Distortions to Agricultural Incentives

in Asia

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For decades farm earnings have often been depressed by pro-urban, anti-agricultural biases of government policies in developing countries. True, progress has been made since the latter 1980s by many countries in reducing the policy bias, and indeed these changes have been transformational in China and to a lesser extent in India. But many trade-reducing price distortions remain between sectors, as well as within the agricultural sector of low- and middle-income countries, including in Asia. This matters for the majority of households in the world, because 45 percent of the global workforce is employed in agriculture and 75 percent of the world's poorest households depend directly or indirectly on farming for their livelihoods. It matters even more in Asia's developing economies where 60 percent of the workforce and 81 percent of the poor (625 million people earning less than $1/day) are engaged in agriculture (World Bank 2007, Chen and Ravallion 2007).

This study is part of a global research project seeking to understand the changing extent and the effects of the policy bias against agriculture and the reasons behind the policy reforms in Africa, Europe's transition economies, and Latin America and the Caribbean, as well as in Asia.[1] One purpose of the project is to obtain quantitative indicators of past and recent policy interventions. A second objective is to gain a deeper understanding of the political economy of trends in distortions to agricultural incentives in different national settings. Our third purpose is to use this deeper understanding to explore the prospects for further reducing the distortions to agricultural incentives and discover the likely implications for agricultural competitiveness, inequality and poverty alleviation in the major countries of the world.

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[1] The other three regional studies are Anderson and Masters (2008), Anderson and Swinnen (2008), and Anderson and Valdés (2008). Together with comparable studies of high-income countries (which includes Japan), they form the basis for a global overview volume (Anderson 2009a).

The compilation of new annual time series estimates of protection and taxation of farmers over the past half century is a core component of the first stage of this research project. These estimates are used to help address such questions as the following: Where is there still a policy bias against agricultural production? To what extent has there been overshooting in the sense that some developing-country food producers are now being protected from import competition along the lines of the examples of earlier-industrializing Europe and Japan? What are the political economy forces behind the more-successful reformers, and how do they compare with those in less-successful countries where major distortions in agricultural incentives remain? Over the past two decades, how important have domestic political forces been in bringing about reform relative to international forces (such as loan conditionality, rounds of multilateral trade negotiations within the General Agreement on Tariffs and Trade, regional integration agreements, accession to the World Trade Organization, and the globalization of supermarkets and other firms along the value chain) and compared with forces operating in earlier decades? What explains the pattern of distortions within the agricultural sector of each country? What policy lessons and trade implications may be drawn from these differing experiences with a view to ensuring better growth-enhancing and poverty-reducing outcomes—including less overshooting that results in protectionist regimes—in Asian and other still-distorted developing countries during their reforms in the future?

The study is timely for at least four reasons. One is because the World Trade Organization (WTO) is in the midst of the Doha round of multilateral trade negotiations, and agricultural policy reform is one of the most contentious issues in those talks. Second, countries are seeking to position themselves favorably also in preferential trade negotiations, and in the wake of other forces of globalization such as the information, communication, agricultural-biotechnology and supermarket revolutions. Third, poorer countries and their development partners are striving to achieve their United Nations–encouraged Millennium Development Goals by 2015, the prime ones being the alleviation of hunger and poverty. And fourth, the outputs of the study are timely also because world food prices have spiked in 2008 at very high levels and governments in some developing countries, in their panic to deal with the inevitable protests from consumers, have reacted in far from optimal ways. Such spikes have occurred in the past, most notably in 1973-74, and lessons as to what policy responses work better than others can be drawn from that set of experiences.

The empirical estimates reported here reveal that governments in Asia have differed in their past responses to such shocks, although much less so with respect to rice, the region's main staple.

The Asian part of this study is based on a sample of twelve developing economies. We exclude Japan, which was a high income country throughout our review period and so is analyzed separately as part of the high-income group in the project's global overview volume (Anderson 2009a). In Northeast Asia we include the People's Republic of China (the mainland excluding Hong Kong, Macao and Taiwan, herein referred to as China), the Republic of Korea (the southern part of the Korean peninsula, herein referred to as Korea) and Taiwan Province of China (herein referred to as Taiwan). We include for Southeast Asia the five large economies of Indonesia, Malaysia, the Philippines, Thailand and Vietnam, while for South Asia we include the four largest economies of Bangladesh, India, Pakistan and Sri Lanka. In 2000–04 these economies (all of which are now WTO members) together accounted for more than 95 percent of the agricultural value added, farm households, total population and total gross domestic product (GDP) of Asia.[2] Estimates of distortions are provided for as many years as data permit over the past five decades (an average of 42 years), and for an average of 8 crop and livestock products per economy which in aggregate amounts to about 70 percent of the gross value of agricultural production in each of those economies. The time series and country coverage greatly exceed that of earlier studies such as Anderson and Hayami (1986), Krueger, Schiff and Valdes (1991), Orden et al. (2007), and OECD (2007); and the product coverage is broader in each of the present case studies than in all earlier ones other than the OECD's.[3]

The key characteristics of these economies—which accounted in 2000-04 for only 10 percent of worldwide GDP but 37 percent of agricultural value added, 51

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[2] Apart from the urban islands of Hong Kong and Singapore, the omitted Asian and Pacific economies with popuations above one million are thus North Korea, Mongolia, Cambodia, Laos, Myanmar, Papua New Guinea, Afghanistan, and Nepal – which together contributed in 2004 less than 5 percent of the population, 4 percent of agricultural GDP and 2 percent of total GDP of all Asian and Pacific developing economies.

[3] Anderson and Hayami (1986) only examine Japan, Korea and Taiwan and only from 1955 to 1982 (apart from providing rice distortion estimates back a further five decades); Krueger, Schiff and Valdes (1991) analyse Korea, Malaysia, Pakistan, the Philippines, Sri Lanka and Thailand but for only 4 or 5 crops from 1960 to 1984; Orden et al. (2007) provide producer support estimates for just China, India, Indonesia and Vietnam and for the period since 1985; and the OECD (2007) has been covering its two Asian members, Japan and Korea, since 1986 (but has also begun examining China – see OECD 2005). All of these earlier studies show the average nominal rate of assistance to farmers being higher in higher-income settings and where agricultural comparative advantage is weaker, and to be much higher for the import-competing sub-sector than for exporters of farm products in each economy.

percent of the global population and 73 percent of the world's farmers—are shown in table 1.1. The table reveals the considerable diversity within the region in terms of stages of development, relative resource endowments, comparative advantages and hence trade specialization, and the incidence of poverty and income inequality. These economies thus provide a rich sample for comparative study.

Per capita incomes in Bangladesh, India and Vietnam are barely one-twelfth the global average. In Indonesia, the Philippines and Sri Lanka it is around one-sixth, whereas in China it is more than one-quarter, in Thailand more than one-third, and in Malaysia around three-quarters of the world average. Korea and Taiwan look exceptional in that they currently have more than twice the global average per capita income, but it needs to be remembered that in the 1950s, at the start of the period under study, those two economies were among the poorest in the world.

In terms of endowments of agricultural land per capita, Korea and Taiwan are again exceptional in having only one-twentieth of the global average endowment ratio. Bangladesh has only a little more, followed by Sri Lanka and the Philippines. Even Indonesia, India and Pakistan have only about one-quarter of the global average endowment, while Malaysia and Thailand have about two-fifths and China one-half.[4] That is, none of these Asian economies are relatively well endowed with crop or pasture land, and on a per capita basis the region has only one-third the global average. This might suggest Asian economies would have a low comparative advantage in agricultural goods, were it not for two facts: these economies are at varying stages of industrial development, and the quality of and institutional arrangements/entitlement to their land and water vary greatly. As a result, so too do their strengths in terms of agricultural competitiveness. Those differences are reflected in the indexes of revealed comparative advantage (RCA) and trade specialization shown in table 1.1. A majority of our focus economies have an RCA index well above 100, indicating the extent to which the share of agricultural and food products in the country's merchandise trade exceeds the global average share, but for Korea and Taiwan that index is below 30 and for China and the Philippines it is around 60. The index of agricultural trade specialization (net exports as a ratio of exports plus imports of farm products, and so ranging between -1 and +1) is positive

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[4] In terms of overall (as distinct from just crop and pasture) land endowment per capita, China is only one-third of the global average.

for half of our focus economies but is as low as -0.7 for Bangladesh, Korea and Taiwan.

Income inequality has risen a little over the past two decades but is still low throughout much of the region compared with the rest of the world: as of 2004, the Gini coefficient is between 0.40 and 0.49 for Malaysia, the Philippines, Sri Lanka and Thailand and averages between 0.31 and 0.37 for the rest of the region. The regional average of 0.36 contrasts with, for example, an average of 0.52 for Latin America. Likewise, the Gini coefficient for land distribution is relatively low in Asia, at just 0.41 for China and Pakistan and below 0.50 also in Bangladesh, Indonesia, Korea, Taiwan and Thailand. Vietnam is just on 0.5, and India is 0.58, but even these imply reasonably even distributions of land, compared with in Latin America where the Gini coefficient for land distribution is above 0.7 for the major countries such as Argentina and Brazil and possibly for the region as a whole (World Bank 2007). A significant proportion of the rural population is landless in South Asia, however, so 31 percent of that sub-continent's population was still living on less than $1 a day in 2004 compared with just 9 percent in East Asia (table 1.1).

The extent of poverty decline in Asia since 1981 has been unprecedented in world history. The number of Asian people living on less than $1/day (1993 PPP) has halved since then. Most of that decline has been in East Asia, especially China, and represents a decline from 58 to less than 10 percent of the population; but even in South Asia the proportion has fallen from one-half to less than one-third (table 1.2). During the ten years to 2002, no less than three-quarters of that decline in the proportion of Asia's poor occurred in rural areas, and another one-sixth was due to a movement out of poverty by rural people migrating to better opportunities in urban areas (Chen and Ravallion 2007).

Policy developments have made non-trivial contributions to the growth, structural changes and poverty alleviation observed in Asia over the past five decades. The transformational move away from planning and state-owned enterprises to greater dependence on markets and private entrepreneurship has had a particularly dramatic effect in China and Vietnam from the 1980s, but India too has been benefiting from similar reforms from the early 1990s. Also important has been the move in market economies away from import-substituting industrialization towards export-oriented development strategies, beginning in Taiwan around 1960 and soon followed by Korea, then by several Southeast Asian countries, and now also by South Asia.

Agricultural policies were not the only – or even the main – target of these reforms, but they were an integral part of the process.

This chapter begins with a brief summary of economic growth and structural changes in the region since the 1950s and of agricultural and other economic policies as they affected agriculture before and after the various reforms – and in several cases fundamental regime changes – of the past half-century.[5] It then introduces the methodology used by the authors of the individual country studies to estimate the nominal rate of assistance (NRA) and the relative rate of assistance (RRA) to farmers delivered by national farm and nonfarm policies over the past several decades (depending on data availability), as well as the impact of these policies on the consumer prices of farm products. Both farmer assistance and consumer taxation will be negative in periods where there is an anti-agricultural, pro-urban consumer bias in a country's policy regime. The chapter subsequently provides a synopsis of the empirical results detailed in the country studies in this volume, without attempting to also survey the myriad policy changes discussed in detail in the following chapters. The final sections summarize what we have learned and draw out implications of the findings, including for poverty and inequality and for possible future directions of policies affecting agricultural incentives in Asia.

Growth and structural changes[6]

The most striking economic characteristic of Asia's developing economies, and especially those in East Asia, is their rates of economic growth and industrial development over the past three decades (and even longer for Korea and Taiwan). The recent report of the Commission on Growth and Development (Spence 2008) noted that 13 of the world's economies have had sustained growth of real per capita income of more than 7 percent for at least 25 consecutive years since World War II, and nine

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[5] Apart from the regime changes that occurred during this period, such as the move from socialism to the market in China and Vietnam, and the opening of India and several other economies, the region saw the end of colonization between the late 1940s and late 1950s: Korea and Taiwan from Japan in 1945, India and Pakistan from Britain in 1947, Indonesia from the Netherlands in 1949, Indochina from France in 1954, and Malaya from Britain in 1957.

[6] The rest of this chapter draws in part on Anderson (2008).

of those are East Asian.[7] Between 1980 and 2004, East Asia's per capita GDP grew at 6.3 percent per year and South Asia's at 3.4 percent, which contrasts with the global average of just 1.4 percent. Asia's industrial growth in that period was 8.6 percent per year compared with the world's 2.5 percent; and even agricultural growth in Asia was more than half as high again as in the world as a whole (3.1 compared with 2.0 percent per year – see table 1.3). A consequence is that per capita incomes of some Asian economies have been converging rapidly – albeit from a low base – on those of rich countries, while other developing and transition economies have, on average been slipping further away from the US level (figure 1.1).

A key driver of the rapid growth and industrialization of Asia has been the decision by many countries of the region to become more open and switch away from an import-substituting development strategy to one that is export oriented. That change occurred at different times in our focus countries, beginning with Taiwan and then Korea in the 1960s. China joined the group from the late 1970s, Vietnam in the mid-1980s, and India haltingly in the early 1980s but more concertedly from 1991. As a result, export volumes grew at double-digit rates (last column of table 1.3); the share of exports in GDP rose steadily for the region, more than doubling in the 30 years to 2004 (table 1.4); and the East Asian region's share of global exports of non-food manufactures has quadrupled since 1990, thanks especially to China's industrialization. China in 2006 accounted for 11 percent of the world's manufacturing exports, compared with less than 1 percent in 1990: a twenty-fold increase in current dollar terms. But the increase for all our other focus countries in Asia has averaged nearly five-fold, and all of them have contributed to the region's growing share of global manufacturing exports since 1990 (table 1.5).[8]

With that export-led growth has come dramatic restructuring of Asia's economies away from agriculture and towards not only manufacturing but also service activities. In East Asia the farm sector's share of GDP is now less than 30 percent of what it was in the latter 1960s, and even in slower-growing South Asia it has less than halved over that period. The biggest changes are in China and Indonesia, where agriculture's shares of GDP have dropped from more than 40 and 50 percent, respectively, in the 1960s to 13 percent by 2005. Bangladesh also has transformed

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[7] The nine are Japan, Korea, Taiwan, China, Indonesia, Malaysia, Thailand, Hong Kong and Singapore. Brazil is the only other large economy in the set, the other three being Botswana, Malta and Oman.
[8] By contrast, the focus countries of Asia's share of global exports of agricultural and food products has grown very little (from 11.0 to 13.5 percent between 1990 and 2006).

remarkably: agriculture's share was 54 percent in 1965-69 when all other non-service industries accounted for just 9 percent, and now industry's share is well above agriculture's (27 versus 20 percent in 2005). Pakistan, Sri Lanka and the Philippines, being the slowest-growing of our focus economies, have been the slowest to move away from agriculture since the 1960s. At the other extreme are Korea and Taiwan, which now have only 2 or 3 percent of their GDP coming from farming. For Asia as a whole, agriculture is now less than one-eighth of GDP (down from more than one-third in the late 1960s), industry has risen from 27 to 38 percent, and services from 35 to 49 percent (table 1.6).

The shares of overall employment accounted for by farming activities have fallen somewhat more slowly than agriculture's GDP shares, according to statistics in the FAOSTAT Database of the Food and Agriculture Organization of the United Nations (which, because of definitional differences, is not always consistent with databases within countries). These shares remain at much higher levels than the GDP shares, implying relatively low and labor productivity on farms. The most rapid declines have occurred in Korea and Taiwan, where the employment share in agriculture has fallen from around 50 percent to less than ten percent during the past 40 years. Malaysia too has seen a major fall, from 57 to 18 percent of the workforce. Elsewhere in Asia, however, a very large share of employment remains predominantly in farming (table 1.7). These shares would be somewhat less in full-time equivalent terms when more-careful account is taken of part-time off-farm work activities (see, e.g., Otsuka 2006), but nonetheless they underscore the importance of incentives faced by farmers for the well-being of the majority of Asia's households.

Agriculture's average share in Asia's merchandise exports has declined even more dramatically than the GDP share, from 45 percent to just 7 percent in the past four decades. During that period the share of non-primary goods has doubled, to 85 percent. Among our 12 focus countries, only natural resource-rich Indonesia has less than three-quarters of its exports coming from such goods (table 1.8). The declining relative importance of farm exports has been much more rapid in Asia than in the rest of the world: the index of the revealed agricultural comparative advantage for Asia (defined as the share of agriculture and processed food in national exports as a ratio of the share of such products in worldwide merchandise exports) has fallen since the

1980s by about two-thirds in East Asia and one-third in South Asia. So too has the index of agricultural trade specialization (defined as net exports divided by the sum of the imports and exports of agricultural and processed food products). That index, which ranges from -1 to +1, has become increasingly less positive or has become negative in virtually all our focus countries over recent decades (table 1.9).

That apparent decline in agricultural comparative advantage is evident in the self-sufficiency data for primary farm products. Until 30 years ago the region was almost exactly 100 percent self-sufficient in farm products, but since then that indicator has declined to less than 85 percent. The share of farm production exported has not changed much, averaging in the 4-6 percent range (although there have been substantial changes in individual countries, with declines in Malaysia, the Philippines, Sri Lanka and Taiwan offset by increases in countries such as Vietnam, Thailand and China). By contrast, since the latter 1970s the share of imports in domestic consumption of farm products has quadrupled, to around 20 percent (table 1.10).

As will become clear below, the increasing dependence on imports of farm products in Asia has occurred despite reductions in the taxation of agricultural exports and increases in incentives provided to farmers via government policy reforms. These reforms probably have contributed to poverty alleviation in Asia. Using a simpler price indicator than developed below, Ravallion and Chen (2007) show that the reduction in the anti-agricultural bias in farm price policies has contributed significantly to China's poverty reduction. As well, rural growth has been shown to be a key contributor to the reduction in poverty in India (Ravallion and Datt 1996). These types of studies will be able to be revisited using the more comprehensive set of measures of the extent of changes in distortions to agricultural incentives summarized below. To generate those measures, a common methodology was adopted by the authors of the country case studies in this volume. A summary of the methodology follows, and further details can be found in Anderson et al. (2008) which is reproduced as Appendix 1 in this book.

Methodology for measuring rates of assistance/taxation

The nominal rate of assistance (NRA) is defined as the percentage by which government policies have raised gross returns to producers above what they would be without the government's intervention (or lowered them, if NRA<0). If a trade measure is the sole source of government intervention, then the measured NRA will also be the consumer tax equivalent (CTE) rate at that same point in the value chain. But where there are also domestic producer or consumer taxes or subsidies, the NRA and CTE will no longer be equal and at least one of them will be different from the price distortion at the border due to trade measures.[9]

There are several purposes for which NRAs and CTEs can be used, and the purpose chose affects the appropriate choice of methodology. This project uses them to achieve three purposes. One is to generate a comparable set of numbers across a wide range of countries and over a long time period, with the consequence that the methodology needs to be both simple and somewhat flexible. Another purpose is to provide a single number to indicate the total extent of transfer to (or from) farmers due to agricultural policies – the NRA; and another number for the extent of transfer to (or from) consumers – the CTE. Both are expressed either as a percentage of the undistorted price or in dollar terms. This is what the OECD's PSE and CSE do, both of which can be negative when transfers from exceed transfers to the relevant group. This research project's agricultural NRA and CTE are similar in spirit to the OECD's PSE and CSE but with some important differences outlined below. And the third purpose is to enable economic modelers to use the NRAs for individual primary and lightly processed agricultural products as producer price wedges, and the CTEs as consumer price wedges, in single-sector, multi-sector and economy-wide policy simulation models by allocating those wedges to particular policy instruments such as trade taxes or domestic producer or consumer subsidies.

The NRAs are based on estimates of assistance to individual industries. Great care has gone into generating the NRA for each covered agricultural industry, particularly in countries where trade costs are high, pass-through along the value

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[9] Our definition of a policy-induced price distortion follows Bhagwati (1971) and Corden (1997) and includes any policy measure at a country's border (such as a trade tax or subsidy, a quantitative restriction on trade, or a dual or multiple foreign exchange rate system, assuming the country is small enough to have no monopoly power in international markets), or any domestic producer or consumer tax/subsidy/restraint on output, intermediate inputs or primary factors of production (except where needed to directly overcome an externality, or where it is set optimally across all products or factors, for example as a value added tax to raise government revenue).

chain is affected by imperfect competition, and markets for foreign currency have been highly distorted at various times and to varying degrees in the past.

Most distortions to industries producing tradables come from trade measures, such as a tariff imposed on the cif import price or an export subsidy or tax imposed on the fob price at the country's border, or quantitative restrictions on trade. Since an ad valorem tariff or export subsidy is the equivalent of a production subsidy and a consumption tax of the same rate expressed as a percentage of the border price, it is that which is captured in the NRA and CTE at the point in the value chain where the product is first traded. To get the NRA for the farmer, authors of the country studies estimated or guessed the extent of pass-through back to the farm gate, and added any domestic farm output subsidies. To obtain the CTE they also added any product-specific domestic consumer taxes to the distortion from border measures. Note that the NRA and CTE differs from the OECD's PSE and CSE in that the latter pair are expressed as a percentage of the distorted price and hence will be lower (for positive protection rates) than the former pair which are expressed as percentages of the undistorted price.

