table 9, cont.

Country	Period	Savings	Investment	Current Account Balance
Japan	1950-54	-9.46	-4.63	-4.82
Japan	1955-59	-5.63	-1.94	-3.69
Japan	1960-64	-1.33	0.98	-2.31
Japan	1965-69	1.60	2.60	-1.00
Japan	1970-74	2.78	2.56	0.21
Japan	1975-79	3.14	1.76	1.38
Japan	1980-84	3.64	0.87	2.78
Japan	1985-89	3.64	-0.58	4.22
Japan	1990-92	2.69	-2.72	5.40
Korea, Rep.	1950-54	-4.64	-3.26	-1.39
Korea, Rep.	1955-59	-6.54	-4.87	-1.67
Korea, Rep.	1960-64	-8.43	-6.21	-2.22
Korea, Rep.	1965-69	-7.00	-5.04	-1.95
Korea, Rep.	1970-74	-3.37	-2.33	-1.04
Korea, Rep.	1975-79	0.70	0.68	0.02
Korea, Rep.	1980-84	6.17	4.72	1.45
Korea, Rep.	1985-89	12.70	9.15	3.55
Korea, Rep.	1990-92	17.34	11.93	5.41
Malaysia	1950-54	0.73	-0.78	1.51
Malaysia	1955-59	-2.23	-2.16	-0.07
Malaysia	1960-64	-4.11	-3.04	-1.07
Malaysia	1965-69	-4.52	-3.35	-1.17
Malaysia	1970-74	-2.83	-2.16	-0.67
Malaysia	1975-79	0.50	0.62	-0.13
Malaysia	1980-84	3.30	3.03	0.27
Malaysia	1985-89	4.80	4.21	0.59
Malaysia	1990-92	7.27	6.04	1.23
Myanmar	1950-54	3.51	3.64	-0.14
Myanmar	1955-59	1.86	1.99	-0.13
Myanmar	1960-64	0.07	0.24	-0.17
Myanmar	1965-69	-1.17	-1.03	-0.14
Myanmar	1970-74	-2.12	-2.01	-0.12
Myanmar	1975-79	-2.05	-2.03	-0.02
Myanmar	1980-84	-1.21	-1.27	0.06
Myanmar	1985-89	-0.08	-0.28	0.20
Myanmar	1990-92	2.00	1.22	0.78
Nepal	1950-54	1.95	-0.15	2.10
Nepal	1955-59	2.06	0.69	1.37
Nepal	1960-64	1.29	0.74	0.55
Nepal	1965-69	0.36	0.54	-0.18
Nepal	1970-74	-0.99	-0.31	-0.69
Nepal	1975-79	-1.56	-0.63	-0.93
Nepal	1980-84	-0.93	0.02	-0.94
Nepal	1985-89	-1.53	-0.62	-0.92
Nepal	1990-92	-1.08	-0.48	-0.60
Pakistan	1950-54	9.86	5.20	4.66
Pakistan	1955-59	4.84	2.02	2.82
Pakistan	1960-64	1.14	-0.01	1.15
Pakistan	1965-69	-1.52	-1.33	-0.20
Pakistan	1970-74	-2.71	-1.62	-1.09
Pakistan	1975-79	-2.36	-0.85	-1.52
Pakistan	1980-84	-2.76	-0.83	-1.93
Pakistan	1985-89	-4.10	-1.68	-2.42
Pakistan	1990-92	-3.98	-1.50	-2.48

Table 9, cont.