We decided against seeking estimates of the more complex effective rate of assistance (ERA) even though it is, in principle, a better partial equilibrium single measure of distortions to producer incentives than the nominal rate. The reason is that to do so requires knowing each product's value added and various intermediate input shares of output. Such data are not available for most developing countries even every few years, let alone for every year in the long time series that is the focus of this study. And in most countries distortions to farm inputs are very small compared with distortions to farm output prices. But where there are significant product-specific distortions to input costs, they are captured by estimating their equivalence in terms of a higher output price and including that in the NRA for individual agricultural industries wherever data allow. Any non-product-specific distortions, including distortions to farm input prices, are also added into the estimate for the overall sectoral NRA for agriculture as a whole.

The targeted minimum coverage of products for NRA estimates was 70 percent, based on the gross value of farm production at undistorted prices. This target degree of coverage is similar to that for the OECD's PSEs. Unlike the OECD, however, in this project we do not routinely assume that the nominal assistance for covered products would apply equally to non-covered farm products. This is because

in developing countries the agricultural policies affecting the non-covered products are often very different from those for covered products. For example, nontradables among non-covered farm goods (often highly perishable or low-valued products relative to their transport cost) are often not subject to direct distortionary policies. The authors of the country case studies were asked to provide three sets of 'guesstimates' of the NRAs for non-covered farm products, one each for the import-competing, exportable and nontradable sub-sectors. Weighted averages for all agricultural products were then generated, using the gross values of production at unassisted prices as weights. For countries that also provide non-product-specific agricultural subsidies or taxes (assumed to be shared on a pro-rata basis between tradables and nontradables) or assistance decoupled from production, such net assistance is then added to product-specific assistance to get a NRA for total agriculture, and also for tradable agriculture for use in generating the Relative Rate of Assistance (RRA, defined below).

How best to present regional aggregate NRA and RRA estimates depends on the purpose for which the averages are required. We generate a weighted average *NRA* for covered products for each country, because only then can we add the *NRA* for non-covered products and from non-product-specific assistance to get the *NRA* for all agriculture. When it comes to averaging across countries, each polity is an observation of interest, so a simple average is meaningful for the purpose of political economy analysis. But if one wants a sense of how distorted a whole region's agriculture is, a weighted average is needed. The weighted average *NRA* for covered primary agriculture can be generated by multiplying each primary industry's share of the gross value of production (valued at the farm-gate equivalent undistorted prices) by its corresponding *NRA* and adding across industries.[10] The overall sectoral rate, which we denote *NRAag*, can be obtained by adding also the actual or assumed information for the non-covered farm commodities and, where it exists, the aggregate value of non-product-specific and decoupled assistance to agriculture.

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[10] Corden (1971) proposed that free-trade volume be used as weights, but since they are not observable (and an economy-wide model is needed to estimate them) the common practice is to compromise by using actual distorted volumes but undistorted unit values or, equivalently, distorted values divided by (1+ *NRA*). If estimates of own-and cross-price elasticities of demand and supply are available, a partial equilibrium estimate of the quantity at undistorted could be generated, but if those estimated elasticities are unreliable this may introduce more error than it seeks to correct.

A weighted average can be similarly generated for the tradables part of agriculture – including those industries producing products such as milk and sugar that require only light processing before they can be traded – by assuming that its share of non-product-specific assistance equals its weight in the total. Call that $NRAag^t$.

In addition to the mean, it is important to provide also a measure of the dispersion or variability of the NRA estimates across the covered products. The cost of government policy distortions to incentives in terms of resource misallocation tend to be greater the greater the degree of substitution in production (Lloyd 1974). In the case of agriculture which involves the use of farm land that is sector-specific but transferable among farm activities, the greater the variation of $NRAs$ across industries within the sector then the higher will be the welfare cost of those market interventions. A simple indicator of dispersion is the standard deviation of the covered industries' $NRAs$.

Each industry is classified either as import-competing, or a producer of exportables, or as producing a nontradable (with its status sometimes changing over the years), so that it is possible to generate for each year the weighted average NRAs for the two different groups of tradables. Those NRAs are used to generate a trade bias index, TBI, defined in percentage terms as:

(2) $TBI = 100[(1+NRAag_x/100)/(1+NRAag_m/100) - 1]$

where $NRAag_m$ and $NRAag_x$ are the average percentage NRAs for the import-competing and exportables parts of the agricultural sector. The TBI indicates in a single number the extent to which the typically anti-trade bias (negative TBI) in agricultural policies changes over time.

Farmers are affected not just by prices of their own outputs but also, albeit indirectly via changes to factor market prices and the exchange rate, by the incentives nonagricultural producers face. That is, it is *relative* prices and hence *relative* rates of government assistance that affect producer incentives. More than seventy years ago Lerner (1936) provided his Symmetry Theorem that proved that in a two-sector economy, an import tax has the same effect as an export tax. This carries over to a model that also includes a third sector producing only nontradables, to a model with imperfect competition, and regardless of the economy's size (Vousden 1990, pp. 46-47). If one assumes that there are no distortions in the markets for nontradables and

that the value shares of agricultural and non-agricultural nontradable products remain constant, then the economy-wide effect of distortions to agricultural incentives can be captured by the extent to which the tradable parts of agricultural production are assisted or taxed relative to producers of other tradables. By generating estimates of the average NRA for non-agricultural tradables, it is then possible to calculate a Relative Rate of Assistance, RRA, defined in percentage terms as:

(1) $RRA = 100[(1+NRAag^t/100)/(1+NRAnonag^t/100) - 1]$

where $NRAag^t$ and $NRAnonag^t$ are the weighted average percentage NRAs for the tradable parts of the agricultural and non-agricultural sectors, respectively. Since the NRA cannot be less than -100 percent if producers are to earn anything, neither can the RRA (assuming $NRAnonag^t$ is positive). And if both of those sectors are equally assisted, the RRA is zero. This measure is useful in that if it is below (above) zero, it provides an internationally comparable indication of the extent to which a country's policy regime has an anti- (pro-)agricultural bias.

In calculating the NRA for producers of agricultural and non-agricultural tradables, the methodology outlined in Appendix 1 sought to include distortions generated by dual or multiple exchange rates. Such direct interventions in the market for foreign currency were common in some Asian countries in the 1970s and 1980s, including China. However, authors of some of the focus country studies had difficulty finding an appropriate estimate of the extent of that distortion, so the impact of that on NRAs has not been included for all. Its exclusion for some countries (e.g., India) means their estimated (typically) positive NRAs for importables and (typically) negative NRAs for exportables are smaller than they should be. In cases where the NRA for importables dominates that for exportables, this omission would lead to an underestimate of the average (positive) NRA for such tradables sectors, and conversely. And in either case it leads to an underestimate of the (anti-)trade bias index.

To obtain dollar values of farmer assistance and consumer taxation, Valenzuela, Croser and Anderson (2008) have taken the country authors' estimates of *NRA* and multiplied them by the gross value of production at undistorted prices to obtain an estimate in current US dollars of the direct gross subsidy equivalent of assistance to farmers (*GSE*). This is then added up across products for a country and across countries for any or all products to get regional aggregate transfer estimates for

the studied economies. These *GSE* values are calculated in current and constant dollars, and are also expressed on per-farm-worker basis.

To obtain comparable dollar value estimates of the consumer transfer, the *CTE* estimate at the point at which a product is first traded is multiplied by consumption (obtained from the FAO's supply and utilization database) valued at undistorted prices to obtain an estimate in current US dollars of the tax equivalent to consumers of primary farm products (*TEC*). This too is added up across products for a country, and across countries for any or all products, to get regional aggregate transfer estimates for the studied economies. These *TEC* values are also expressed on per capita basis.

Estimates of Asian policy indicators

We begin with the nominal rates of assistance to agriculture, then compare them with the nominal rates for non-agricultural tradables. Dollar equivalents of assistance/taxation to farmers are also presented, and so too are the consumer tax equivalents of policies as they affect buyers of farm products.

Nominal rates of assistance to agriculture

Agricultural price and trade policies reduced farmers earnings throughout the period to the 1980s in developing Asia,[11] on average by more than 20 percent; but that implicit taxation declined from the early 1980s and, from the mid-1990s, the NRA switched sign and became increasingly positive. The average hides considerable diversity within the region, however. Nominal assistance to farmers in Korea and Taiwan was positive from the early 1960s (although very small initially), Indonesia had some years in the 1970s and 1980s when its NRA was a little above zero (as did Pakistan prior to Bangladesh becoming an independent country in1971), and India's and the Philippines' average NRAs became positive from the 1980s (table 1.11). A visual impression of both the differences across countries and the rise in average NRAs is clear in figure 1.2, where 2000-04 is compared with 1980-84. This trend is

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[11] Recall that the use of the word 'Asia' throughout this chapter and volume is shorthand for our focus Asian developing economies and thus excludes Japan.

present for the vast majority of the commodity NRAs for the region too, with meat and milk the only products to have seen their assistance rates cut over that period (figure 1.3).

Figure 1.3 also illustrates the diversity of the region's average NRAs across farm commodities. As is true for other regions of the world, assistance is among the highest for the 'rice pudding' products of sugar, milk and rice. But even for those three products there is a great diversity across countries in their NRAs, with 5-year averages ranging from almost zero to as much as 400 percent for rice and 140 percent for milk in Korea, and to 230 percent for sugar in Bangladesh (figure 1.4). This suggests the production of these products within Asia may be far from optimally allocated from the viewpoint of efficient resource use.

There is a great deal of NRA diversity also across economies in their average NRA, and across commodities *within* each Asian economy's farm sector, and the extent of both types of diversity (as measured by the standard deviation) has grown rather that diminished over the past five decades. The cross-economy diversity of average NRAs is evident from the bottom of table 1.11 (weighted average rising from around 25 percent in the early years under study to around 40 percent in recent years); and the cross-commodity diversity within each economy is clear from table 1.12 (unweighted average), where the standard deviation of NRAs is reported for covered products (which account for up to three-quarters of the value of agricultural production at undistorted prices). It means that there is still much that could be gained from improved resource reallocation both between economies and within the agricultural sector of Asian economies, were differences in rates of assistance to be reduced.

A striking feature of the distortion pattern within the farm sector is its strong anti-trade bias. This is evident in figure 1.5, which depicts the average NRAs for agriculture's import-competing and export sub-sectors for the region: the former average is always positive and its trend is upward-sloping, whereas the NRA average for exportables is negative and became moreso in the 1980s before gradually approaching zero thereafter. While the gap between the NRAs for those two sub-sectors has diminished little since the 1960s for the region as a whole, there are nonetheless several countries (Malaysia, Thailand, Pakistan, Sri Lanka) for which that gap has narrowed and hence their trade bias index has come closer to zero (table 1.13).

The rise in the average NRAs since the 1980s is too large to be explained just by economies losing their comparative advantage in farm products as they industrialize. As shown in the 'export share' rows of table 1.13, the proportion of tradable farm production that is produced by the export sub-sector has not declined very much for most Asian economies. This suggests that the main motive for interevention cannot be revenue raising via trade taxes. Nor can it be solely to reduce distortions, for otherwise we would not have seen an 'overshooting', in going from taxing to assisting farmers on average, nor would we have seen an increase in assistance to import-competing farmers.

The contributions to the overall NRA for agriculture from input subsidies, from domestic output taxes or subsidies, and from trade measures at the economy's border are summarized in table 1.14. (Non-product-specific assistance, not shown there, added only around two percentage points during the period of the study.) Product-specific input price distortions contributed little on average to the overall regional NRA for agriculture, reducing its negative value slightly in the 1960s and adding slightly to its positive value during the past decade or so. India is where the contribution of input subsidies is largest, especially in recent years when they have added almost 10 pecentage points to the sector's NRA and have been a non-trivial item in the government's overall budget. Earlier they were high for Indonesia too, peaking at 7 percentage points in the 1980s before reforms brought them back to just 2 percentage points in recent years. There is even less in the way of domestic output subsidies on average in the region now, although there had been some in earlier decades in both India and Sri Lanka – while in China output taxes in kind were prevelant until very recently (table 1.14).

The US dollar value equivalent of the positive or negative assistance to farmers due to agricultural price and trade policies has been non-trivial. The anti-agricultural bias peaked for the region in the latter 1970s at more than $130 billion per year in constant dollar terms (expressed in 2000 US dollars – see bottom row of table 1.15(a)). That is equivalent to a gross tax of around $170 for each person engaged in agriculture. Most of that $130 billion was due to China's anti-agricultural policies, with India the second biggest contributor in the 1960s and 1970s. Thanks to the reforms of the past two decades, such taxation has gradually disappeared in all our focus countries. But the reform does not mean there is no intervention now. Rather, the former negative influence has been replaced by positive assistance to farmers in

most countries, totalling around $60 billion per year, with China, India and Korea each contributing about one-quarter of that total. In recent years the total has averaged around $60 per farm worker in Asia. That $60 is not small compared with per capita income for the region, but it is very unevenly distributed: it ranges from between $6900 and $5300 for farmers in Korea and Taiwan (more than one-third of those economies' per capita income) to around $150 in the Philippines, $90 in Indonesia, $60 in Malaysia, India and Vietnam, and virtually zero in Thailand, Bangladesh and Pakistan (table 1.15(b)).

Which products contribute to the Asia's positive or negative assistance to farmers due to agricultural price and trade policies? Table 1.15(c) shows that the negative contribution comes mainly from policies directly affecting the exportable parts of Asian agriculture, while most of the positive contribution comes from protecting import-competing producers. The NRAs by product, shown in Table 1.16(a), give some insight into which products are responsible, but they need to be combined with information on each product's share of the gross value of production (see Appendix 2) to obtain the dollar contributions by product that are shown in Table 1.16(b). Clearly rice, milk and sugar again are the most assisted industries today. But note that back in the early 1980s, when China was still heavily taxing its farmers, the net contribution of rice was negative and large. At that time poicies affecting pigmeat, and fruits and vegetables, were equally large contributors to the effective taxation of Asian farmers, again almost entirely because of China's influence.

Assistance to non-farm sectors and relative rates of assistance

The anti-agricultural policy biases of the past were due not just to agricultural policies. Also important to changes in incentives afffecting inter-sectorally mobile resources have been the significant reductions in border protection to the manufacturing sector (which has been the dominant intervention in the tradables part of non-agricultural sectors). That reduction in assistance to producers of non-farm tradables has been even more responsible for the improvement in farmer incentives than the reduction in direct taxation of agricultural industries.

It has not been possible to quantifying the distortions to non-farm tradable sectors as carefully as for agriculture. Authors typically have had to rely on applied trade taxes (for exports as well as imports) rather than being able to undertake price

comparisons, and hence they usually do not capture the quantitative restrictions on trade which were important in earlier decades but decreasingly so through recent times.[12] Nor do they capture distortions in the services sectors, some of which now produce tradables (or would do in the absence of interventions preventing their emergence). As a result the estimated NRAs for non-farm importables are smaller and decline less rapidly than in fact was the case – and likewise for non-farm exportables, except their NRAs in some cases would have been negative. Of those two elements of under-estimation, the former bias certainly dominates, so the authors' estimate of the overall NRA for non-agricultural tradables should be considered a lower-bound estimate, and more so in the past so that its decline is less rapid than it should be.[13]

Despite these methodological limitations, the estimated NRAs for non-farm tradables are very sizeable prior to the 1990s. For Asia as a whole, the average NRA value has steadily declined throughout the past four or five decades as policy reforms have spread. This has therefore contributed to a decline in the estimated negative relative rate of assistance for farmers: the weighted average RRA has was worse than -50 percent up to the early 1970s but improved to an average of -32 percent in the 1980s, -9 percent in the 1990s and is now positive, averaging 7 percent in 2000-04 (or 15 percent if the average is unweighted). The five-decade trends in RRAs and their two component NRAs for each economy are summarized in table 1.17. It is clear from figure 1.6 that the falling positive NRAs for non-farm producers has contributed even more to the rise of the RRA in Asia than has the gradual disappearance of the negative NRAs for farmers.

Has the international location of production of farm products within Asia become more or less efficient as a results of policy changes over the past five decades? A global computable general equilibrium model with a time series of databases is needed to answer that question well. But one very crude way of addressing the question is to examine the standard deviation of RRAs across the economies of the region over time. That indicator suggests distortions have become

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[12] Also ignored are distortions to the prices of inputs into non-farm goods production, again in contrast to their treatment in estimating agricultural NRAs.

[13] This bias is accentuated in those cases where distortions to exchange rates are not included, as noted above in the methodology section. Exchange rate distortions were included in the studies for China, Malaysia, Vietnam, Pakistan and Sri Lanka. Their impact was greatest in China, where it made the RRA more negative to the extent of about 2 percenatage points in the 1970s, 6 percentage points in the 1980s and 3 points in the 1990s (see Table 7.5 in Chapter 7 of this volume).

more dispersed across countries over time: it averaged 35 percent during 1960-74, 50 percent during 1975-89 and 55 percent during 1990-2004 (final row of table 1.17).

Of the striking changes in RRAs shown for individual economies over the past two decades in figure 1.7, it is the move from negative to positive RRAs for China and India that matter most for the region – and indeed for the world. The extent of the decline in the non-agricultural NRA since the early 1980s is very similar for those two key countries, but the agricultural NRA has differed: in China the 5-year averages have risen steadily from -45 percent to 6 percent, whereas in India it has been close to zero except for a spike upward when international food prices collapsed in the mid-1980s and for a rise in the present decade (figure 1.8).

This dramatic rise in the RRA for the world's two most populous countries is of great significance to the current analyses of the causes of the international food price rises of the present decade. One of the contributors is said to be the growing appetite for food imports by these two countries as they industrialize and their per capita incomes rise. Yet as Table 1.10 shows, both countries have remained very close to self sufficient in agricultural products over the past four decades. Undoubtedly the steady rise in their RRAs has contributed to that outcome. It may also have helped ensure that the trend in China's ratio of urban to rural mean incomes (adjusted for cost of living differences) has been flat since 1980 (Ravallion and Chen 2006, Figure 3), and that the Gini coefficient for India has hardly changed between 1984 and 2004 (Table 1.1). A major question, to which we return at the end of the chapter, is: will their RRAs remain at their current neutral level of close to zero, or will they continue to rise in the same way as observed in Korea and Taiwan and, before them, in Japan and Western Europe?

Comparisons with other regions

The regional upward shift in agricultural NRAs and the RRAs towards zero and even the move to positive agricultural NRAs and RRAs recently are not unique to Asia. Figure 1.9 shows that similar trends, albeit less steep, have resulted from policy reforms in other developing country regions over the past four decades, suggesting that similar political economy trends might be at work as economies develop. This is despite the fact that farm-nonfarm houesehold income inequality is very different in Asia than in the rest of the world (figure 1.10). In the past it has been found that

agricultural NRAs and RRAs are positively correlated with per capita income and agricultural comparative disadvantage (Anderson 1995). A glance at table 1.18 suggests that Asian economies have been – and continue to be – contributors to that trend. This is confirmed statistically in the simple regressions with country fixed effects shown in figure 1.11, and with the multiple regressions with country and time fixed effects shown in table 1.19.

Consumer tax equivalents of agricultural policies

The extent to which farm policies impact on the retail consumer price of food and on the price of livestock feedstuffs depends on a wide range of things including the degree of processing undertaken and the extent of competition along the value chain. We, like the OECD (2007), therefore attempt only to ask how much impact policies have on the buyer's price at the point on the value chain where the farm product is first traded internationally and hence where comparisons are made between domestic and international prices (e.g., as milled rice, or raw sugar, or beef). To get weights to make it possible to sum up across commodities and countries, if they were not supplied from national sources we obtained consumption data either directly from the FAO food balance sheets or, in the case of minor products, indirectly by using FAO value of trade data and assuming the undistorted value of consumption is production valued at undistorted prices plus imports minus exports.

If there were no farm input distortions and no domestic output price distortions so that the NRA was entirely the result of border measures such as an import or export tax or restriction, and there were no domestic consumption taxes or subsidies in place, then the CTE would equal the NRA for each covered product. But such domestic distortions are present in several Asian economies. In Korea, for example, producer prices have been well above consumer prices for several important crop products, while in China the opposite was true at least until the early 1990s: producers of food staples were taxed more than consumers were subsidized, even taking into account the 'iron rice bowl' in-kind partial wage payment received by many urban workers.[14] Also, because of international trade, the weights used to aggregate product distortion

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[14] It is true also that consumers received staple food at effectively subsidized prices in South Asia via 'fair price shops'. But these hand-outs from the government were rationed sufficiently to be mostly infra-marginal, and so are considered here as implicit income transfers rather than additional distortive consumer subsidies.

rates on the consumption side differ from those on the production side of the market. Hence the aggregate CTE differs somewhat from the aggregate NRA for each economy, as can be seen by comparing the CTEs in table 1.20(a) with the NRAs in table 1.11. The weighted average CTE for the region is negative until the early 1990s, but above zero thereafter and increasingly so in recent years. The variance in CTEs across products is even more now than before the reforms of the past two decades (see table 1.20(b) including the bottom row).

In proportional and in per capita terms the current transfers from consumers are clearly largest in Korea and Taiwan (tables 1.20(a) and 1.21(b)), but in dollar terms they are also large in China, India and Indonesia (table 1.21(a)). In the present decade the transfer on average from consumers to producers in the region amounts to around $35 billion per year. In the early 1980s, by contrast, the transfer was from producers to consumers, and amounted to $50 billion per year at the producer level for products covered in this project. Among the covered products, the biggest transfers are again for milk, rice and sugar (table 1.21(c)).

The role of agricultural policies in stabilizing domestic prices

An often-stated objective of food policies in Asia (and elsewhere) is to reduce fluctuations in domestic food prices and in the quantities available for consumption. Nowhere is that more obvious than in rice, for which fluctuations in trade barriers are frequently used as a buffer against domestic or international shocks, rather than using trade as a source of cheaper imports or an opportunity for export earnings. Since Asia produces and consumes four-fifths of the world's rice (compared with about one-third of the world's wheat and maize), this market-insulating behavior of Asian policy makers means that even by 2000-04 only 6.9 percent of global rice production was traded internationally[15] (compared with 14 and 24 percent for maize and wheat), and so international prices are much more volatile for rice than for those other grains. This in turn means that nominal rates of protection for rice would be above trend in years of low international prices and conversely in years when international prices for rice are high.

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[15] This was up from the pre-1990s half-decade global shares which are all less than 4.5 percent (e.g., 4.1 percent in 1985-89), and is greater than the Asian share of just 5.7 percent in 2000-04, according to the project's database (Anderson and Valenzuela 2008).

Figure 1.12 reveals that this indeed is the case. Even when averaging over all our focus countries in Southeast or South Asia, the negative correlation between the rice NRAs and the international rice price is very high, at -0.59 for Southeast Asia and -0.75 for South Asia. Moreover, that behavior is evident whether the NRA trend is upward or downward. A clear illustration of the latter point is provided by Malaysia, whose policy was reformed during its financial crisis years of 1985-87 when the growth in rice protection was reversed (figure 1.13).

This begger-thy-neighbor dimension of each economy's food policy reduces hugely the international public good role that trade between nations can play in bringing stability to the world's food markets. The more some countries insulate their domestic markets, the more they export their volatility to the international market, and the greater the resulting volatility in that marketplace. This, in turn, creates a perceived need for other countries to do likewise. In most cases, volatility is exported through changes in import tariffs; but export taxes and export controls are sometimes also used by exporting countries. When NRAs in enough countries are adjusted in this way to changes in international prices, this exacerbates those change in world prices so that even larger changes in NRAs are desired—a classic collective action problem.

A multilateral agreement to desist is thus needed. That is precisely what was sought during the GATT's Uruguay Round Agreement on Agriculture via tariff bindings and disciplines on administered domestic prices. Tariff bindings can reduce the extent of the problem by restricting the range over which tariffs can increase in response to low prices. But to date the bindings are so far above applied import tariffs that this discipline on food-importing members in years of low international prices is very weak. Moreover, there is no corresponding GATT or WTO discipline on food export restrictions, which – as 2008 has starkly revealed – can be the problem in years of high international prices.

Summary: What have we learned?

One of the most salient features of price and trade policies in the Asian region since the 1960s is the spate of major economic reforms, including significant trade liberalization. Overall levels of non-agricultural protection have declined considerably, which has improved the competitiveness of the agricultural sector in many economies but especially in China and India. Two other salient features have

been the gradual policy movement away from taxing agricultural exportables, and at the same time – and in contrast to non-agriculture – a rise in agricultural import protection.

These features are captured in figure 1.14, which shows agriculture's trade bias index on the horizontal axis and the RRA on the vertical axis. An economy with no anti-agricultural bias (RRA = 0) and no anti-trade bias within the farm sector (TBI = 0) would be located at the intersection of the two axes in figure 1.14. China and all the focus countries of South and Southeast Asia were to the southwest of that neutral point as of 1980-84, but by 2000-04 most had moved ot the right to become closer to the vertical axis (meaning they had reduced their anti-trade bias in agriculture). Most had shifted up to become also closer to the horizontal axis; but some are now above rather than below that axis, which means they are assisting farmers relative to producers of other tradable products – which can lead to just as much waste of resources as the earlier, anti-agricultural, policy bias.

More specifically, the following features of the Asian experience of the past five decades are worth highlighting by way of summarizing the key findings of this regional study.

Since the 1950s the region has seen a gradual movement away from taxing farmers relative to non-agricultural producers and the emergence during the most recent decade of positive assistance on average for Asian farmers. The gradual fall in the estimated (negative) RRA for the region, from more than -50 percent up to the early 1970s to small positive rates in the past decade, has been not dissimilar to but is more dramatic than the trends in Africa and Latin America. Instead of being efffectively taxed more than $130 billion per year as in the late 1970s/early 1980s (or $170 per person working in agriculture), Asian farmers in the region now enjoy support worth more than $60 billion per year or nearly $60 per person employed on farms.

The dispersion across Asian economies in nominal and relative rates of assistance to farmers has increased rather than diminished despite the reforms in the region. This result means there is still lots of scope for reducing distortions in the region's use of resources in agriculture though more interantional re-location of production, especially in rice. That finding also suggests there are political economy forces at work in each country that do not change greatly relative to other countries over time. In particular, the econometric results reported above suggest the NRA for

agriculture and the RRA tend to rise with per capita income and to be higher the lower a country's agricultural comparative advantage.

The dispersion in nominal rates of assistance to farmers also has increased rather than diminished within *each studied Asian economy.* This result means there is still scope for reducing distortions in resource use within agriculture even in countries with an average NRA for agriculture and an RRA close to zero. As in other regions, the products in Asia with the highest rates of distortion and gross subsidy equivalent values are rice, sugar and milk.

In particular, the strong anti-trade bias in assistance rates within the farm sector remains in place. The NRA for import-competing farm industries has increased over the decades studied, while the negative NRA for agricultural exportables has been phased down. The fact that the average NRAs for import-competing and exportable agricultural industries have risen almost in parallel means that the trade bias index has not fallen much from the high levels it rose to by the 1980s. This may be understandable from a political economy viewpoint, but it nonetheless means that resources are not allocated efficiently within the farm sector and – since openness tends to promote economic growth (Spence et al. 2008) – that total factor productivity growth in agriculture is slower than it would be if remaining interventions were removed.

The most important instruments of farm assistance/taxation continue to be trade-restrictive measures. Domestic taxes and subsidies on farm inputs and outputs, and non-product-specific assistance, have made only minor contributions to the estimates of NRAs for Asia as a whole. True, input subsidies have played a significant role in India and, occasionally, in some other parts of the region. But, as in other regions such as Latin America (Lopez and Gallinato 2006), there has been comparatively little assistance provided via public investments in rural infrastructure and agricultural R&D[16] even though social rates of return from further such investments remain very high (Fan and Hazell 2001, Fan 2008) which suggests they could play a much bigger role in boosting farm output and productivity in the region.

Movements in the consumer tax equivalent closely replicate changes in farm support/taxation, because agricultural taxation or assistance is mostly due to trade

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[16] Data in Pardey et al. (2006) suggest that public R&D expenditure in Asia since the late 1970s has averaged less than 0.5 percent of the gross value of production at undistorted prices, which is trivial compared with the NRA via price-distorting measures for Asia of 25 to 40 times that (12 percent in 2000-04 and below -20 percent prior to the mid-1980s).

measures. This means that before the reforms food prices were kept artificially low but, in recent years, they have been above international levels on average in Asia. It also means there is considerable variation in consumer tax equivalents across products and across countries in the region. The current level of taxation of food consumers for the region as a whole is rising, and in 2000-04 it amounted to $11 per capita per year (compared with a subsidy of $22 in 1980-84).

The decline in negative relative rates of assistance has been due as much to cuts in protection for non-agricultural sectors as to reforms of agricultural policies. This underscores the fact that the reductions in distortions to agricultural incentives in the region have been part of a series of economy-wide reform programs and not just due to farm policy reforms.

Food policies in continue to seek to reduce fluctuations in domestic food prices and in the quantities available for consumption via fluctuations in barriers to trade. This begger-thy-neighbor dimension of each economy's food policy reduces hugely the international public good role that trade between nations can play in bringing stability to the world's food markets. This is especially the case for rice, because it is the main staple in Asia and because Asia accounts for five-sixths of the global market for rice.

Where to from here?

The expectation is that, provided they remain open and continue to free up domestic markets and practice good macroeconomic governance, Asia's developing economies will keep growing rapidly in the foreseeable future, and the growth there will be more rapid in manufacturing and service activities than in agriculture. In the more densely populated economies of the region that growth will be accompanied by rapid increases in per capita incomes of low-skilled workers where labor-intensive exports boom. Agricultural comparative advantage is thus likely to decline in such economies. Whether these economies become more dependent on imports of farm products depends, however, on what happens to the RRA. The first wave of Asian industrializers (Japan, and then Korea and Taiwan) chose to slow the growth of food import dependence by raising their NRA for agriculture even as they were bringing

down their NRA for non-farm tradables, such that their RRA became increasingly above the neutral zero level. A key question is: will later industrializers follow suit, given the past close association of RRAs with rising per capita income and falling agricultural comparative advantage?

When the RRAs for Japan, Korea and Taiwan are mapped against real per capita income, it is possible to superimpose on that same graph the RRAs for lower-income economies to see how they are tracking relative to the first industrializers. Figure 1.15 does that for China and India, and shows that their RRA trends of the past three decades are on the same trajectory as the richer Northeast Asians. That provides reason to expect the governments of later industrializing economies to follow suit if other things were equal.

One reason one might expect different government behavior now is because the earlier industrializers were not bound under GATT to keep down their agricultural protection. Had there been strict discipline on farm trade measures at the time Japan and Korea joined GATT in 1955 and 1967, respectively, their NRAs may have been halted at less than 20 percent (figure 1.16). At the time of China's accession to WTO in December 2001, its NRA was less than 5 percent according to this present study, or 7.3 percent for just import-competing agriculture. Its average bound import tariff commitment was about twice that (16 percent in 2005), but what matters most is China's out-of-quota bindings on the items whose imports are restricted by tariff rate quotas. The latter tariff bindings as of 2005 were 65 percent for grains, 50 percent for sugar and 40 percent for cotton (WTO, ITC and UNCTAD 2007, p. 60). China also has bindings on farm product-specific domestic supports of 8.5 percent, and can provide another 8.5 percent as non-product specific assistance if it so wishes – a total 17 percent NRA from domestic support measures alone, in addition to what is available through out-of-quota tariff protection.

Clearly the legal commitments China made on acceding to WTO are a long way from current levels of domestic and border support for its farmers, and so are unlikely to constrain the government very much in the next decade or so;[17] and the legal constraints on Asia's developing countries that joined the WTO earlier (except for Korea) are even less constraining. For India, Pakistan and Bangladesh, for example, their estimated NRAs for agricultural importables in 2000-04 are 34, 4 and 6

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[17] For more on this point, see Anderson, Martin and Valenzuela (2008).

percent, respectively, whereas the average bound tariffs on their agricultural imports are 114, 96 and 189 percent, respectively (WTO, ITC and UNCTAD 2007). Also, like other developing countries, they have high bindings on product-specific domestic supports of 10 percent and another 10 percent for non-product specific assistance, a total of 20 more percentage points of NRA that legally could come from domestic support measures – compared with currently 10 percent in India and less than 3 percent in the rest of South Asia (tables 1.13 an 1.14).

One can only hope that the China and South and Southeast Asia will not make use of the legal wiggle room they have allowed themselves in their WTO bindings and thereby follow Japan, Korea and Taiwan into high agricultural protection.[18] A much more efficient and equitable strategy would be to instead treat agriculture in the same way they have been treating non-farm tradable sectors. That would involve opening the sector to international competition, and relying on more-efficient domestic taxes (e.g., income and consumption or value-added taxes) rather than trade taxes for raising government revenue.

It might be argued that such a laissez faire strategy could increase rural-urban inequality and poverty and thereby generate social unrest. On the other hand, policies that lead to high prices for staple foods, in particular, involve potentially serious risks for the urban and rural poor who are net buyers of food in developing countries, as has been demonstrated by concerns about the recent increases in prices of these goods (Ivanic and Martin 2008). Available evidence suggests that problems of rural-urban poverty gaps have been alleviated in parts of Asia by some of the more-mobile members of farm households finding full- or part-time work off the farm and repatriating part of their higher earnings back to those remaining in farm households (Otsuka and Yamano 2006, World Bank 2007). Concerted government intervention through social policy measures are hugely important both in reducing the gaps between rural and urban incomes, identified by Hayami (2007) as a concern, and in raising national incomes overall (Winters, McCulloch and McKay 2004). Efficient ways of assisting any left-behind groups of poor (nonfarm as well as farm) households

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[18] The indications in the on-going Doha round of multilateral trade negotiations at the WTO are not encouraging. The Group of 33 developing countries, led by Indonesia but strongly supported by India and the Philippines, among others, is arguing for additional 'special and differential treatment' for developing countries in the form of exemptions from agricultural tariff cuts for so-called 'special products', and for a special safeguard mechanism that would allow such countries to impose even higher than bound tariffs in years of likely import surges.

include public investment measures that have high social payoffs such as in basic education and health and in rural infrastructure, as well as in agricultural research and development.[19]

What do the above lessons and implications suggest developing country policymakers should do when confronted, as in recent years, with a sharp upward movement in international food prices? In the past, as illustrated for rice in figures 1.12 and 1.13, many governments have simply either increased their export restrictions or lowered their import restrictions on food staples for the duration of the spike. But what if this recent rise in international prices is much more prolonged than the short-lived spikes of recent decades? This year's outlook projections by international agencies are suggesting prices could remain high for the foreseeable future, and that growth in net food imports by rapidly industrializing economies of Asia is one of the significant contributors.[20] Yet as we saw in figure 1.8 above, China and India over the past two or more decades have steadily raised their RRAs which had been sufficient to keep both countries very close to self sufficient in primary agricultural products over the previous four decades. In terms of all agricultural and processed food trade though, in 2000-04 China for the first time became a net importer while, in South Asia, India's net exports were less than Pakistan and Bangladesh's net imports for the first time since the latter 1960s (Sandri, Valenzuela and Anderson 2007).[21] Should these countries choose to keep their RRAs at current (close to zero) levels, their import dependence in agriculture could well increase over time. If so, other developing countries might well re-consider their current position in the WTO's Doha round of trade negotiations: by agreeing to lower substantially their bound tariffs and subsidies on agricultural products, they could extract greater

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[19] As implied by the estimates reported in note 15 above, even if just one-twentieth of the current NRA provided to Asian farmers via farm price-support policies was replaced by agricultural R&D expenditure, that would more than double current public spending on such R&D – and the latter would increase regional economic welfare whereas price-distortionary policies reduce it. Such a boost to Asian R&D could well be able to generate another green revolution of the order of magnitude of the first one that began in the 1960s, especially if it took full advantage of the new developments in biotechnology (as shown for rice, for example, in Anderson, Jackson and Nielsen 2005).

[20] The World Bank's commodity forecast as of May 2008 for grain prices is that by 2020 in real terms they will still be 10 percent above 2006 levels, which in turn were 20 percent above the average for 2001-05. IFPRI (von Braun 2007) and the OECD and FAO (2008) similarly expect food prices to remain high well into next decade and beyond.

[21] This change for China was largely due to increases in imports of cotton needed to supply China's surging production of textiles and clothing for export.

'concessions' from high-income countries without having to reduce their actual applied rates for the foreseeable future.

We have said little in this chapter about the effects of the NRA and RRA trends and fluctuations on economic welfare, price instability, income inequality or poverty, nor about their underlying causes. The analytical narratives in the chapters that follow touch to varying extents on those issues, but much more in-depth empirical analysis can now be undertaken with the help of these assistance estimates. Some will appear in the project's forthcoming books. Specifically, Anderson, Valenzuela and van der Mensbrugghe (2009) provide results from a global economy-wide model of the impacts on agricultural markets, national economic welfare and net farm incomes of distortions to the world's goods markets as of 2004, using the new agricultural distortion estimates in this volume and its companion volumes for the other regions of the world. How those distortions – both own-country and rest-of world's – impact on the extent of poverty and inequality are explored in a series of country case studies brought together in Anderson, Cockburn and Martin (2009), using national economy-wide models that are enhanced with detailed earning and spending information of numerous types of urban and rural households. And in Anderson (2009b) a broad range of theoretical and econometric analyses are brought together in an attempt to shed more light on the political economy forces that generated the evolving pattern of inter- and intra-sectoral distortions to farmer and food consumer incentives over the past half-century. But our hope is that the results from this study and its companion volumes will spawn many more such analyses in the years to come.

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Table 1.1: Key economic and trade indicators, Asian focus economies, 2000–04

	Share (%) of world:			National rel. to world (world=100)			Agric trade specialization index[b]	Poverty incidence[c]	Gini index for per capita income[d]	
	Pop'n	Total GDP	Agric GDP	Agric workers	GDP per capita	Ag land per capita	RCA[a] ag & food			1984	2004
East Asia	**29.09**	**8.38**	**24.76**	**47.1**	**29**	**45**	**75**	**-0.12**	**9**	**0.24**	**0.37**
China	20.60	4.33	16.62	38.4	21	54	58	-0.05	10	0.20	0.36
Indonesia	3.41	0.59	2.62	3.8	17	27	173	0.08	4	0.30	0.35
Korea, Rep.	0.77	1.62	1.69	0.2	212	5	26	-0.78	0	na	na
Malaysia	0.39	0.28	0.73	0.1	74	41	107	-0.18	0	0.49	0.49
Philippines	1.27	0.22	0.91	1.0	18	19	67	-0.10	13	0.41	0.44
Taiwan	0.36	0.84	0.45	0.1	232	5	28	-0.72	0	na	na
Thailand	1.01	0.38	1.05	1.5	38	39	204	0.38	1	0.45	0.42
Vietnam	1.29	0.11	0.69	2.1	8	14	301	0.61	1	0.36	0.37
South Asia	**21.67**	**1.99**	**11.90**	**25.3**	**9**	**20**	**145**	**0.07**	**31**	**0.31**	**0.35**
Bangladesh	2.16	0.14	0.90	2.9	7	8	93	-0.69	35	0.26	0.33
India	16.87	1.57	9.32	20.2	9	22	143	0.24	36	0.31	0.33
Pakistan	2.33	0.23	1.43	1.9	10	23	137	na	17	0.33	0.31
Sri Lanka	0.31	0.05	0.24	0.3	16	15	254	0.45	6	0.32	0.40
Asian focus economies	**50.76**	**10.37**	**36.65**	**72.5**	**20**	**34**	**80**	**-0.15**	**19**	**0.27**	**0.36**

[a] Revealed comparative advantage index is the share of agriculture and processed food in national exports as a ratio of that sector's share of global exports.
[b] Primary agricultural trade specialization index is net exports as a ratio of the sum of exports and imports of agricultural and processed food products (world average =0.0).
[c] Percentage of the population living on less than US $1 per day.

[d] The poverty incidence and the 2004 Gini index are for the most recent year available between 2000 and 2004. The 1984 Gini coefficients are for the year nearest 1984, from the World Bank's Povcal website. The weighted averages for the focus economies use population as the basis for weights.
Source: Sandri, Valenzuela and Anderson (2007), compiled mainly from World Bank's *World Development Indicators.*

Table 1.2: Changes in poverty in Asia, 1981 to 2004

	1981	**1987**	**1993**	**1999**	**2004**
No. of people (million):					
China	634	310	334	223	128
Other East Asia	162	119	86	53	41
India	364	369	376	376	371
Other South Asia	91	102	61	87	75
TOTAL, Asia	1251	900	857	740	615
% of population					
East Asia	58	28	25	15	9
South Asia	50	45	37	35	31

Source: Chen and Ravallion (2007)

Table 1.3: Growth of real GDP and exports, Asian focus economies, 1980 to 2004

(at constant 2000 prices, percent per year, trend-based)

	Agriculture	Industry	Services	Total GDP	GDP per capita	Export volume[a]
East Asia	**3.1**	**9.0**	**7.9**	**7.6**	**6.3**	**13.7**
China	4.4	12.1	11.3	9.9	8.6	15.1
Indonesia	2.9	6.6	5.3	5.4	3.7	10.4
Korea, Rep.	1.3	8.2	7.2	7.1	6.1	10.6
Malaysia	1.7	7.8	6.9	6.6	3.9	10.3
Philippines	1.7	2.0	3.5	2.7	0.4	12.8
Taiwan	0.5	5.3	8.3	6.7	5.6	17.0
Thailand	2.4	8.5	5.8	6.3	4.9	17.3
Vietnam	3.9	9.7	7.5	7.0	5.1	**n.a.**
South Asia	**3.0**	**6.2**	**6.4**	**5.4**	**3.4**	n.a.
Bangladesh	2.7	6.6	4.4	4.4	2.1	13.4
India	3.0	6.3	7.0	5.7	3.7	n.a.
Pakistan	4.0	5.5	4.8	4.7	2.1	9.8
Sri Lanka	1.8	5.6	5.1	4.5	3.3	6.3
Asian focus economies	**3.1**	**8.6**	**7.5**	**7.1**	**5.5**	**n.a.**
WORLD	**2.0**	**2.5**	**3.2**	**3.0**	**1.4**	**n.a.**

[a] 1985-95, from World Bank's *World Development Indicators 2008,* Table 6.2.