Country	Period	Savings	Investment	Current Account Balance
Philippines	1950-54	0.83	-0.13	0.96
Philippines	1955-59	-0.53	-0.77	0.24
Philippines	1960-64	-1.75	-1.48	-0.26
Philippines	1965-69	-3.50	-2.43	-1.07
Philippines	1970-74	-3.51	-1.84	-1.67
Philippines	1975-79	-0.28	0.24	-0.51
Philippines	1980-84	1.38	0.81	0.57
Philippines	1985-89	3.50	2.63	0.87
Philippines	1990-92	6.44	4.97	1.47
Singapore	1950-54	-8.75	-4.04	-4.71
Singapore	1955-59	-9.19	-4.44	-4.74
Singapore	1960-64	-9.38	-5.72	-3.66
Singapore	1965-69	-7.12	-5.39	-1.73
Singapore	1970-74	-1.64	-1.79	0.16
Singapore	1975-79	3.84	1.93	1.91
Singapore	1980-84	9.23	5.71	3.52
Singapore	1985-89	13.37	8.20	5.17
Singapore	1990-92	16.05	9.25	6.80
Sri Lanka	1950-54	-4.93	-3.49	-1.44
Sri Lanka	1955-59	-4.84	-3.27	-1.57
Sri Lanka	1960-64	-4.08	-2.70	-1.38
Sri Lanka	1965-69	-3.43	-2.29	-1.14
Sri Lanka	1970-74	-2.44	-1.67	-0.77
Sri Lanka	1975-79	1.04	0.83	0.21
Sri Lanka	1980-84	4.54	3.27	1.27
Sri Lanka	1985-89	7.54	5.04	2.50
Sri Lanka	1990-92	11.00	7.14	3.86
Taiwan	1950-54	na	na	na
Taiwan	1955-59	-11.97	-7.15	-4.83
Taiwan	1960-64	-10.60	-6.51	-4.10
Taiwan	1965-69	-6.19	-3.45	-2.74
Taiwan	1970-74	-0.59	0.32	-0.91
Taiwan	1975-79	3.54	2.48	1.06
Taiwan	1980-84	6.90	3.99	2.91
Taiwan	1985-89	10.74	5.92	4.81
Taiwan	1990-92	13.65	7.32	6.33
Thailand	1950-54	-2.26	-1.27	-0.99
Thailand	1955-59	-3.18	-1.93	-1.25
Thailand	1960-64	-4.54	-3.18	-1.37
Thailand	1965-69	-6.03	-4.67	-1.35
Thailand	1970-74	-6.05	-4.74	-1.30
Thailand	1975-79	-2.14	-1.77	-0.38
Thailand	1980-84	4.56	3.19	1.37
Thailand	1985-89	10.09	7.41	2.68
Thailand	1990-92	15.91	11.60	4.31

Notes: See Table 8.

Table 10

The Impact of Dependency Rates on Foreign Capital Dependency Across Asia: Using the Counterfactual 1955-1992 (in %)

Country	Period	Share Current Account Balance in GDP: Actual	Counterfactual	Difference
A. Bangladesh, Pakistan and Thailand with Japanese Demographics:				
Bangladesh	1955-59			+3.89
	1975-79	-5.31	5.06	+12.60
	1990-92	-8.22	+9.92	+18.14
Pakistan	1950-59	-7.59	-3.18	+4.41
	1975-79	-11.38	2.44	+13.82
	1990-92	-6.92	+11.90	+18.81
Thailand	1955-59	-2.05	+6.50	+8.56
	1975-79	-4.31	+8.45	+12.75
	1990-92	-7.66	+4.42	+12.08
B. Japan with Demographics of Bangladesh, Pakistan and Thailand:				
Japan	1955-59	+0.30	-4.75	-5.05
	1975-79	+0.68	-12.43	-13.11
	1990-92	+2.46	-14.84	-17.30
C. Fast-Transition Countries with South Asian Demographics:				
China	1955-59			-3.06
	1975-79	+0.16	-1.99	-2.15
	1990-92	+2.29	-2.79	-5.09
Hong Kong	1955-59			+1.37
	1975-79			-6.21
	1990-92			-9.55
Korea	1955-59	-8.73	-7.45	+1.27
	1975-79	-5.43	-5.78	-0.35
	1990-92			-4.87
Singapore	1955-59			+4.43
	1975-79	-7.13	-9.39	-2.26
	1990-92	+9.61	+3.33	-6.28
Taiwan	1955-59	-6.61	-2.03	+4.13
	1975-80	+1.92	+0.22	-1.70
	1990-92			-6.10
D. South Asia with Fast-Transition Demographics:				
Bangladesh	1955-59			+1.83
	1975-79	-8.79	-4.03	+4.76
	1990-92	-8.22	1.93	10.15
India	1955-59	-3.24	-0.19	+3.05
	1975-79	-0.56	+0.73	+1.28
	1990-92			+3.60
Myanmar	1955-59			+2.70
	1975-79	-2.71	-0.83	+1.88
	1990-92			+4.95

Table 10, cont.

Country	Period	Share Current Account Balance in GDP: Actual	Counterfactual	Difference
Nepal	1955-59			+2.42
	1975-79	-3.51	+0.50	+4.01
	1990-92			+7.55
Pakistan	1955-59	-7.59	-5.23	+2.36
	1975-79	-11.38	-5.39	+5.99
	1990-92	-6.92	+3.91	+10.83
Sri Lanka	1955-59	+1.24	+5.08	+3.84
	1975-79	-5.28	-3.93	+1.36
	1990-92	-10.74	-9.17	+1.57

Notes: The fast-transition countries are China, Hong Kong, Japan, Korea, Singapore and Taiwan. The period for which there are blanks reflect absence of national accounts data, but the "difference" does not need that information. See text.