Source: Sandri, Valenzuela and Anderson (2007), compiled from World Bank's *World Development Indicators.*

Table 1.4: Exports of goods and services as a share of GDP, Asian focus economies, 1965 to 2004

(percent)

	1965-69[b]	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
East Asia[a]	**8**	**19**	**22**	**25**	**28**	**34**	**39**
China	3	6	11	14	22	21	28
Indonesia	10	23	25	23	26	32	35
Korea, Rep.	13	32	34	35	27	33	39
Malaysia	37	49	53	63	82	103	117
Philippines	11	20	21	25	28	47	53
Taiwan	22	49	53	54	45	48	59
Thailand	18	21	23	30	38	49	68
Vietnam	na	na	na	na	na	44	55
South Asia	**na**	**7**	**7**	**7**	**11**	**12**	**14**
Bangladesh	na	5	5	6	8	13	15
India	3	6	6	6	9	11	13
Pakistan	na	12	12	14	17	16	16
Sri Lanka							
	19	24	29	26	32	36	37
Asian focus economies[a]	**na**	**16**	**19**	**22**	**25**	**30**	**34**

[a] Ignores Vietnam in the period 1980 to 1994, whose weight in Asian GDP was less than 1 percent.

[b] For 1965-69, merchandise exports only except for Taiwan. In 1960-64, Korea and Taiwan's shares were 6 and 15 percent respectively, and in 1955-59 Taiwan's share was 10 percent.

Source: Sandri, Valenzuela and Anderson (2007), compiled from World Bank's *World Development Indicators.*

Table 1.5: Share of world exports of non-food manufactures, Asian focus economies, 1990 to 2006

(percent)

	1990-94	1995-99	2000-04	2006	Current value in 2006 as % of 1990
East Asia	**5.1**	**10.3**	**15.6**	**20.4**	**790**
China	1.0	2.4	6.1	10.8	2020
Indonesia	0.1	0.5	0.6	0.5	490
Korea, Rep.	1.7	2.6	3.1	3.5	480
Malaysia	0.2	1.0	1.5	1.4	750
Philippines	0.1	0.2	0.6	0.5	730
Taiwan	1.8	2.7	2.5	2.3	310
Thailand	0.2	0.8	1.0	1.2	670
Vietnam	0.0	0.1	0.2	0.2	na
South Asia	**0.6**	**0.9**	**1.1**	**1.4**	**470**
Bangladesh	0.0	0.1	0.1	0.1	800
India	0.4	0.5	0.7	1.0	550
Pakistan	0.1	0.2	0.2	0.2	310
Sri Lanka	0.0	0.1	0.1	0.1	480
Asian focus economies	**5.7**	**11.2**	**16.7**	**21.8**	**760**

Source: Sandri, Valenzuela and Anderson (2007), compiled from World Bank's *World Development Indicators*, updated from the WTO's, *International Trade Statistics 2007.*

Table 1.6: Sectoral shares of GDP, Asian focus economies, 1965 to 2004

(percent)

	Agriculture				Industry				Services			
	1965 –69	1975 –79	1985 –89	2000 –04	1965 –69	1975 –79	1985 –89	2000 –04	1965 –69	1975 –79	1985 –89	2000 –04
East Asia[a]	**34**	**26**	**19**	**10**	**29**	**40**	**40**	**42**	**34**	**32**	**41**	**48**
China	39	31	27	14	35	47	44	46	26	22	30	41
Indonesia	49	29	23	16	16	35	36	45	35	36	41	40
Korea, Rep.	30	21	10	4	22	30	37	35	48	49	53	61
Malaysia	29	26	20	9	27	37	39	49	44	37	42	42
Philippines	27	29	24	14	27	36	35	32	46	35	42	53
Taiwan	20	10	5	2	34	44	45	31	47	46	50	67
Thailand	30	25	16	10	24	29	34	43	46	46	50	48
Vietnam	na	na	41	23	na	na	27	39	na	na	32	38
South Asia	**43**	**36**	**29**	**21**	**18**	**21**	**23**	**24**	**39**	**42**	**48**	**55**
Bangladesh	54	55	31	22	9	14	21	25	36	31	48	52
India	44	36	29	21	19	22	24	24	38	43	47	55
Pakistan	35	29	24	22	19	21	21	22	46	50	55	56
Sri Lanka	29	28	24	17	21	26	24	24	51	46	51	59
Asian focus economies[a]	**36**	**28**	**22**	**12**	**27**	**36**	**35**	**38**	**35**	**34**	**43**	**49**

[a] Ignores Vietnam in the periods 1965-69 and 1975-79, whose weight in Asian GDP was less than 1 percent.

Source: Sandri, Valenzuela and Anderson (2007), compiled from World Bank's *World Development Indicators.*

Table 1.7: Agriculture's shares of employment, Asian focus economies, 1965 to 2004

(percent)

	1965–69	1975–79	1985–89	2000–04
East Asia	**77**	**72**	**68**	**60**
China	79	75	73	66
Indonesia	69	60	56	47
Korea, Rep.	53	41	24	9
Malaysia	57	45	31	18
Philippines	60	54	48	39
Taiwan	45	25	15	7
Thailand	81	74	66	55
Vietnam	79	74	72	67
South Asia	**74**	**70**	**65**	**57**
Bangladesh	85	76	67	54
India	73	70	66	59
Pakistan	65	64	55	46
Sri Lanka	55	53	49	45
Asian focus economies	**76**	**71**	**67**	**59**

Source: Sandri, Valenzuela and Anderson (2007), compiled from FAOSTAT.

Table 1.8: Sectoral shares of merchandise exports, Asian focus economies, 1965 to 2004

(percent)

	Agriculture and processed food				Other primary				Other goods			
	1965 –69	1975 –79	1985 –89	2000 –04	1965 –69	1975 –79	1985 –89	2000 –04	1965 –69	1975 –79	1985 –89	2000 –04
East Asia	**46**	**30**	**18**	**7**	**10**	**16**	**12**	**7**	**43**	**53**	**62**	**85**
China	51	35	19	5	5	17	14	4	44	48	53	90
Indonesia	49	26	21	15	48	72	55	29	2	2	24	55
Korea, Rep.	21	11	5	2	9	2	2	6	70	87	92	92
Malaysia	61	55	36	10	32	27	24	11	5	17	40	78
Philippines	78	55	27	6	16	17	11	3	7	18	32	83
Taiwan	39	13	6	3	2	2	2	3	59	85	92	94
Thailand	79	67	46	18	14	10	3	4	4	20	50	75
Vietnam	na	na	na	27	na	na	na	23	na	na	na	48
South Asia	**42**	**40**	**26**	**13**	**9**	**8**	**7**	**8**	**49**	**52**	**66**	**78**
Bangladesh	na	37	28	8	na	1	1	0	na	61	71	91
India	38	35	22	13	11	9	9	11	50	55	67	75
Pakistan	53	38	30	12	2	5	1	2	45	57	68	85
Sri Lanka	96	79	47	23	2	8	5	2	1	9	46	75
Asian focus economies	**45**	**32**	**18**	**7**	**10**	**14**	**12**	**7**	**44**	**53**	**62**	**85**

[a] Ignores Vietnam in the period 1985-89, whose weight in Asian merchandise trade was less than 1 percent.

Source: Sandri, Valenzuela and Anderson (2007), compiled from World Bank's *World Development Indicators.*

Table 1.9: Indexes of comparative advantage in agriculture and processed food,[a]
Asian focus economies, 1965 to 2004

(a) Revealed comparative advantage index,[a] world = 1.0

	1965–69	1975–79	1985–89	2000–04
East Asia	**2.2**	**2.2**	**1.1**	**0.7**
China	2.1	2.1	1.3	0.6
Indonesia	2.0	1.3	1.4	1.7
Korea, Rep.	0.8	0.6	0.3	0.3
Malaysia	2.4	2.9	2.4	1.1
Philippines	3.1	2.8	1.9	0.7
Taiwan	1.5	0.6	0.4	0.3
Thailand	3.1	3.5	3.1	2.0
Vietnam	na	na	na	3.0
South Asia	**1.9**	**2.0**	**1.8**	**1.4**
Bangladesh	na	1.9	1.9	0.9
India	1.5	1.8	1.5	1.4
Pakistan	2.1	1.9	2.1	1.4
Sri Lanka	3.8	4.1	3.2	2.5
Asian focus economies	**2.2**	**2.2**	**1.2**	**0.8**

(b) Trade specialization index,[b] world = 0.0

	1965–69	1975–79	1985–89	2000–04
East Asia	**na**	**na**	**na**	**-0.03**
China	na	na	0.07	-0.16
Indonesia	0.48	0.42	0.43	0.16
Korea, Rep.	-0.63	-0.41	-0.45	-0.53
Malaysia	0.44	0.60	0.56	0.29
Philippines	0.47	0.51	0.25	-0.18
Taiwan	0.08		-0.27	-0.35
Thailand	0.68	0.69	0.57	0.44
Vietnam	na	na	na	0.44
South Asia	**na**	**0.05**	**0.03**	**-0.06**
Bangladesh	na	-0.37	-0.46	-0.62
India	-0.18	0.13	0.16	0.10
Pakistan	0.20	-0.13	-0.05	-0.24
Sri Lanka	0.34	0.30	0.21	0.08
Asian focus economies	**na**	**na**	**na**	**-0.03**

[a] Share of agriculture and processed food in national exports as a ratio of that sector's share of global merchandise exports.
[b] Net exports as a ratio of the sum of exports and imports of agricultural and processed food products.
Source: Sandri, Valenzuela and Anderson (2007), compiled from World Bank's *World Development Indicators.*

Table 1.10: Export orientation, import dependence and self-sufficiency in primary agricultural production, Asian focus economies, 1961 to 2004

(percent at undistorted prices)

(a) Exports as share of production

	1961-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Korea	0	0	0	0	0	0	0	2	1
Taiwan	5	9	13	14	10	10	6	5	6
China	2	2	2	3	5	5	7	7	7
Indonesia	-	-	6	5	5	6	4	5	4
Malaysia	70	64	54	41	35	34	19	12	9
Philippines	13	11	14	8	7	2	1	1	1
Thailand	-	-	13	20	24	26	25	25	30
Vietnam	-	-	-	-	-	3	4	9	11
Bangladesh	-	-	-	3	3	3	2	1	1
India	1	1	1	1	1	1	1	1	2
Pakistan	7	5	5	2	5	8	4	2	1
Sri Lanka	68	62	44	52	36	34	24	31	39
Asian focus economies[c]	**3**	**4**	**4**	**4**	**4**	**6**	**6**	**5**	**5**

(b) Imports as share of apparent consumption

	1961-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Korea	4	5	12	8	11	9	11	11	13
Taiwan	24	33	56	66	76	81	86	90	93
China	2	2	2	3	5	5	7	7	7
Indonesia	-	-	0	1	1	1	1	2	2
Malaysia	13	6	3	1	1	1	2	3	6
Philippines	0	0	1	0	1	0	0	2	1
Thailand	-	-	0	0	0	0	0	2	5
Vietnam	-	-	-	-	-	0	0	0	0
Bangladesh	-	-	-	3	4	5	3	3	5
India	3	4	2	2	1	1	1	1	2
Pakistan	6	5	3	5	2	5	5	6	4
Sri Lanka	7	5	1	0	1	4	1	3	5
Asian focus economies[c]	**3**	**4**	**4**	**5**	**7**	**12**	**17**	**17**	**19**

Table 1.10 (continued): Export orientation, import dependence and self-sufficiency in primary agricultural production, Asian focus economies, 1961 to 2004

(c) Self-sufficiency ratio

	1961-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Korea	96	95	88	92	89	91	90	91	87
Taiwan	80	73	51	40	27	21	15	11	7
China	99	101	100	99	98	101	101	99	98
Indonesia	-	-	106	105	104	106	104	103	102
Malaysia	293	265	215	167	152	150	122	110	104
Philippines	115	112	116	108	106	101	101	99	99
Thailand	-	-	115	125	131	135	133	130	137
Vietnam	-	-	-	-	-	103	104	110	112
Bangladesh	-	-	98	99	99	98	99	98	96
India	98	97	99	99	99	99	100	100	100
Pakistan	101	100	102	97	103	104	99	96	97
Sri Lanka	297	298	194	221	155	144	131	142	157
Asian focus economies[c]	**100**	**100**	**100**	**99**	**97**	**94**	**88**	**87**	**85**

Source: Compiled using the project's estimates of total agricultural production (both covered and non-covered products) valued at undistorted prices, plus the FAO's total agricultural trade value data, with self-sufficiency defined for each product as the ratio of production to production plus imports minus exports.

Table 1.11: Nominal rates of assistance to agriculture,[a] Asian focus economies, 1955 to 2004[c]
(percent)

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Northeast Asia	-42.8	-42.6	-41.7	-41.2	-39.5	-38.2	-25.7	-1.7	14.4	11.9
Korea	-3.2	4.0	13.4	35.7	56.3	89.4	126.1	152.8	129.8	137.3
Taiwan [c]	-12.0	3.6	3.0	9.3	7.1	14.9	27.1	38.1	46.4	61.3
China [d]	-45.2	-45.2	-45.2	-45.2	-45.2	-45.2	-35.5	-14.3	6.6	5.9
Southeast Asia	**na**	**-6.8**	**5.9**	**-8.8**	**0.0**	**4.6**	**-0.4**	**-4.2**	**0.0**	**11.1**
Indonesia	na	na	na	-2.6	9.3	9.2	-1.7	-6.6	-8.6	12.0
Malaysia	na	-7.2	-7.5	-9.0	-13.0	-4.6	1.3	2.3	-0.2	1.2
Philippines	na	-5.3	14.4	-5.1	-7.1	-1.0	18.7	18.5	32.9	22.0
Thailand	na	na	na	-20.3	-14.0	-2.0	-6.2	-5.7	1.7	-0.2
Vietnam[c]	na	na	na	na	na	na	-13.9	-25.4	0.6	21.2
South Asia	**0.0**	**-0.5**	**0.6**	**0.4**	**-5.5**	**0.6**	**20.9**	**0.7**	**0.2**	**13.6**
Bangladesh	na	na	na	-16.0	1.4	-3.3	11.7	-1.5	-5.2	2.7
India [d]	0.1	0.1	0.1	0.2	-5.6	1.9	24.9	1.8	0.7	15.8
Pakistan [c]	na	-0.7	15.3	6.8	-8.5	-6.4	-4.0	-6.9	-1.6	1.2
Sri Lanka	-2.3	-22.8	-24.5	-16.3	-25.5	-13.5	-9.9	-1.2	12.2	9.5
Asian focus economies:										
Unweighted average[b]	**-12.3**	**-10.2**	**-3.9**	**-4.7**	**-4.1**	**3.2**	**11.5**	**12.1**	**16.8**	**21.7**
Weighted. average[a]	**-27.3**	**-26.7**	**-25.1**	**-25.3**	**-23.8**	**-20.6**	**-9.0**	**-2.0**	**7.5**	**12.0**
Dispersion of individual country NRAs [e]	25.3	25.2	31.2	29.9	32.5	39.9	43.8	47.5	36.6	38.0
Product coverage [f]	52	65	63	64	68	74	78	75	73	66

[a] Weighted average for each country, including product-specific input distortions and non-product specific assistance as well as authors' guesstimates for non-covered farm products, with weights based on gross value of agricultural production at undistorted prices.
[b] The unweighted average is the simple average across the twelve economies of their national NRA (weighted) averages.
[c] Pakistan data for 1960-64 is 1961-64; Vietnam data for 1985-89 is 1986-1989; Taiwan data for 2000-04 is 2000-03.
[d] Estimates for China pre-1981 and India pre-1965 are based on the assumption that the nominal rates of assistance to agriculture in those years was the same as the average NRA estimates for those economies for 1981-84 and 1965-69, respectively, and that the gross value of production in those missing years is that which gives the same average share of value of production in total world production in 1981-84 and 1965-69, respectively. This NRA assumption is conservative in the sense that for both countries the average NRA was probably even lower in earlier years.
[e] Dispersion is a simple 5-year average of the annual standard deviation around a weighted mean of the national agricultural sector NRAs each year.
[f] Weighted average share of gross value of total agricultural production at undistorted prices accounted for by covered products.

Source: Anderson and Valenzuela (2008), drawn from estimates reported in Chapters 2-12 of this book.

Table 1.12: Dispersion of nominal rates of assistance across covered agricultural products,[a] Asian focus economies, 1955 to 2004

(percent)

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Northeast Asia[c]	38.5	38.5	66.8	61.7	68.6	64.0	67.1	80.5	102.3	116.6
Korea	34.1	40.5	85.0	82.5	89.0	80.1	114.8	164.2	200.1	225.4
Taiwan [b]	42.8	36.4	48.7	40.9	48.2	37.5	34.3	56.5	88.4	109.0
China	na	na	na	na	na	74.3	52.3	20.7	18.4	15.3
Southeast Asia[c]	**na**	**21.1**	**30.4**	**23.9**	**32.7**	**46.2**	**47.9**	**42.5**	**39.7**	**40.4**
Indonesia	na	na	na	29.1	49.4	53.6	35.0	40.5	49.0	33.3
Malaysia	na	19.8	10.6	11.0	34.8	58.6	90.5	71.9	33.7	40.1
Philippines	na	22.5	50.2	28.3	24.2	42.7	50.9	30.1	40.6	37.6
Thailand	na	na	na	27.5	22.4	30.1	29.3	25.1	22.9	16.7
Vietnam[b]	na	na	na	na	na	na	33.6	44.7	52.4	74.3
South Asia[c]	**44.2**	**46.3**	**64.9**	**51.8**	**55.2**	**51.5**	**86.2**	**55.4**	**45.0**	**58.7**
Bangladesh	na	na	na	na	71.4	67.6	190.7	77.5	67.9	101.2
India	na	35.5	68.0	45.8	49.8	39.2	46.9	28.5	19.4	21.5
Pakistan [b]	na	74.6	105.8	77.6	45.0	52.2	69.4	34.4	29.4	43.1
Sri Lanka	44.2	28.7	20.9	31.9	54.6	46.9	37.9	81.3	63.3	69.1
Asian focus economies: Unweighted average[c]	39.0	36.8	55.5	41.5	48.0	51.1	66.9	55.9	55.6	64.4

[a] Dispersion for each country is a simple 5-year average of the annual standard deviation around a weighted mean of NRAs across covered products each year.
[b] Pakistan data for 1960-64 is 1961-64; Vietnam data for 1985-89 is 1986-1989; Taiwan data for 2000-04 is 2000-03.
[c] The unweighted average is the simple average across the relevant economies of their 5-year simple average dispersion measures.

Source: Anderson and Valenzuela (2008), drawn from estimates reported in Chapters 2-12 of this book.