Table 11

The Impact of Dependency Rates on Foreign Capital Dependency in the Future 1990-2025 (in %)

Country	Year/s	Current Account Balance
Bangladesh	1990-92	-8.22
	2005	-6.56
	2015	-3.11
	2025	+1.40
China	1990-92	+2.29
	2005	+5.93
	2015	+9.15
	2025	+11.21
India	1985-89	-3.81*
	2005	-1.51
	2015	+1.08
	2025	+4.05
Indonesia	1990-92	-3.45
	2005	+0.93
	2015	+4.03
	2025	+6.97
Japan	1990-92	+2.46
	2005	+4.36
	2015	+4.81
	2025	+4.51
Korea	1985-89	+3.18*
	2005	+8.82
	2015	+11.68
	2025	+13.86
Malaysia	1990-92	-6.20
	2005	-1.67
	2015	+2.18
	2025	+5.10
Myanmar	1985-89	-3.39*
	2005	-1.26
	2015	+1.35
	2025	+4.80
Pakistan	1990-92	-6.92
	2005	-4.67
	2015	-1.22
	2025	+3.02
Philippines	1990-92	-2.33
	2005	+1.28
	2015	+4.67
	2025	+8.18

Table 11, cont.

Country	Year/s	Current Account Balance
Singapore	1990-92	+9.61
	2005	+14.93
	2015	+18.04
	2025	+19.13
Sri Lanka	1990-92	-10.74
	2005	-6.33
	2015	-3.57
	2025	-1.61
Thailand	1990-92	-7.66
	2005	-2.31
	2015	+1.07
	2025	+4.02

Notes: The figures denoted by an "*" mean that the CAB share for 1990-92 cannot be documented in our source; we use 1985-89 instead. The CAB share for Nepal is not even available for 1985-89, and thus was excluded from this table. Hong Kong and Taiwan are not included in these projections.

Chart 1: Simulated Demographic Transition

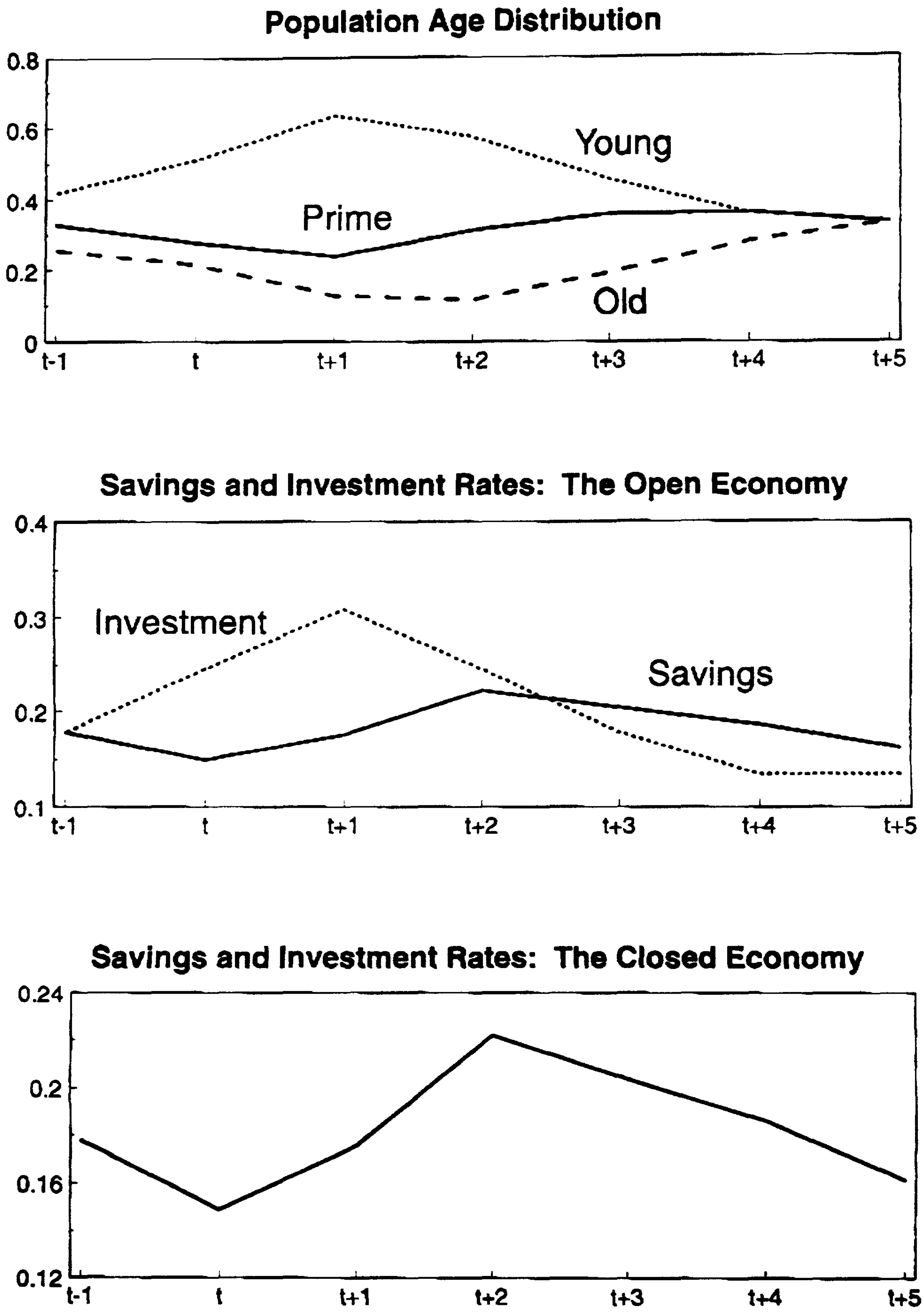
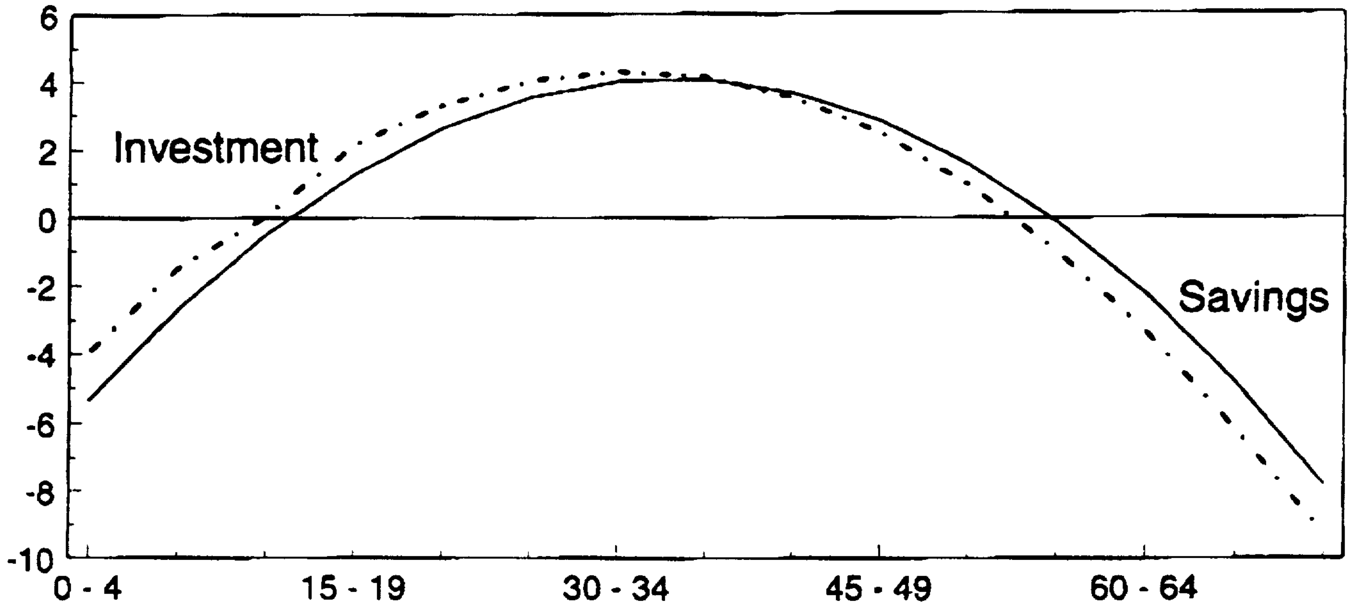
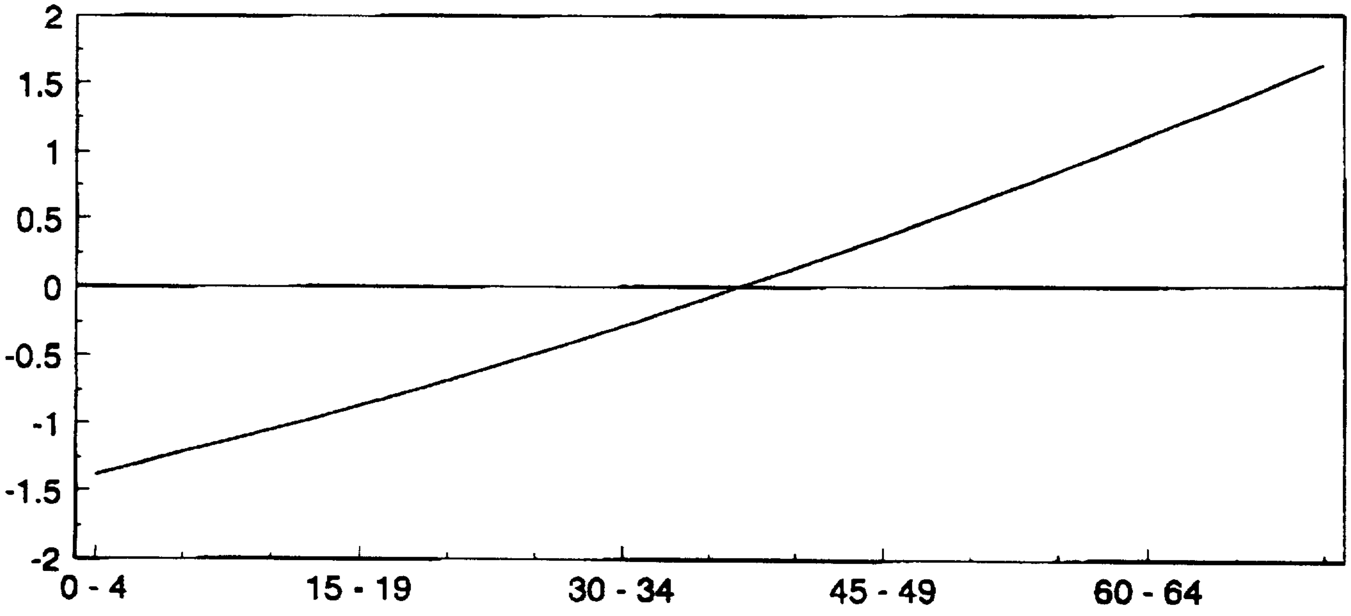