Table 1.13: Nominal rates of assistance to agricultural exportables, import-competing products, and the trade bias index,[a] Asian focus economies, 1955 to 2004
(percent)

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Korea										
NRA agric. exp	na	na	na	na	na	na	na	na	na	na
NRA agric. imp-comp	-3.3	4.9	16.3	46.1	71.8	118.6	159.8	197.6	164.8	171.9
Trade Bias Index	0.03	-0.05	-0.14	-0.32	-0.42	-0.54	-0.62	-0.66	-0.62	-0.63
Exportables' share[b]	0	0	0	0	0	0	0	0	0	0
Taiwan [c]										
NRA agric. exp	-18.1	5.7	4.3	15.4	10.3	25.1	48.9	57.1	57.0	70.3
NRA agric. imp-comp	-3.6	0.5	2.3	3.3	5.2	9.2	18.1	42.0	54.3	71.3
Trade Bias Index	-0.15	0.05	0.02	0.12	0.05	0.15	0.27	0.11	0.02	0.00
Exportables' share[b]	85	80	78	74	70	61	47	28	25	24
China										
NRA agric. exp	na	na	na	na	na	-56.9	-46.0	-21.8	-0.8	-0.1
NRA agric. imp-comp	na	na	na	na	na	-11.0	20.4	2.2	17.0	7.3
Trade Bias Index	na	na	na	na	na	-0.50	-0.55	-0.23	-0.15	-0.07
Exportables' share[b]	na	na	na	na	na	79	88	80	75	72
Northeast Asia										
NRA agric. exp	-18.1	5.7	4.3	15.4	10.3	-40.0	-44.2	-20.5	-0.2	0.2
NRA agric. imp-comp	-3.4	3.9	14.4	38.3	59.7	21.2	51.8	42.8	40.5	26.4
Trade Bias Index	-0.15	0.02	-0.09	-0.17	-0.31	-0.50	-0.63	-0.44	-0.29	-0.21
Exportables' share[b]	35	31	32	29	29	76	83	74	70	69
Indonesia										
NRA agric. exp	na	na	na	-3.3	-0.3	-7.0	-16.5	-24.6	-17.2	-3.3
NRA agric. imp-comp	na	na	na	-1.3	16.5	19.5	5.1	-0.7	-5.8	24.7
Trade Bias Index	na	na	na	0.01	-0.14	-0.21	-0.20	-0.24	-0.12	-0.22
Exportables' share[b]	na	na	na	57	37	34	32	29	34	37
Malaysia										
NRA agric. exp	na	-11.4	-9.0	-12.7	-18.7	-11.8	-5.0	-4.1	-3.0	-1.3
NRA agric. imp-comp	na	13.0	-1.8	2.5	21.6	36.7	44.1	33.2	10.8	12.3
Trade Bias Index	na	-0.22	-0.06	-0.14	-0.31	-0.35	-0.33	-0.28	-0.12	-0.12
Exportables' share[b]	na	84	79	78	86	86	86	82	80	81
Philippines										
NRA agric. exp	na	-6.2	35.4	-10.2	-9.9	-3.8	6.2	4.8	-0.7	-3.7
NRA agric. imp-comp	na	-5.3	10.1	-2.7	-6.1	0.6	30.0	27.6	47.9	30.8
Trade Bias Index	na	0.00	0.23	-0.04	-0.04	-0.04	-0.18	-0.17	-0.32	-0.25
Exportables' share[b]	na	21	22	30	41	41	39	33	25	22
Thailand										
NRA agric. exp	na	na	na	-26.7	-19.4	-11.1	-11.7	-9.2	-3.8	-0.6
NRA agric. imp-comp	na	na	na	-4.8	1.9	45.3	22.0	6.4	34.4	4.7
Trade Bias Index	na	na	na	-0.18	-0.20	-0.37	-0.24	-0.14	-0.27	-0.03
Exportables' share[b]	na	na	na	83	83	84	84	81	85	86
Vietnam [c]										
NRA agric. exp	na	na	na	na	na	na	-17.5	-27.1	-2.0	17.7
NRA agric. imp-comp	na	na	na	na	na	na	37.1	25.8	65.4	67.3
Trade Bias Index	na	na	na	na	na	na	-0.37	-0.42	-0.40	-0.29
Exportables' share[b]	na	na	na	na	na	na	98	96	96	94
Southeast Asia										
NRA agric. exp	na	-10.8	4.4	-13.9	-10.8	-8.7	-11.0	-14.9	-7.6	1.0
NRA agric. imp-comp	na	4.5	8.2	-2.7	11.1	18.4	10.6	5.8	8.0	24.9
Trade Bias Index	na	-0.15	-0.03	-0.12	-0.20	-0.23	-0.19	-0.20	-0.14	-0.19
Exportables' share[b]	na	57	44	61	51	48	51	48	51	53

Table 1.13 (continued)

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Bangladesh										
NRA agric. exp	na	na	na	na	-34.6	-26.2	-32.4	-33.0	-9.9	-33.2
NRA agric. imp-comp	na	na	na	na	6.5	-1.9	24.4	-0.1	-7.9	6.0
Trade Bias Index	na	na	na	na	-0.30	-0.23	-0.45	-0.33	0.00	-0.37
Exportables' share[b]	na	na	na	na	13	9	7	11	7	5
India										
NRA agric. exp	na	na	-37.4	-22.3	-35.9	-27.8	-6.0	-15.3	-12.4	-6.4
NRA agric. imp-comp	na	na	41.7	52.7	74.5	58.8	81.4	38.3	22.5	34.2
Trade Bias Index	na	na	-0.55	-0.50	-0.63	-0.54	-0.47	-0.38	-0.28	-0.30
Exportables' share[b]	na	na	58	74	73	63	43	70	71	51
Pakistan [c]										
NRA agric. exp	na	-33.3	-35.3	-20.1	-33.5	-29.1	-32.1	-16.7	-4.4	-5.6
NRA agric. imp-comp	na	1.8	45.0	19.2	-4.3	-1.9	5.4	-7.9	-1.9	3.7
Trade Bias Index	na	-0.38	-0.55	-0.27	-0.31	-0.28	-0.35	-0.10	-0.02	-0.08
Exportables' share[b]	na	31	29	24	25	27	30	24	21	22
Sri Lanka										
NRA agric. exp	-22.8	-40.0	-38.6	-41.1	-45.2	-31.1	-21.4	-24.2	-2.0	5.9
NRA agric. imp-comp	62.5	11.9	-5.9	9.0	-3.7	-0.6	-2.1	22.4	31.8	12.8
Trade Bias Index	-0.52	-0.45	-0.35	-0.45	-0.43	-0.31	-0.18	-0.38	-0.25	-0.05
Exportables' share[b]	76	72	68	50	62	58	52	51	58	58
South Asia										
NRA agric. exp	-22.8	-37.7	-37.2	-30.0	-36.1	-27.9	-20.6	-15.8	-12.0	-6.2
NRA agric. imp-comp	62.5	24.7	41.2	39.4	45.1	37.9	63.3	25.1	14.5	26.5
Trade Bias Index	-0.52	-0.50	-0.56	-0.50	-0.56	-0.48	-0.51	-0.33	-0.23	-0.26
Exportables' share[b]	76	27	53	61	63	56	32	63	64	46
All Asian focus economies (unweighted average)[d]										
NRA agric. exp	-20.4	-16.3	-12.5	-15.5	-20.8	-17.3	-12.5	-10.4	0.1	0.9
NRA agric. imp-comp	18.9	6.8	15.2	13.2	17.7	24.6	36.4	31.4	34.5	34.5
Trade Bias Index	-0.33	-0.22	-0.24	-0.25	-0.33	-0.34	-0.36	-0.32	-0.26	-0.25
All Asian focus economies (weighted average)[d]										
NRA agric. exp	-20.2	-12.6	-27.2	-20.7	-25.4	-41.7	-38.1	-19.1	-4.3	-0.6
NRA agric. imp-comp	5.9	4.7	33.9	26.6	31.3	20.8	43.8	25.8	24.8	25.4
Trade Bias Index	-0.25	-0.17	-0.46	-0.37	-0.43	-0.52	-0.57	-0.36	-0.23	-0.21
Exportables' share[b]	47	37	50	58	55	65	69	66	65	63

[a] Trade Bias Index, TBI = $(1+NRAag_x/100)/(1+NRAag_m/100) – 1$, where $NRAag_x$ and $NRAag_m$ are the average percentage NRAs for the exportable and import-competing parts of the agricultural sector.

[b] Export share is the exportables' share of the gross value of production at undistorted prices of all agricultural tradables, with weighted averages shown for sub-regions.

[c] Pakistan data for 1960-64 is 1961-64; Vietnam data for 1985-89 is 1986-89; Taiwan data for 2000-04 is 2000-03.

[d] Regional averages of the trade bias index are calculated from the regional averages of the NRAs for exportable and import-competing parts of the agricultural sector.

Source: Anderson and Valenzuela (2008), drawn from NRA estimates reported in Chapters 2-12 of this book.

Table 1.14: Nominal rates of assistance for covered farm products, by policy instrument, Asian focus economies, 1965 to 2004

(percent)

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Korea										
NRA, agric. inputs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NRA, domestic MS[c]	-0.2	-0.4	0.9	4.2	7.1	5.3	5.5	5.9	6.1	5.2
NRA, border MS[c]	-3.7	4.7	15.7	43.4	66.7	117.5	161.2	196.0	176.9	208.5
NRA, agric. total	-3.9	4.4	16.6	47.6	73.8	122.8	166.7	201.9	182.9	213.6
Taiwan										
NRA, agric. inputs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NRA, domestic MS[c]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NRA, border MS[c]	-23.6	7.3	6.3	20.4	14.4	36.9	82.4	117.4	142.2	178.4
NRA, agric. total	-23.6	7.3	6.3	20.4	14.4	36.9	82.4	117.4	142.2	178.4
China										
NRA, agric. inputs	na	na	na	na	na	0.3	0.3	0.2	0.7	0.5
NRA, domestic MS[c]	na	na	na	na	na	-12.6	-6.3	-6.2	-1.1	-1.4
NRA, border MS[c]	na	na	na	na	na	-38.5	-34.6	-12.9	2.7	1.8
NRA, agric. total	na	na	na	na	na	-50.8	-40.6	-18.9	2.3	0.9
Northeast Asia										
NRA, agric. inputs	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.2	0.7	0.5
NRA, domestic MS[c]	-0.1	-0.2	0.6	2.6	4.6	-8.4	-5.8	-5.5	-0.8	-1.2
NRA, border MS[c]	-12.1	5.7	12.3	34.9	48.3	-11.4	-26.6	-1.5	10.9	9.0
NRA, agric. total	-12.3	5.5	12.9	37.5	53.0	-19.6	-32.2	-6.8	10.7	8.3
Indonesia										
NRA, agric. inputs	na	na	na	6.0	6.8	7.3	6.0	3.2	2.6	2.3
NRA, domestic MS[c]	na	na	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NRA, border MS[c]	na	na	na	-8.7	4.3	4.8	-6.3	-8.8	-11.7	13.3
NRA, agric. total	na	na	na	-2.7	11.1	12.2	-0.3	-5.5	-9.1	15.6
Malaysia										
NRA, agric. inputs	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NRA, domestic MS[c]	na	-9.0	-8.1	-10.2	-17.0	-6.9	0.4	2.5	-0.1	1.5
NRA, border MS[c]	na	0.6	-0.6	-0.3	1.8	1.3	1.3	1.0	-0.3	0.6
NRA, agric. total	na	-8.4	-8.7	-10.5	-15.3	-5.7	1.8	3.4	-0.3	2.1
Philippines										
NRA, agric. inputs	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NRA, domestic MS[c]	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NRA, border MS[c]	na	-6.7	16.7	-6.0	-8.7	-1.6	21.9	21.4	37.8	24.9
NRA, agric. total	na	-6.7	16.7	-6.0	-8.7	-1.6	21.9	21.4	37.8	24.9
Thailand										
NRA, agric. inputs	na	na	na	-1.3	-1.2	-1.1	-2.7	-1.8	-1.4	-0.8
NRA, domestic MS[c]	na	na	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NRA, border MS[c]	na	na	na	-24.5	-17.2	-7.3	-7.0	-5.9	0.3	0.2
NRA, agric. total	na	na	na	-25.8	-18.4	-8.4	-9.7	-7.7	-1.1	-0.6
Vietnam										
NRA, agric. inputs	na	na	na	na	na	na	0.0	0.0	0.0	0.0
NRA, domestic MS[c]	na	na	na	na	na	na	-0.7	-0.9	0.0	1.7
NRA, border MS[c]	na	na	na	na	na	na	-12.6	-24.6	0.6	19.0
NRA, agric. total	na	na	na	na	na	na	-13.3	-25.4	0.7	20.6
Southeast Asia										
NRA, agric. inputs	na	0.0	0.0	2.1	3.5	4.0	2.7	1.3	1.0	0.9
NRA, domestic MS[c]	na	-6.3	-3.3	-1.4	-2.1	-0.9	0.0	0.1	0.0	0.4
NRA, border MS[c]	na	-1.8	9.6	-11.2	-2.1	1.5	-2.2	-4.5	-0.1	11.9
NRA, agric. total	na	-8.1	6.4	-10.5	-0.6	4.7	0.5	-3.0	0.9	13.1

Table 1.14 (continued): Nominal rates of assistance for covered farm products, by policy instrument, Asian focus economies, 1965 to 2004

(percent)

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Bangladesh										
NRA, agric. inputs	na	na	na	na	1.1	1.2	1.2	1.5	2.2	2.6
NRA, domestic MS[c]	na	na	na	na	0.0	0.0	0.0	0.0	0.0	0.0
NRA, border MS[c]	na	na	na	na	1.7	-4.9	15.5	-3.7	-9.8	1.3
NRA, agric. total	na	na	na	na	2.8	-3.8	16.8	-2.2	-7.6	3.9
India										
NRA, agric. inputs	na	na	0.0	0.0	0.0	0.7	4.4	5.7	7.2	9.5
NRA, domestic MS[c]	na	na	18.1	17.8	3.7	2.1	4.3	3.4	-0.1	0.2
NRA, border MS[c]	na	na	-17.9	-17.7	-9.3	-0.8	16.2	-7.3	-6.4	6.1
NRA, agric. total	na	na	0.3	0.2	-5.6	1.9	24.9	1.8	0.7	15.8
Pakistan										
NRA, agric. inputs	na	-4.5	-2.1	-1.6	4.6	3.5	2.9	2.3	1.9	1.4
NRA, domestic MS[c]	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NRA, border MS[c]	na	-1.3	23.9	10.9	-16.4	-12.8	-8.8	-12.5	-4.5	0.1
NRA, agric. total	na	-5.8	21.7	9.3	-11.8	-9.3	-5.9	-10.2	-2.6	1.5
SriLanka										
NRA, agric. inputs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NRA, domestic MS[c]	4.2	8.1	6.9	5.0	5.1	5.0	3.6	1.5	0.7	0.9
NRA, border MS[c]	-14.5	-38.0	-36.9	-25.4	-37.0	-24.2	-16.3	-3.1	10.8	7.8
NRA, agric. total	-10.3	-29.9	-30.0	-20.3	-31.9	-19.2	-12.6	-1.7	11.5	8.6
South Asia										
NRA, agric. inputs	0.0	-1.5	-0.2	-0.1	0.4	0.9	4.0	5.0	6.3	8.3
NRA, domestic MS[c]	4.2	8.3	16.3	16.1	3.1	1.8	3.6	2.8	-0.1	0.2
NRA, border MS[c]	-14.5	-14.7	-14.9	-15.4	-9.2	-2.5	13.5	-7.5	-6.2	5.2
NRA, agric. total	-10.3	-7.8	1.2	0.6	-5.7	0.2	21.0	0.3	0.0	13.6
Asian focus economies (unweighted average)										
NRA, agric. inputs	0.0	-0.6	-0.3	0.3	1.1	1.1	1.0	0.9	1.1	1.3
NRA, domestic MS[c]	1.4	0.6	2.4	1.4	-0.8	-0.9	0.1	0.0	-0.1	0.2
NRA, border MS[c]	-13.4	-6.1	1.1	-0.9	0.3	6.5	17.7	20.8	26.2	30.9
NRA, agric. total	-12.0	-6.2	3.2	0.9	0.6	6.6	18.8	21.7	27.3	32.4
Asian focus economies (weighted average)[d]										
NRA, agric. inputs	0.0	-0.5	-0.1	0.4	1.4	1.1	1.5	1.7	2.3	2.6
NRA, domestic MS[c]	1.4	2.0	13.0	10.6	1.0	-5.3	-2.9	-2.5	-0.6	-0.7
NRA, border MS[c]	-12.4	-4.2	-10.2	-10.8	-2.8	-17.4	-13.7	-4.0	4.3	8.2
NRA, agric. total	-11.1	-2.7	2.6	0.3	-0.4	-21.6	-15.2	-4.8	6.0	10.2

[a] Weights for the sub-regional and regional averages are based on the gross value of agricultural production at undistorted prices.
[b] Pakistan data for 1960-64 is 1961-64; Vietnam data for 1985-89 is 1986-1989; Taiwan data for 2000-04 is 2000-03.
[c] MS = market support, either via domestic subsidies (or taxes if negative) or via a measure at the border such as an import tariff or export subsidy (or, if negative, an import subsidy or export tax)
[d] Weighted by the gross value of production of covered products at undistorted prices.

Source: Anderson and Valenzuela (2008), drawn from NRA estimates reported in Chapters 2-12 of this book.

Table 1.15: Gross subsidy equivalents of assistance to farmers, total and per farm worker, Asian economies,[a] 1955 to 2004

(a) Total (constant 2000 US$ million using the US GDP deflator)

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Korea	-154	107	854	1672	6943	9335	13306	18594	17536	15289
Taiwan	-394	133	132	439	605	1342	2500	3849	4170	3725
China	-52857	-69648	-70671	-98931	-124086	-118224	-75780	-28381	15667	15644
Indonesia	na	na	na	-848	3783	4131	-785	-2729	-4101	4286
Malaysia	na	-250	-246	-547	-1097	-456	75	156	3	100
Philippines	na	-225	735	-1082	-903	-299	1399	1850	3832	1951
Thailand	na	na	na	-2434	-2148	-324	-645	-719	260	-14
Vietnam	na	na	na	na	na	na	-726	-1815	-18	1602
Bangladesh	na	na	na	na	583	-672	882	-103	-448	189
India	46	61	-993	-7803	-8653	-49	21607	1600	281	15433
Pakistan	na	-91	1089	-34	-815	-787	-380	-755	-260	95
Sri Lanka	-68	-461	-455	-396	-571	-344	-194	-27	245	154
Asian focus economies	**-53426**	**-70373**	**-69554**	**-109965**	**-126359**	**-106348**	**-38740**	**-8481**	**37169**	**58455**
All Asian economies[a]	**-56836**	**-74865**	**-73994**	**-116984**	**-134424**	**-113136**	**-41213**	**-9023**	**39541**	**62186**

(b) Per person engaged in agriculture (constant 2000 US$ using the US GDP deflator)[a]

	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Korea	20	155	293	1196	1716	3041	5618	6445	6899
Taiwan	76	76	261	390	1045	2077	3699	4795	5329
China[c]	-235	-222	-281	-319	-280	-163	-57	31	31
Indonesia	na	na	-27	113	113	-19	-60	-86	86
Malaysia	-135	-126	-267	-515	-213	36	79	2	56
Philippines	-33	99	-132	-99	-30	132	163	318	155
Thailand	na	na	-163	-130	-18	-34	-36	13	-1
Vietnam	na	na	na	na	na	-33	-73	-1	57
Bangladesh	na	na	na	20	-22	26	-3	-12	5
India[c]	0	-6	-43	-43	0	97	7	1	57
Pakistan	-7	78	-2	-47	-41	-19	-35	-11	4
Sri Lanka	-217	-195	-155	-207	-116	-60	-8	66	40
Asian focus economies	**-125**	**-115**	**-166**	**-174**	**-136**	**-46**	**-9**	**40**	**61**
All Asian economies[a]	**-125**	**-115**	**-166**	**-174**	**-136**	**-46**	**-9**	**40**	**61**

Table 1.15 (continued): Gross subsidy equivalents of assistance to farmers, total and per farm worker, Asian economies,[a] 1955 to 2004

(c) by sub-sector (at undistorted farmgate prices, constant US$ billions)

	Focus economies			GSE guesstimate for other Asian economies[c]	Total GSE for all Asian economies from all direct assistance to farmers[d, e]		
	GSE[e] for just covered farm products	GSE[e] for just non-covered farm products	GSE for non-product specific assistance		TOTAL	Exportables	Import-competing
1955-59	-0.7	0.1	0.4	-56.6	-56.8	-58.6	10.1
1960-64	0.8	-0.1	-1.0	-74.4	-74.7	-74.4	12.0
1965-69	1.4	-0.3	-0.8	-74.4	-74.0	-78.6	14.8
1970-74	-7.7	-3.7	0.3	-106.3	-117.4	-113.9	11.1
1975-79	-0.9	-1.4	-0.7	-131.4	-134.4	-142.9	26.5
1980-84	-76.4	-6.2	14.0	-44.6	-113.1	-140.3	26.6
1985-89	-50.0	6.2	15.4	-12.8	-41.1	-97.1	48.4
1990-94	-14.9	1.1	4.4	0.3	-9.1	-49.5	33.7
1995-99	21.7	8.1	-0.1	9.8	39.5	-13.4	41.1
2000-04	32.0	14.3	-1.5	15.8	60.6	-2.0	42.0

[a] Assumes the rate of assistance in non-studied economies is the same as the average for the studied Asian economies, and that their share of the value of Asian agricultural production at undistorted prices is the same as their average share of the region's agricultural GDP at distorted prices was 6 percent. (It was actually 4 percent in 2004, but would have been somewhat larger in earlier decades.)

[b] Pakistan data for 1960-64 is 1961-64; Vietnam data for 1985-89 is 1986-1989; Taiwan data for 2000-04 is 2000-03.

[c] The GSE guesstimate includes non-focus economies, plus the backcasting for China and India, such that it equals the sum of columns 1–4.

[d] The last three columns include GSE estimates for China pre-1981 and India pre-1965, which are based on the assumption that the nominal rates of assistance to agriculture in those years was the same as the average NRA estimates for those economies for 1981-84 and 1965-69, respectively, and that the gross value of production in those missing years is that which gives the same average share of value of production in total world production in 1981-84 and 1965-69, respectively. This assumption is conservative in the sense that for both countries the average NRA was probably even lower in earlier years, according to the authors of those country case studies.

[e] Gross subsidy equivalents including assistance to nontradables and non-product-specific assistance.

[f] Gross subsidy equivalents including product-specific input subsidies.

Source: Anderson and Valenzuela (2008), drawn from NRA estimates reported in Chapters 2-12 of this book.

Table 1.16: NRA and gross subsidy equivalents of assistance to farmers in the Asian region, by product, 1955 to 2004

(a) NRA (percent, at primary product level)

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Barley	41	84	72	120	101	166	357	524	543	563
Beef	38	25	34	44	95	101	94	145	106	85
Cassava	na	na	na	-23	-1	-9	-17	-11	-14	-10
Chickpea	na	50	24	1	0	8	12	9	15	19
Cocoa	na	na	-2	-3	-2	-2	-1	-2	-2	0
Coconut	-29	-29	-24	-8	-3	-11	-19	-34	-22	-8
Coffee	na	na	na	-7	-4	-9	-5	-5	-1	-2
Cotton	na	-19	12	63	7	-12	-2	-3	0	5
Egg	-25	-21	19	0	-6	10	22	27	23	51
Fruits & vegetables[a]	na	0	0	0	0	-8	-3	-11	-6	-4
Jute	na	na	na	-30	-37	-29	-35	-38	-6	-39
Maize	na	-10	50	19	8	-20	-6	-15	8	13
Milk	na	na	71	122	139	108	124	40	23	32
Oilseeds[b]	na	24	31	11	-5	22	35	21	22	22
Palmoil	na	-11	-11	-15	-14	-1	-2	2	-9	-3
Pigmeat	-10	16	59	51	47	-41	-39	-3	7	4
Poultry	-25	0	69	18	58	48	-2	20	17	12
Rice	-10	-6	-25	-17	-13	-27	-6	-9	2	18
Rubber	-16	-16	-14	-8	-19	-19	-14	-16	5	4
Sorghum	na	82	42	55	12	7	36	7	21	16
Sugar	na	96	163	13	2	37	39	13	20	43
Tea	-22	-39	-39	-28	-22	-18	-19	-10	-8	-7
Wheat	-33	-12	24	15	-3	-3	12	4	18	11
Asian focus economies[c]:	**-11.1**	**-2.7**	**2.6**	**0.3**	**-0.4**	**-21.6**	**-15.2**	**-4.8**	**6.0**	**10.2**

Table 1.16 (continued): NRA and gross subsidy equivalents of assistance to farmers in the Asian region, by product, 1955 to 2004

(b) GSE by product (at undistorted farmgate prices, constant $US millions)

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Barley	96	307	439	588	546	436	444	331	198	140
Beef	21	49	107	162	670	893	822	1410	1236	831
Cassava	na	na	na	-86	-7	-87	-136	-84	-80	-41
Chickpea	na	1201	499	40	0	193	268	149	224	255
Cocoa	na	na	0	0	-1	-1	-4	-2	-1	0
Coconut	-135	-104	-110	-543	-256	-841	-841	-1103	-1017	-273
Coffee	na	na	na	-18	-42	-56	-34	-28	-14	-11
Cotton	na	-72	338	1820	302	-1008	-147	-227	-20	197
Egg	-28	-29	33	-13	-41	70	150	213	199	282
Fruits & vegetables[a]	na	0	0	-5	19	-23014	-45349	-14769	-1304	-1239
Jute	na	na	na	-338	-275	-147	-193	-118	-12	-66
Maize	na	-36	991	620	230	-4041	-977	-2530	1336	1926
Milk	na	na	605	756	9163	9044	10865	5162	4405	6459
Oilseeds[b]	na	1212	1150	455	-260	1582	2609	2015	2176	1743
Palmoil	na	-13	-20	-210	-380	-70	-101	63	-680	-210
Pigmeat	-62	136	668	897	1464	-35274	-16203	-1232	3443	2019
Poultry	-26	10	217	78	831	1603	-354	1700	2806	2023
Rice	-353	-299	-8741	-13809	-10843	-32220	-5945	-7328	2150	11789
Rubber	-51	-438	-322	-356	-1389	-1230	-734	-813	-121	48
Sorghum	na	2036	1017	1240	359	186	568	30	231	125
Sugar	na	476	2875	-36	-395	3665	3186	1605	1969	3738
Tea	-160	-210	-158	-125	-140	-112	-100	-53	-42	-40
Wheat	-19	243	1732	928	-443	-513	2457	719	4593	2322
Asian focus economies[d]:	-704	771	1377	-7690	-902	-76336	-50000	-14889	21676	32010

[a] Fruit and vegetables includes fruit and vegetables aggregates for India and China, and banana, cabbage, chillies, garlic, onions, peppers and potatoes for other economies.
[b] Oilseeds includes groundnut, rapeseed, soybean and sunflower.
[c] For covered products only. Weights are production valued at undistorted prices.
[d] For covered products only, hence less than the totals in Table 1.15(a).

Source: Anderson and Valenzuela (2008), compiled from data reported in Chapters 2-12 of this book

Table 1.17: Relative rates of assistance (RRA) to agriculture,[a] Asian focus economies, 1955 to 2004

(percent)

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Korea										
NRA Ag.	-3.3	4.9	16.3	46.1	71.8	118.6	159.8	197.6	164.8	171.9
NRA Non-Ag.	45.6	37.1	22.3	11.4	11.7	6.8	5.7	3.3	2.3	1.7
RRA	-32.6	-21.4	-4.8	30.5	53.9	104.8	145.9	188.2	158.8	167.3
Taiwan [b]										
NRA Ag.	-15.8	4.7	3.9	12.0	8.9	18.7	33.8	46.3	54.9	70.9
NRA Non-Ag.	8.8	9.3	8.8	7.5	7.0	5.2	4.5	2.6	1.8	1.0
RRA	-22.5	-4.2	-4.5	4.2	1.7	12.9	28.0	42.5	52.2	69.0
China [b]										
NRA Ag.	-45.2	-45.2	-45.2	-45.2	-45.2	-45.2	-35.5	-14.3	6.6	5.9
NRA Non-Ag.	41.6	41.6	41.6	41.6	41.6	41.6	28.3	24.9	9.9	5.0
RRA	-60.5	-60.5	-60.5	-60.5	-60.5	-60.5	-49.9	-31.1	-3.0	0.9
Northeast Asia										
NRA Ag.	-43.1	-42.5	-42.2	-41.3	-40.0	-18.4	-26.2	-1.7	14.7	12.0
NRA Non-Ag.	40.9	40.8	40.0	39.7	39.4	71.1	18.8	15.0	6.8	3.3
RRA	-58.2	-57.7	-56.6	-55.7	-53.7	-51.9	-38.0	-14.2	7.4	8.5
Indonesia										
NRA Ag.	na	na	na	-3.8	10.4	10.5	-1.9	-7.5	-9.7	13.9
NRA Non-Ag.	na	na	na	27.7	27.7	27.7	26.5	17.6	10.6	8.1
RRA	na	na	na	-24.7	-13.6	-13.5	-22.5	-21.3	-18.3	5.4
Malaysia										
NRA Ag.	na	-7.6	-7.9	-9.4	-13.7	-4.9	1.4	2.6	-0.2	1.5
NRA Non-Ag.	na	7.4	7.0	7.1	6.5	5.2	3.9	2.8	2.0	0.9
RRA	na	-14.0	-13.9	-15.5	-18.9	-9.6	-2.4	-0.3	-2.2	0.6
Philippines										
NRA Ag.	na	-1.7	14.3	-6.0	-7.2	-4.0	15.8	16.7	35.7	23.5
NRA Non-Ag.	na	19.0	20.3	16.3	16.3	12.9	11.0	9.9	8.6	6.4
RRA	na	-17.4	-5.0	-19.8	-20.3	-14.9	4.3	6.1	24.9	15.9
Thailand										
NRA Ag.	na	na	na	-23.1	-15.9	-2.3	-6.9	-6.4	1.8	-0.2
NRA Non-Ag.	na	na	na	16.1	16.0	14.2	11.1	10.0	8.9	7.8
RRA	na	na	na	-33.7	-27.5	-14.4	-16.3	-14.9	-6.5	-7.4
Vietnam [b]										
NRA Ag.	na	na	na	na	na	na	-15.9	-26.4	0.0	20.7
NRA Non-Ag.	na	na	na	na	na	na	4.3	-11.2	1.5	20.8
RRA	na	na	na	na	na	na	-19.2	-17.4	-1.3	0.0
Southeast Asia										
NRA Ag.	na	-5.8	5.6	-10.2	0.1	4.9	-0.9	-4.7	0.0	12.1
NRA Non-Ag.	na	11.5	15.4	20.2	22.0	21.1	18.0	11.5	8.2	8.1
RRA	na	-15.5	-8.5	-25.3	-18.0	-13.4	-16.1	-14.5	-7.7	3.7
Bangladesh										
NRA Ag.	na	na	na	na	3.1	-3.9	17.5	-2.4	-8.0	4.0
NRA Non-Ag.	na	na	na	na	28.4	22.4	28.5	33.3	29.0	23.4
RRA	na	na	na	na	-19.7	-21.5	-8.6	-26.7	-28.6	-15.8
India [b]										
NRA Ag.	5.2	5.2	5.2	12.6	-7.4	4.1	67.5	2.0	-2.3	15.4
NRA Non-Ag.	113.0	113.0	113.0	83.1	64.8	59.3	48.6	15.9	12.6	5.2
RRA	-56.3	-56.3	-56.3	-38.3	-43.8	-33.5	11.7	-12.1	-12.9	12.5
Pakistan [b]										
NRA Ag.	na	-1.0	21.7	9.3	-11.8	-9.3	-5.9	-10.2	-2.6	1.5
NRA Non-Ag.	na	169.7	224.5	146.7	44.0	48.3	45.1	39.3	27.0	14.6
RRA	na	-63.8	-62.4	-55.9	-38.6	-38.6	-35.1	-35.2	-23.0	-11.5
Sri Lanka										
NRA Ag.	-2.7	-25.7	-27.6	-18.5	-29.0	-15.4	-11.2	-1.3	14.0	10.8
NRA Non-Ag.	104.9	124.6	138.4	70.7	52.9	57.1	59.0	47.1	36.4	22.9
RRA	-52.5	-66.6	-68.0	-51.6	-53.5	-46.2	-44.3	-32.9	-16.3	-9.8
South Asia										
NRA Ag.	4.7	3.9	4.4	9.7	-7.7	1.8	47.1	0.2	-2.4	12.7
NRA Non-Ag.	112.7	115.5	143.1	81.7	57.8	54.6	39.9	18.6	15.0	10.1
RRA	-56.2	-56.8	-57.0	-39.8	-41.6	-33.3	5.1	-15.5	-14.9	3.4

Table 1.17 (continued): Relative rates of assistance (RRA) to agriculture[a], Asian focus economies, 1955 to 2004

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Asian focus economies (unweighted average) [c]										
NRA Ag.	-12.1	-8.3	-2.5	-3.1	-3.6	5.9	18.0	15.5	19.6	25.2
NRA Non-Ag.	62.8	65.2	72.0	42.8	28.8	22.1	19.3	12.3	10.0	8.4
RRA	-44.7	-38.0	-34.4	-27.0	-22.2	-13.2	-1.2	2.9	8.7	15.5
Asian focus economies (weighted average) [d]										
NRA Ag.	-29.0	-27.7	-26.9	-24.3	-31.3	-18.8	-11.2	-2.6	7.5	11.7
NRA Non-Ag.	66.8	67.1	70.9	50.3	50.3	38.3	15.4	14.9	9.6	4.3
RRA	-57.5	-56.4	-55.3	-47.9	-44.7	-40.8	-22.8	-15.2	-1.9	7.1
Dispersion of national RRAs [e]	21.9	30.7	36.2	37.6	41.5	51.9	56.0	65.1	50.5	50.8

[a] The RRA is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

[b] Pakistan data for 1960-64 is 1961-64; Vietnam data for 1985-89 is 1986-1989; Taiwan data for 2000-04 is 2000-03. Estimates for China pre-1981 and India pre-1965 are based on the assumption that the nominal rates of assistance to agriculture in those years was the same as the average NRA estimates for those economies for 1981-84 and 1965-69, respectively, and that the gross value of production in those missing years is that which gives the same average share of value of production in total world production in 1981-84 and 1965-69, respectively. This NRA assumption is conservative in the sense that for both countries the average NRA was probably even lower in earlier years, according to the authors of those country case studies.

[c] Simple averages of the above (weighted) national averages.

[d] Weighted averages of the above national averages, using weights based on gross value of national agricultural production at undistorted prices.

[e] Dispersion is a simple 5-year average of the standard deviation around a weighted mean of the national agricultural sector NRAs for the region each year.

Source: Anderson and Valenzuela (2008), drawn from NRA and RRA estimates reported in Chapters 2-12 of this book.

Table 1.18: Relative per capita income,[a] agricultural comparative advantage index,[b] and nominal and relative rates of assistance to tradable agriculture, Asian focus economies, 2000‑04

	Relative per capita income	Agric comparative advantage[b]	NRA (percent)	RRA (percent)
Korea	212	26	137.3	167.3
Taiwan	232	28	61.3	69.0
China	21	58	5.9	0.9
Indonesia	17	173	12.0	5.4
Malaysia	74	107	1.2	0.6
Philippines	18	67	22.0	15.9
Thailand	38	204	-0.2	-7.4
Vietnam	8	301	21.2	0.0
Bangladesh	7	93	2.7	-15.8
India	9	143	15.8	12.5
Pakistan	10	137	1.2	-11.5
Sri Lanka	16	254	9.5	-9.8
Asian focus economies[c]	**20**	**80**	**12.0**	**7.1**

[a] Income per capita relative to the world average, 2000-04. (World=100)
[b] Agriculture and food's share of national exports as a percentage of agriculture and food's share of global exports, 2000-04
c. Unweighted average for relative per capita income and agricultural comparative advantage; weighted averages for NRA and RRA.

Sources: Columns 1 and 2: Sandri, Valenzuela and Anderson (2007); columns 3 and 4: Anderson and Valenzuela (2008), drawn from NRA and RRA estimates reported in Chapters 2-12 of this book.

Table 1.19: Relationships between nominal rates of assistance and some of its determinants, Asian region, 1960 to 2004

Explanatory variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Ln GDP per capita	-0.28* (-0.03)	-0.21* (-0.03)	-0.23* (-0.03)	-0.22* (-0.03)	-0.11 (-0.05)	-0.06 (-0.05)	-0.14 (-0.06)	-0.16* (-0.06)	-0.38* (-0.10)	-0.28* (-0.9)	-0.44* (-0.10)	-0.38* (-0.11)
Ln GDP per capita squared	0.23* (-0.02)	0.20* (-0.01)	0.21* (-0.01)	0.21* (-0.01)	0.19* (-0.02)	0.15* (-0.02)	0.21* (-0.03)	0.18* (-0.02)	0.23* (-0.03)	0.19* (-0.02)	0.22* (-0.03)	0.21* (-0.03)
Importable			0.33* (-0.04)	0.34* (-0.04)	0.32* (-0.04)		0.40* (-0.04)	0.41* (-0.04)	0.40* (-0.04)		0.39* (-0.04)	0.39* (-0.04)	0.39* (-0.04)
Exportable			-0.13 (-0.04)	-0.12 (-0.04)	-0.14 (-0.04)		-0.03 (-0.04)	-0.03 (-0.04)	-0.03 (-0.04)		-0.04 (-0.04)	-0.04 (-0.04)	-0.04 (-0.04)
Revealed Comparative Advantage[a]					0.03* (-0.01)				-0.07* (-0.02)				-0.04 (-0.03)
Trade Specialization Index[b]				0.11* (-0.03)				-0.13 (-0.09)				-0.03 (-0.10)	
Constant	0.14* (-0.01)	0.03 (-0.03)	0.00 (-0.03)	-0.02 (-0.04)	0.07* (-0.02)	-0.11 (-0.04)	-0.05 (-0.05)	0.07 (-0.07)	-0.49* (-0.12)	0.23* (-0.11)	-0.19 (-0.09)	-0.08 (-0.10)
R²	0.10	0.27	0.27	0.27	0.07	0.23	0.22	0.22	0.14	0.28	0.29	0.29
No. of obs.	2766	2766	2594	2594	2766	2766	2594	2594	2766	2766	2594	2594
Country FE	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes

[a] Revealed comparative advantage index is the share of agriculture and processed food in national exports as a ratio of that sector's share of global exports (world=1).

[b] Net exports as a ratio of the sum of exports and imports of agricultural and processed food products (world=1).

Notes: Dependent variable for regressions is NRA by commodity and year. Results are OLS estimates, with standard errors in parentheses and significance levels shown at the 99%(*). The main explanatory variable is ln GDP per capita in $10,000s.

Source: Authors' estimates

Table 1.20: Percentage consumer tax equivalent of policies assisting producers of covered farm products,[a] Asian focus economies, 1955 to 2003

(a) aggregate CTEs by country[b]

	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Korea	6.6	14.5	39.7	63.9	114.3	148.5	176.4	144.9	143.8
Taiwan	15.0	17.2	22.2	15.7	36.4	82.7	116.5	136.8	166.5
China	na	na	na	na	-38.7	-35.8	-14.2	0.4	0.2
Indonesia	na	na	-9.0	6.4	8.4	-4.3	-6.7	-11.2	18.3
Malaysia	11.1	1.4	3.6	18.1	18.1	28.8	15.7	2.8	6.1
Philippines	-5.5	12.0	-4.5	-7.4	-3.1	23.7	22.3	40.2	30.6
Thailand	na	na	-27.3	-19.6	-5.7	-6.1	-6.8	3.1	2.3
Vietnam	na	na	na	na	na	-11.5	-24.3	1.0	19.3
Bangladesh	na	na	na	3.1	-4.6	17.0	-2.9	-9.3	4.4
India	na	-19.1	-21.8	-10.8	-0.6	14.1	-8.7	-7.4	2.9
Pakistan	0.7	38.0	14.4	-11.2	-5.5	1.2	-13.2	-5.8	3.6
SriLanka	-9.7	-14.7	-2.6	-19.8	-11.5	-6.1	3.5	20.4	20.7
Asian focus economies:									
Unweighted average	7.2	7.1	1.8	3.8	10.5	21.6	21.5	26.3	31.7
Weighted average[c]	8.8	-11.3	-14.6	-1.8	-14.5	-12.7	-4.0	1.2	1.7
Dispersion of national CTEs[d]	11.5	28.0	27.3	25.7	46.8	60.8	66.6	61.3	66.9

Table 1.20 (continued): Percentage consumer tax equivalent of policies assisting producers of covered farm products,[a] Asian focus economies, 1955 to 2003

(percent, at primary product level)

(b) Regional CTEs by product

	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-03
Barley	65	97	57	120	326	411	341	335
Beef	32	41	99	110	95	156	106	109
Cassava	na	-22	1	-8	-13	-8	-12	-9
Chickpea	5	0	0	3	5	0	3	7
Cocoa	-3	-4	-1	-2	-2	-3	-3	0
Coconut	-24	-9	-3	-12	-22	-36	-25	-9
Coffee	na	-17	-11	-18	-13	-8	-3	-1
Cotton	-5	14	-4	-16	-11	-15	-6	-3
Egg	19	0	-6	10	22	27	23	38
Fruit & vegetables[e]	0	0	-26	-45	-18	0	0	0
Jute	na	-30	-37	-30	-36	-39	-7	-39
Maize	23	-1	6	-4	17	-7	8	14
Milk	71	122	139	108	123	39	23	34
Oilseeds[f]	25	15	26	30	29	25	27	27
Palmoil	-1	-9	-3	10	1	12	-15	-6
Pigmeat	58	49	47	-37	-38	-6	1	1
Poultry	69	18	58	49	-2	17	3	2
Rice	-41	-37	-17	-15	-4	-8	0	18
Rubber	-52	-6	-19	-23	-19	-11	2	2
Sorghum	9	30	7	0	23	-5	10	0
Sugar	121	0	-3	31	31	8	16	43
Tea	-58	-29	-19	-14	-17	-10	-15	-17
Wheat	8	-1	-7	7	22	15	8	1
Asian focus economies:								
Weighted average[c]	-11	-15	-2	-14	-13	-4	1	2
Dispersion of regional product CTEs[g]	59	50	47	56	92	103	82	82

[a] Assumes the CTE is the same as the NRA derived from trade measures (that is, not including any input taxes/subsidies or domestic producer price subsidies/taxes), except for rice, barley, wheat and sorghum in Korea and wheat in Taiwan.
[b] Pakistan data for 1960-64 is 1961-64; Vietnam data for 1985-89 is 1986-89; and Taiwan data for 2000-04 is 2000-03.
[c] Weights are consumption valued at undistorted prices, where consumption (from FAO) is production plus imports net of exports plus change in stocks of the covered products.
[d] Simple 5-year average of the annual standard deviation around a weighted mean of the national average CTE.
[e] Fruit and vegetables includes fruit and vegetables aggregates for India and China, and banana, cabbage, chillies, garlic, onions, peppers and potatoes for other economies.
[f] Oilseeds includes groundnut, rapeseed, soybean and sunflower.
[g] Simple 5-year average of the annual standard deviation around a weighted mean of the regional average CTE for the covered products shown above.

Source: Anderson and Valenzuela (2008), compiled from NRA$_{BS}$ estimates and production data reported in Chapters 2-12 of this book and self sufficiency ratios based on FAO data to get proxy consumption data.