Chart 2: Age Distribution Coefficients

Savings and Investment



Current Balance



Note: The age distribution coefficients show the change in the national savings rate, etc., associated with a unit increase in the corresponding log age shares. A unit increase means that the age share rises by the factor e.

APPENDIX I: *Polynomial Representation of the Age Distribution*

Consider the regression specification:

$$s_t = \lambda + \mathbf{x}_t'\beta + \alpha_1 p_{1t} + \alpha_2 p_{2t} + \ldots + \alpha_J p_{Jt} + u_t \quad (1)$$

where s_t is the dependent variable, $\mathbf{x}_t$ a vector of explanatory variables and $p_{1t}, \ldots, p_{Jt}$ represent the shares of the population in J age groups. Constraining the coefficients of the population shares to lie along a second-order polynomial means that they are constructed as follows:

$$\alpha_j = \gamma_0 + \gamma_1 j + \gamma_2 j^2 \quad (2)$$

We can then rewrite the regression specification as:

$$s_t = \lambda + \mathbf{x}_t'\beta + \gamma_0 \sum_{j=1}^{J} p_{j,t} + \gamma_1 \sum_{j=1}^{J} j p_{j,t} + \gamma_2 \sum_{j=1}^{J} j^2 p_{j,t} \quad (3)$$

Now impose the additional restriction that the coefficients of the age distribution variables sum to zero, that is, that $\sum \alpha_j = 0$ (this following Fair and Dominguez, 1991). This can easily be seen to imply the following relationship among γ_0, γ_1, and γ_2:

$$\gamma_0 J + \gamma_1 \sum_{j=1}^{J} j + \gamma_2 \sum_{j=1}^{J} j^2 = 0 \rightarrow \gamma_0 = -\left(\frac{\gamma_1}{J}\right) \sum_{j=1}^{J} j - \left(\frac{\gamma_2}{J}\right) \sum_{j=1}^{J} j^2 \quad (4)$$

Thus, our final regression specification is given by:

$$s_t = \lambda + \mathbf{x}_t'\beta + \gamma_1 \left(\sum_{j=1}^{J} j p_{j,t} - (1/J) \sum_{j=1}^{J} j \right) + \gamma_2 \left(\sum_{j=1}^{J} j^2 p_{j,t} - (1/J) \sum_{j=1}^{J} j^2 \right) \quad (5)$$

The specification above summarizes the information contained in the age distribution according to two variables (which I call Z_1 and Z_2) which are, in effect, geometric averages of the population age shares. Given the estimated coefficients, γ_1 and γ_2, we can find γ_0 using **Equation (4)**. The implict α_j can then be recovered relying on **Equation (2)**.