Table 1.21: Value of consumer tax equivalent of policies assisting producers of covered farm products, Asian focus economies, 1955 to 2003
(constant 2000 US$ million at primary product level, using the US GDP deflator)

(a) aggregate CTEs[a]

	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-03
Korea	635	1607	6020	9497	13019	19275	16969	14617
Taiwan	675	466	636	1287	2586	3711	4284	3964
China	na	na	na	-62859	-33988	923	58257	44497
Indonesia	na	-1676	2147	3378	-500	-884	-2524	4849
Malaysia	5	2	163	196	208	169	43	67
Philippines	485	-890	-467	96	1808	2059	4178	2509
Thailand	na	-1552	-1253	-347	-229	-344	168	83
Vietnam	na	na	na	na	-36	-939	320	991
Bangladesh	na	-1546	771	-668	1193	-75	-621	300
India	-17659	-27664	-12120	-2586	11985	-6025	-5811	9079
Pakistan	1636	-317	-698	-433	27	-883	-543	189
Sri Lanka	-38	46	-107	-94	-26	124	206	99
Asian focus economies	**-9961**	**-24347**	**-3060**	**-46901**	**-40694**	**-8400**	**17749**	**32686**
All Asian economies[b]	**-10597**	**-25901**	**-3255**	**-49894**	**-43292**	**-8936**	**18882**	**34773**

(b) CTE per capita

	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-03
Korea	21.2	48.3	165.2	242.1	312.6	440.7	370.5	308.3
Taiwan	50.5	30.5	37.8	69.8	131.4	179.4	202.1	175.1
China	na	na	na	-60.9	-30.6	0.8	46.6	34.2
Indonesia	na	-13.3	15.3	21.6	-2.9	-4.7	-12.4	22.3
Malaysia	0.5	0.2	12.7	13.5	12.6	9.0	2.0	2.8
Philippines	14.5	-23.0	-10.5	1.9	31.7	32.2	58.6	31.9
Thailand	na	-40.5	-28.9	-7.2	-4.4	-6.2	2.8	1.3
Vietnam	na	na	na	na	-0.6	-13.6	4.3	12.3
Bangladesh	na	-22.2	9.8	-7.5	11.7	-0.7	-4.8	2.1
India	-34.1	-47.6	-18.7	-3.6	15.0	-6.8	-6.0	8.7
Pakistan	28.5	-4.9	-9.4	-5.0	0.3	-7.6	-4.1	1.3
Sri Lanka	-3.3	3.6	-7.7	-6.3	-1.6	7.2	11.4	5.3
Asian focus economies	**-5.9**	**-12.7**	**-1.4**	**-20.2**	**-16.0**	**-3.0**	**5.9**	**10.2**
All Asian economies[b]	**-6.3**	**-13.5**	**-1.5**	**-21.5**	**-17.0**	**-3.2**	**6.3**	**10.9**

Table 1.21 (continued): Percentage consumer tax equivalent of policies assisting producers of covered farm products,[a] Asian economies, 1955 to 2003

(constant 2000 US$ million at primary product level, using the US GDP deflator)

(c) Regional CTEs by product

	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-03
Barley	430	577	442	376	441	400	276	226
Beef	118	172	966	1291	1108	2934	2257	2264
Cassava	0	-8	0	-5	-7	-5	-6	-3
Chickpea	150	0	0	91	121	0	58	125
Cocoa	0	0	0	0	0	0	0	0
Coconut	-76	-564	-239	-877	-880	-1104	-1087	-367
Coffee	0	-23	-22	-23	-15	-10	-12	-3
Cotton	-211	563	-165	-1289	-643	-1045	-477	-178
Egg	34	-13	-41	70	150	215	200	234
Fruit & vegetables[c]	0	-7	-3	-23355	-46810	-14771	-1252	-916
Jute	0	0	-189	-92	-146	-86	-9	-46
Maize	578	-118	186	-757	1800	-855	1483	2037
Milk	608	759	9183	9099	10904	5150	4422	6676
Oilseeds[d]	211	-446	-674	1748	3003	2344	2945	2973
Palmoil	0	-8	-9	50	-17	98	-255	-70
Pigmeat	636	839	1418	-28008	-14856	-1449	3270	2222
Poultry	0	0	7	5	6	34	37	40
Rice	-16207	-25199	-13033	-14210	-3768	-6261	-939	11059
Rubber	-3	-3	-49	-72	-77	-87	-21	10
Sorghum	343	854	230	-8	379	-118	99	0
Sugar	2173	-835	-913	3294	2812	1029	1565	3953
Tea	-17	-24	-27	-16	-16	-10	-22	-22
Wheat	1076	-905	-957	2223	5147	3429	2397	151
Asian focus economies:	-9942	-24312	-3065	-48839	-41683	-8411	17735	32753

[a] Pakistan data for 1960-64 is 1961-64; Vietnam data for 1985-89 is 1986-1989; and Taiwan data for 2000-04 is 2000-03.

[b] Assumes the rate of assistance to covered products in non-studied economies is the same as the average for the studied Asian economies, and that their share of the value of Asian agricultural production at undistorted prices is the same as their average share of the region's agricultural GDP at distorted prices during 1990-2004, which was 6 percent. These dollar amounts do not include non-covered farm products, which amount to almost one-third of agricultural output (see last row of Table 1.10), nor any mark-up that might be applied along the value chain.

[c] Fruit and vegetables includes fruit and vegetables aggregates for India and China, and banana, cabbage, chillies, garlic, onions, peppers and potatoes for other economies.

[d] Oilseeds includes groundnut, rapeseed, soybean and sunflower.

Source: Anderson and Valenzuela (2008), compiled from NRA_{BS} estimates and production data reported in Chapters 2-12 of this book and self sufficiency ratios based on FAO data to get proxy consumption data.

Figure 1.1: Real GDP per capita in Asian and other developing focus economies relative to the United States, 1950 to 2006

(United States = 100)

(a) Asian focus economies
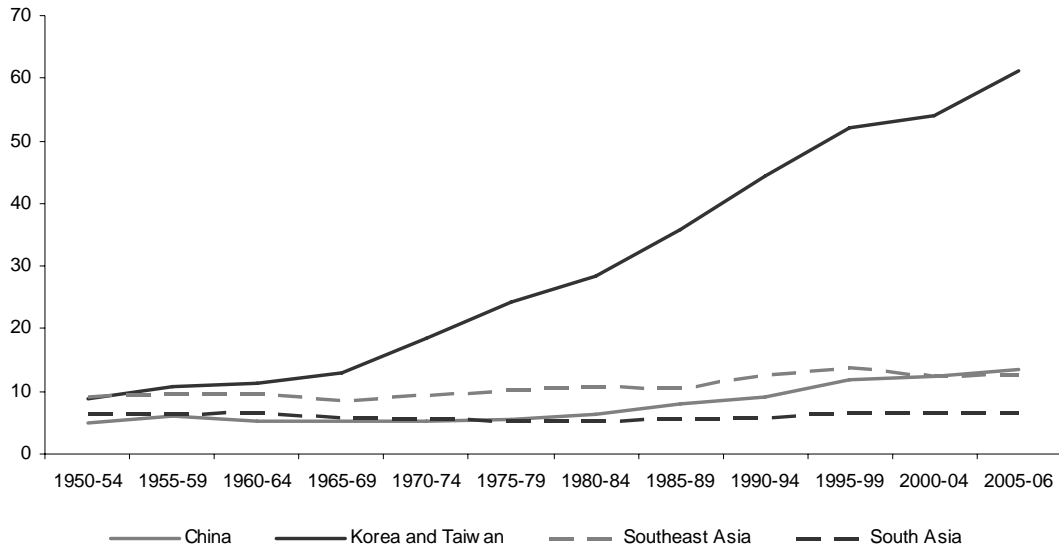
(b) Asia relative to other developing and transition economies
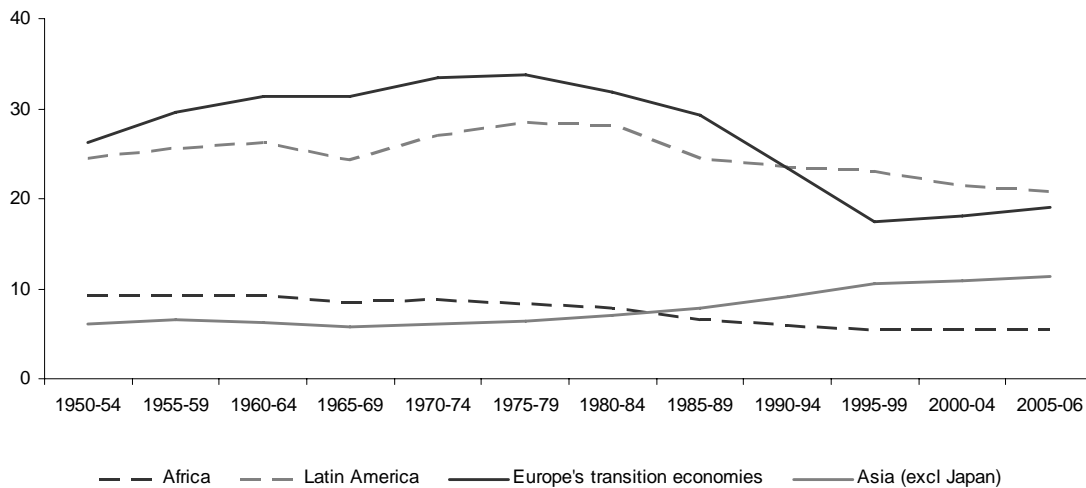
[a] Shown relative to the United States which is set as the numeraire at 100. Southeast Asia is Indonesia, Malaysia, Philippines, Thailand and Vietnam. South Asia is Bangladesh, India, Pakistan and Sri Lanka.
Source: Based on 1990 International Geary-Khamis dollars from Maddison (2003) to 2001, updated using real GDP per capita growth data from the World Bank's *World Development Indicators*.

Figure 1.2: Nominal rates of assistance to agriculture, individual Asian focus economies, 1980-84 and 2000-04[a]

(percent)
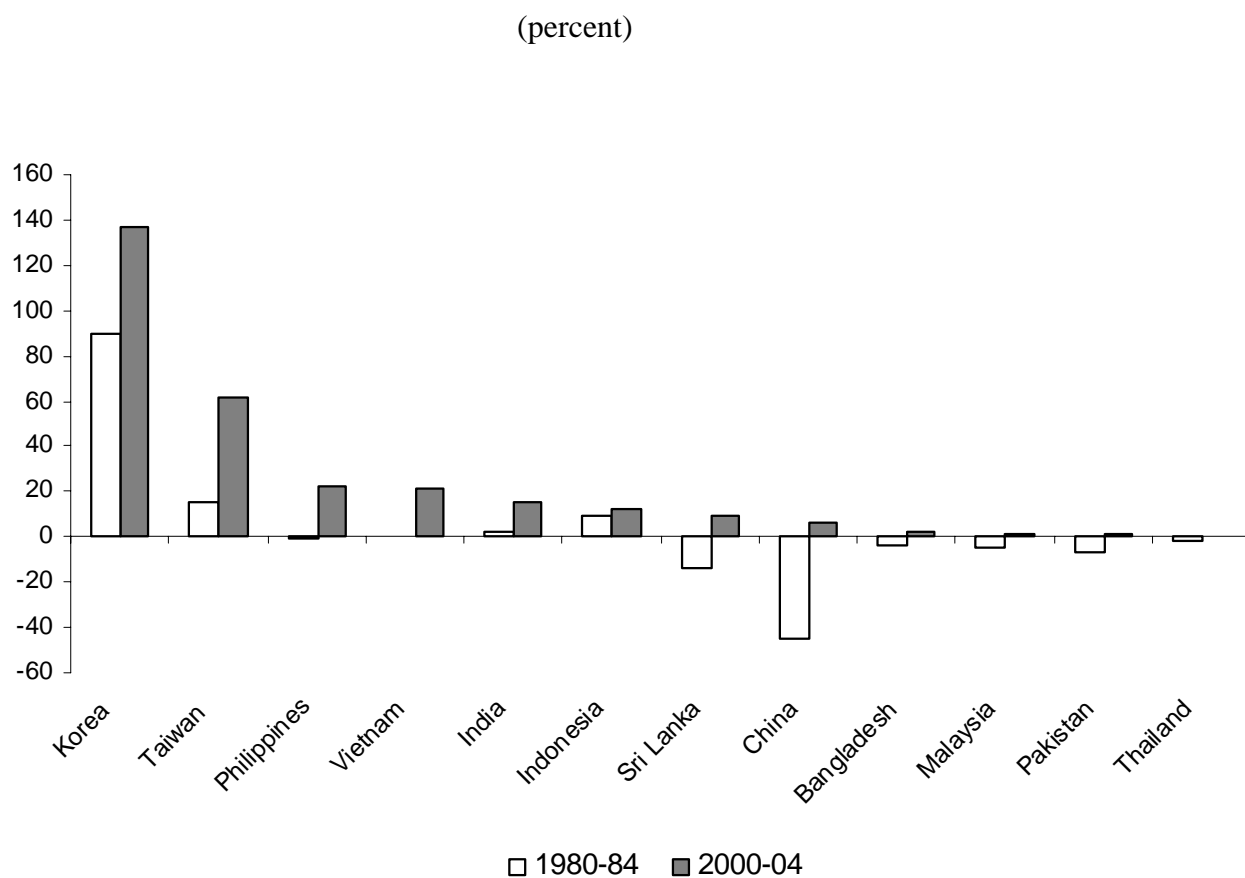
[a] There is no data for Vietnam in 1980-84. Estimates for China pre-1981 are based on the assumption that the nominal rate of assistance to agriculture in those years was the same as the average NRA estimates for the country for 1981-84, and that the gross value of production in those missing years is that which gives the same average share of value of production in total world production in 1981-84.

Source: Anderson and Valenzuela (2008), drawn from NRA estimates reported in Chapters 2-12 of this book.

Figure 1.3: Nominal rates of assistance, by product, Asian region, 1980-84 and 2000-04
(percent)

(a) unweighted average across 12 economies
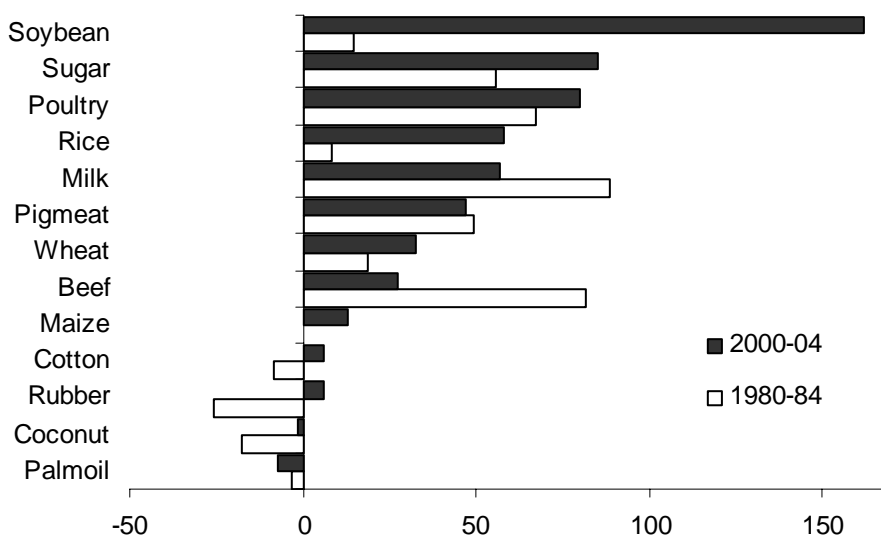
(b) weighted[a] average across 12 economies
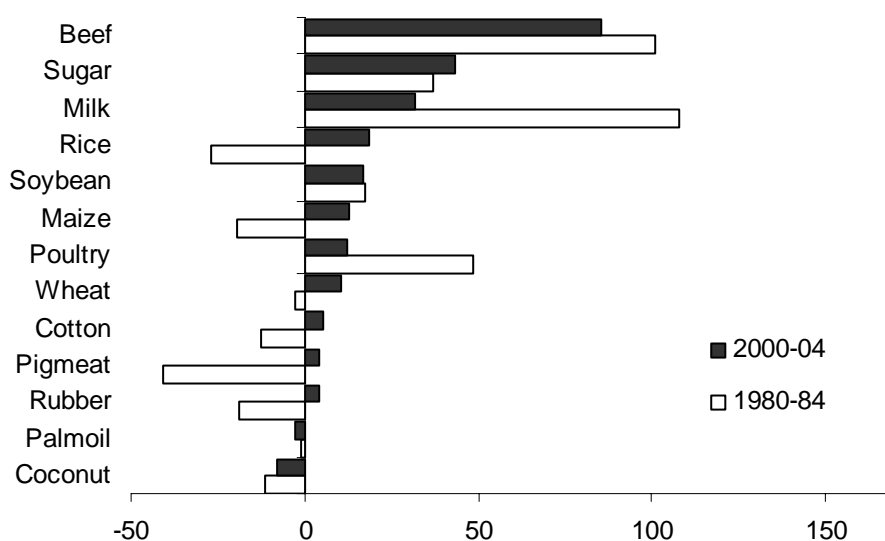
[a] Weights based on gross value of agricultural production at undistorted prices [each NRA (by country, by product) is weighted by the country's value of production of that commodity in a given year]. Products with less than 1 percent of the gross value of regional production are excluded. These include: cocoa, onion, chilies, barley, jute, sunflower, garlic, peppers, cabbage, cassava, potato, egg, tea, coffee, sorghum, rapeseed, chickpea, groundnut, and beef.
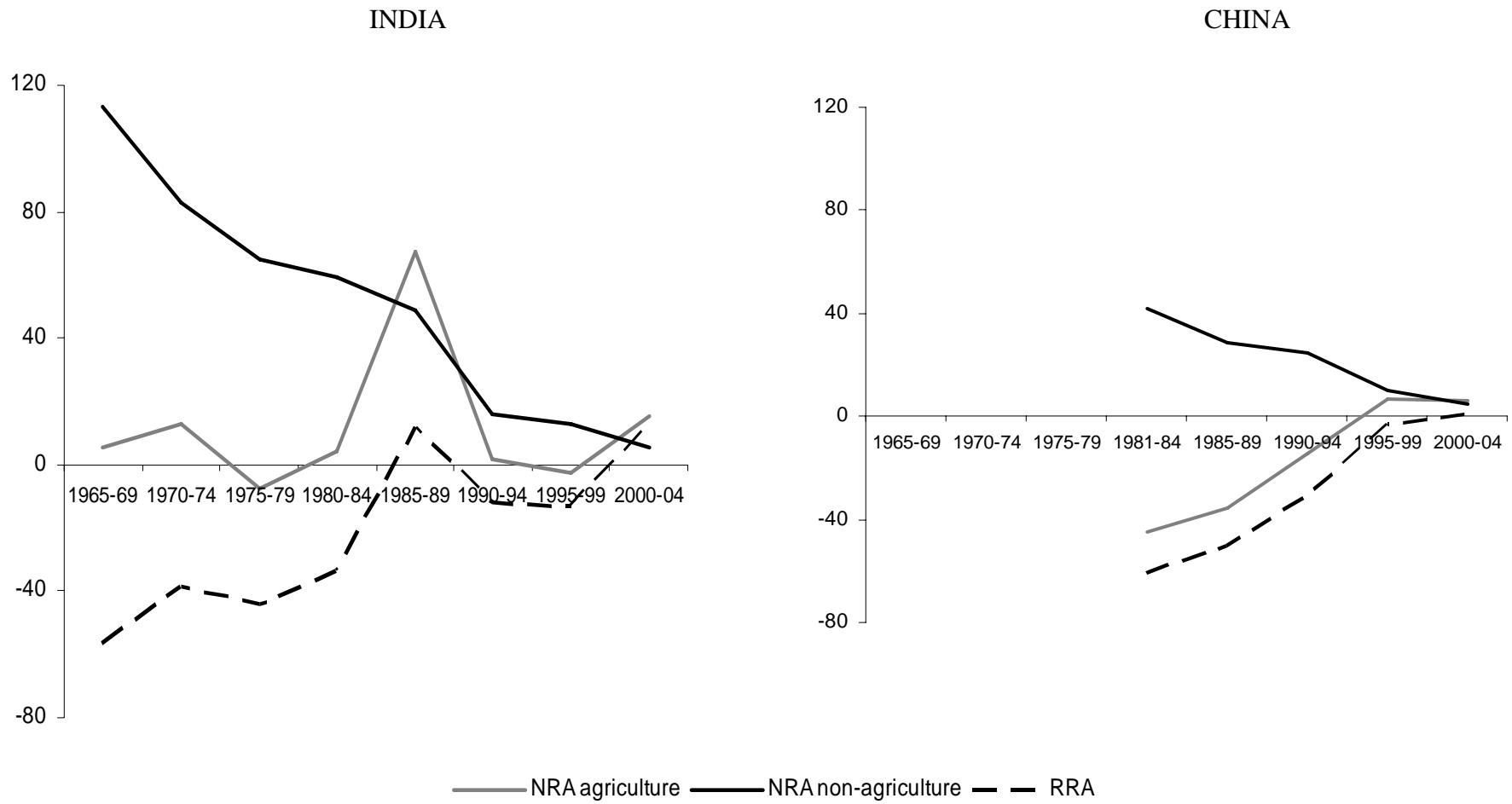
Source: Anderson and Valenzuela (2008), drawn from NRA estimates reported in Chapters 2-12 of this book.

Figure 1.4: Nominal rates of assistance for rice, milk and sugar, individual Asian focus economies, 1980-84 and 2000-04

(percent)

(a) Rice

☐ 1980-84 ■ 2000-04

(b) Milk

☐ 1980-84 ■ 2000-04

(c) Sugar

☐ 1980-84 ■ 2000-04
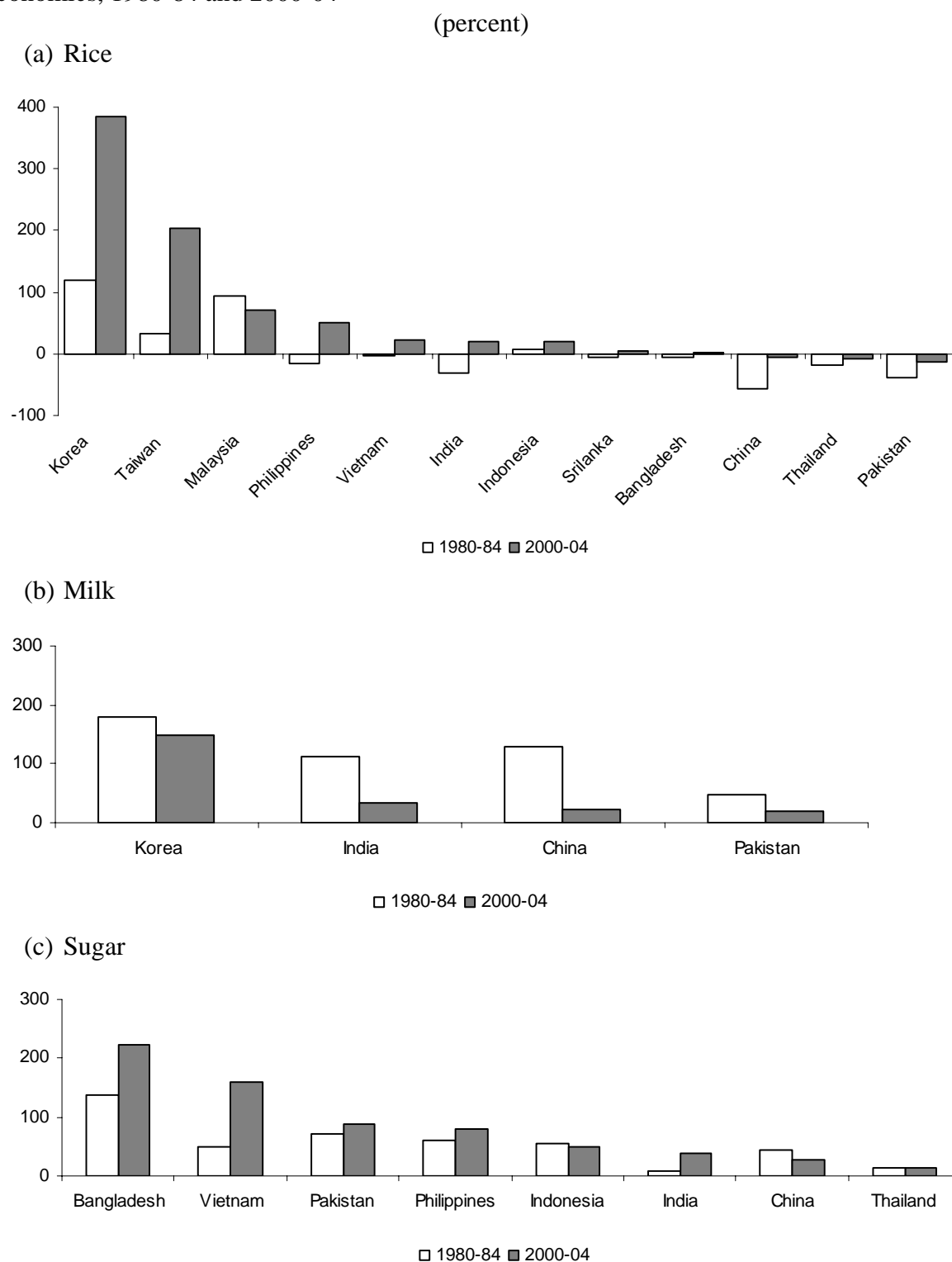
[a] Data for Vietnam in 1980–84 is that for the first 5-year period available, which is 1986–89 for rice and 1990–95 for sugar.

Source: Anderson and Valenzuela (2008), drawn from NRA estimates reported in Chapters 2-12 of this book.

Figure 1.5: Nominal rates of assistance to exportable, import-competing and all[a] agricultural products, Asian region, 1955 to 2004

(percent)
(a) unweighted averages across 12 economies
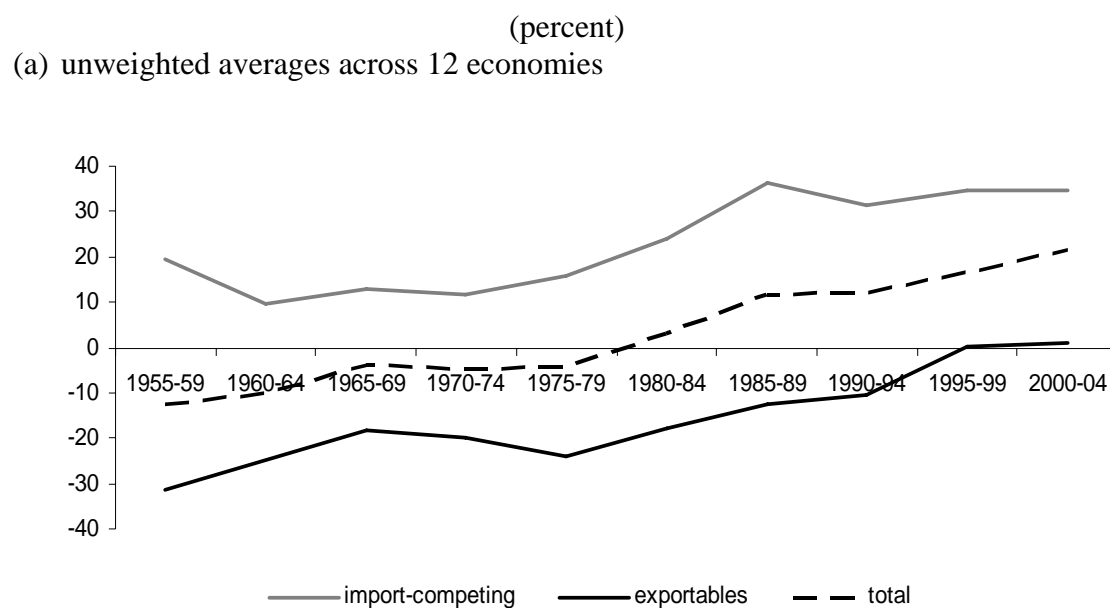
(b) weighted averages across 12 economies
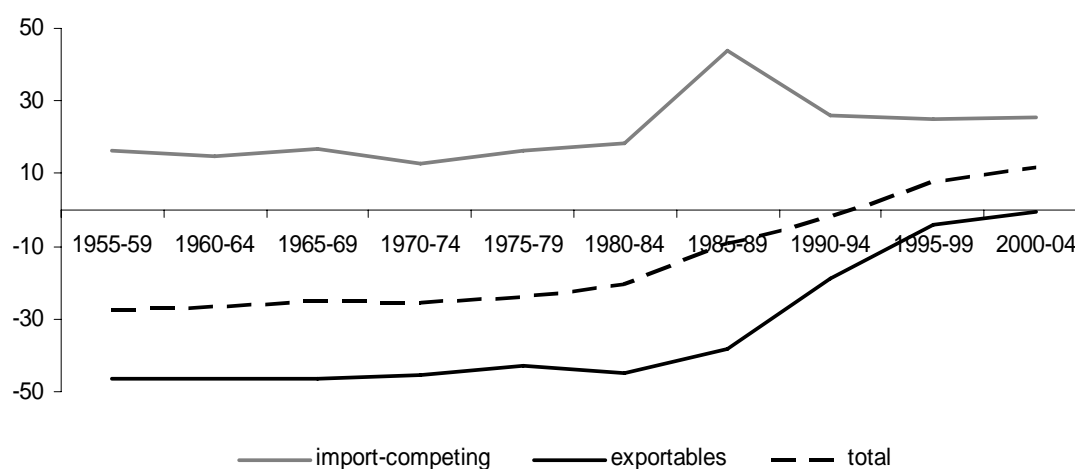
[a] The total NRA can be above or below the exportable and importable averages because assistance to nontradables and non-product specific assistance is also included.
[b] The exportables, import-competing and total estimates are based on China pre-1981 and India pre-1965 values estimated on the assumption that the nominal rate of assistance to agriculture in those years was the same as the average NRA estimates for those economies for 1981-84 and 1965-69, respectively, and that the gross value of production in those missing years is that which gives the same average share of value of production in total world production in 1981-84 and 1965-69, respectively.
Source: Anderson and Valenzuela (2008), drawn from NRA estimates reported in Chapters 2-12 of this book.

Figure 1.6: Nominal rates of assistance to agricultural and non-agricultural tradable products and relative rate of assistance,[a] Asia region, 1955 to 2004

(percent)

(a) unweighted averages across 12 economies
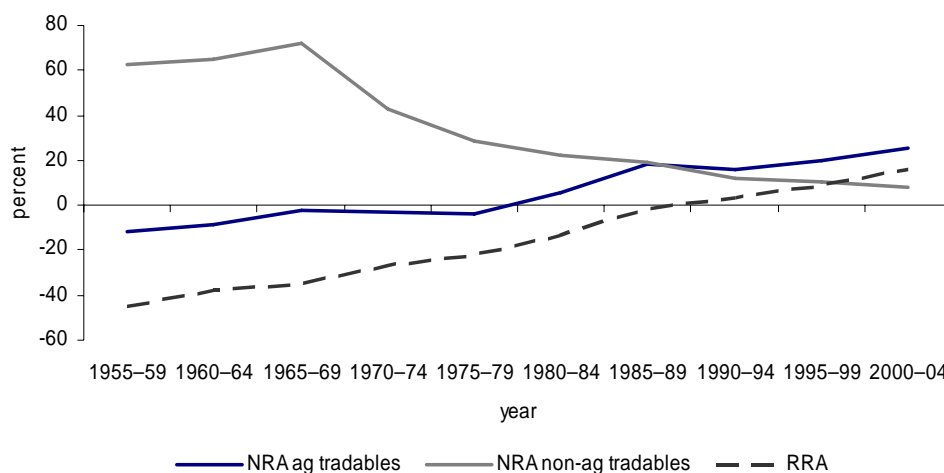
(b) weighted averages across 12 economies
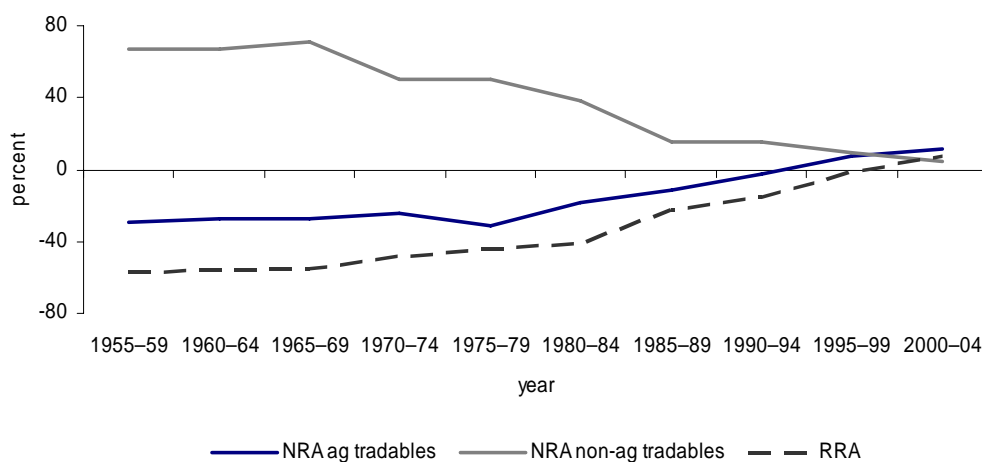
[a] The RRA is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

Source: Anderson and Valenzuela (2008), drawn from NRA estimates reported in Chapters 2-12 of this book.

Figure 1.7: Relative rates of assistance to agriculture,[a] Asian focus economies[b] and unweighted regional average, 1980-84 and 2000-04
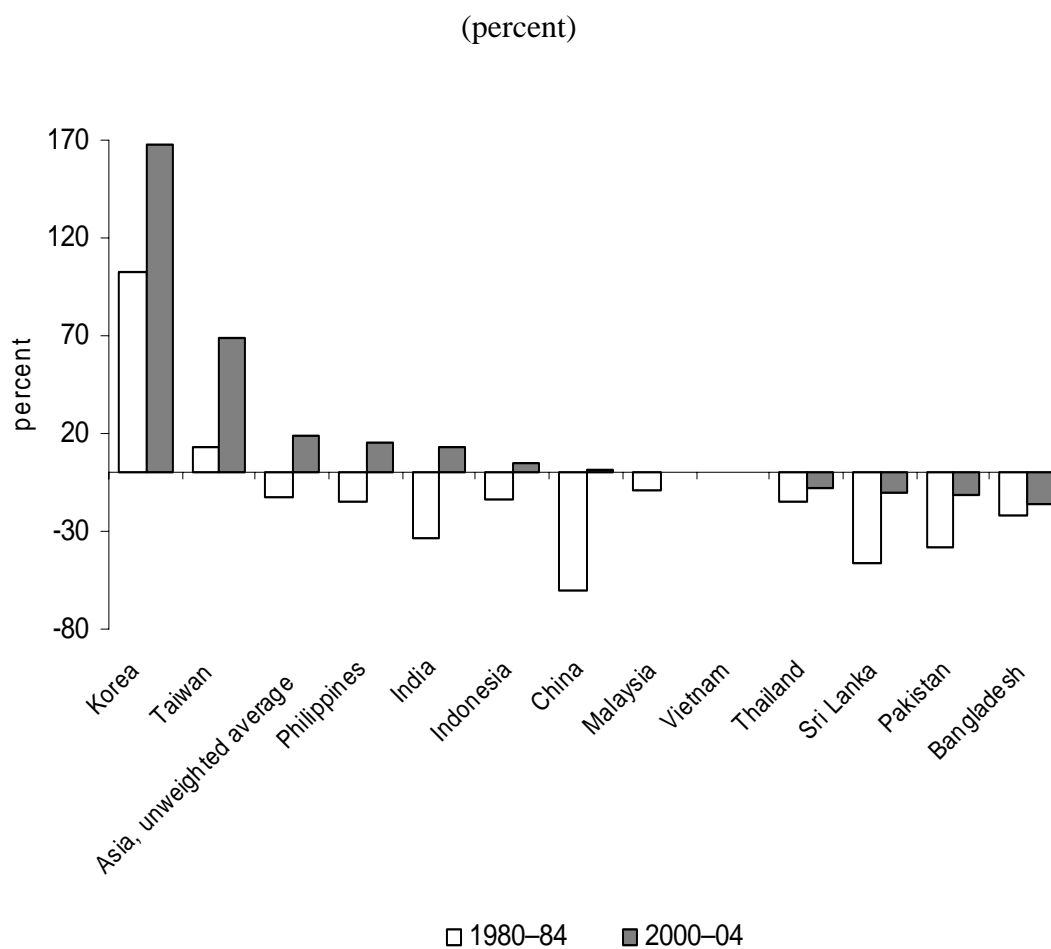
(percent)

☐ 1980–84   ■ 2000–04

[a] The RRA is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.
[b] No estimates for Vietnam in 1980-84

Source: Anderson and Valenzuela (2008), drawn from NRA estimates reported in Chapters 2-12 of this book.

Figure 1.8**:** NRAs and RRAs, China and India, 1964 to 2005

(percent)

INDIA

CHINA

——— NRA agriculture ——— NRA non-agriculture — ─ — RRA

Source: Based on estimates in Anderson and Valenzuela (2008)

Figure 1.9: Nominal and relative rates of assistance,[a] Asian, African and Latin American regions, 1965 to 2004[b]

(percent)

(a) NRA

(b) RRA
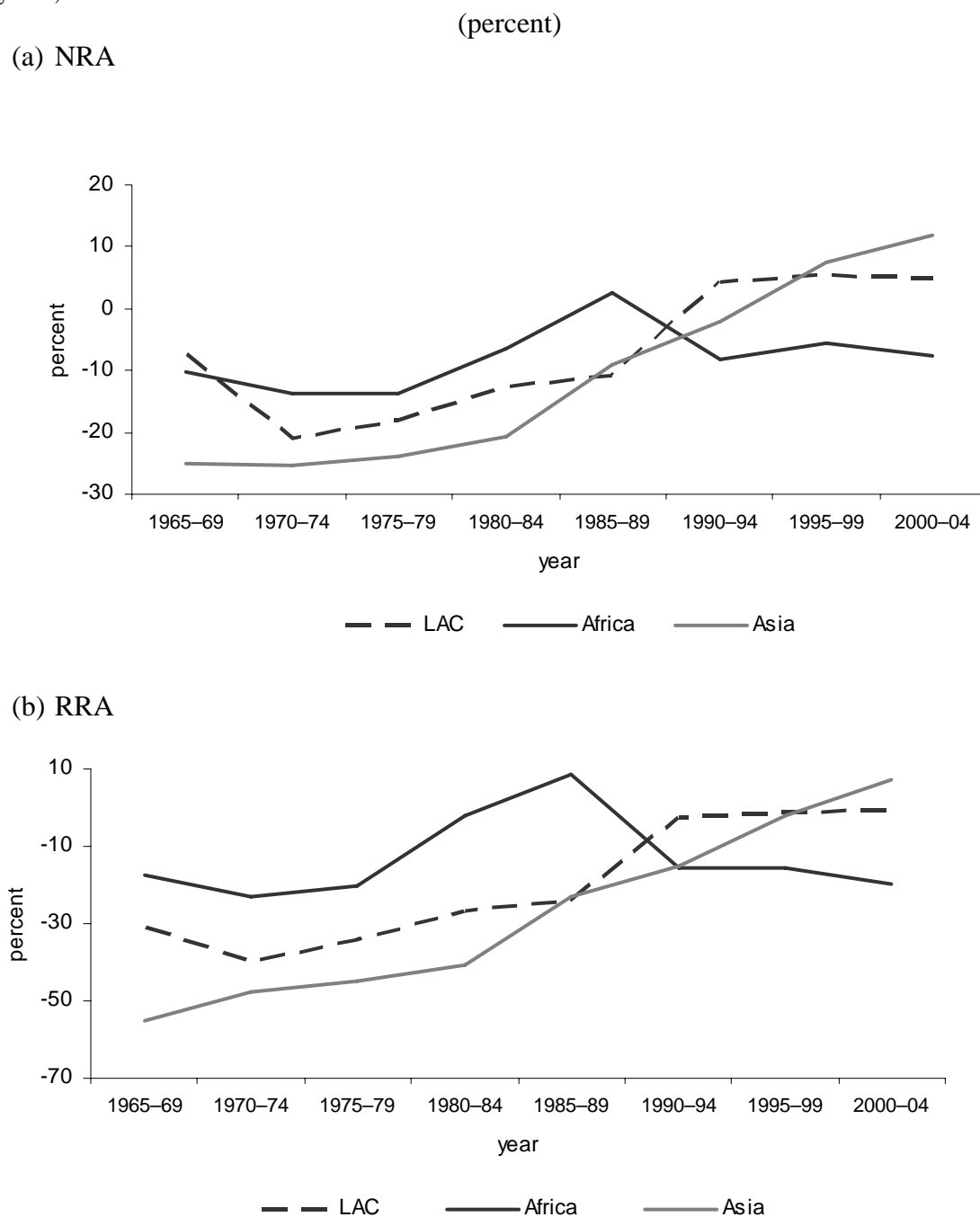
[a] 5-year weighted averages with value of production at undistorted prices as weights.
[b] Estimates for China pre-1981 and India pre-1965 are based on the assumption that the nominal rates of assistance to agriculture and national share or regional agricultural production in those years were the same as the average NRA estimates for those economies for 1981-84 and 1965-69, respectively.
Source: Anderson and Valenzuela (2008), drawn from NRA estimates reported in Chapters 2-12 of this book.

Figure 1.10: Income distribution, Asian regions and the world,[a] 2000

(a) East Asia region
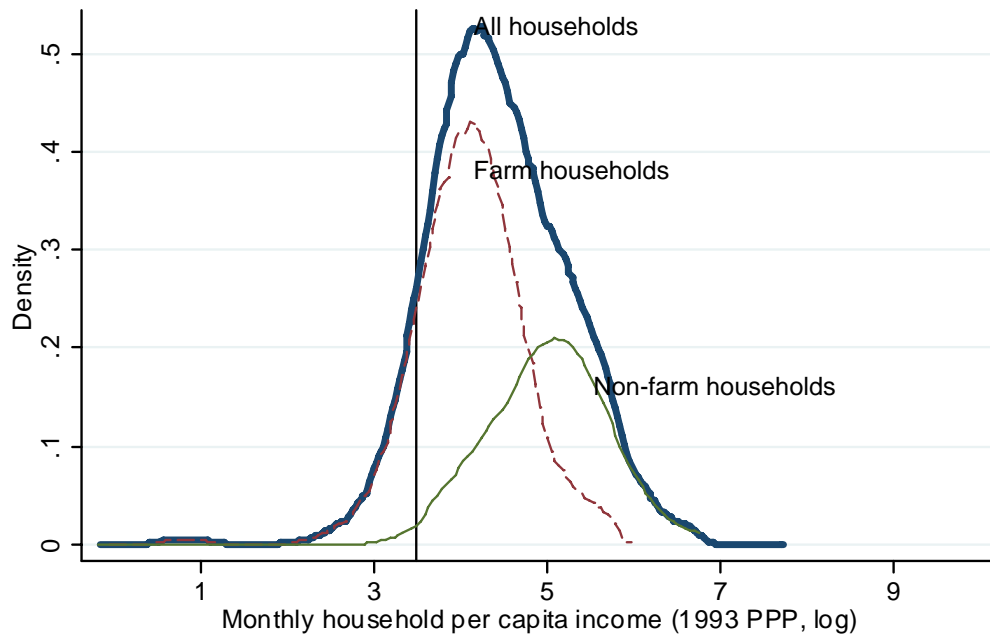
(b) South Asia region

(c) World

Monthly household per capita income (1993 PPP, log)
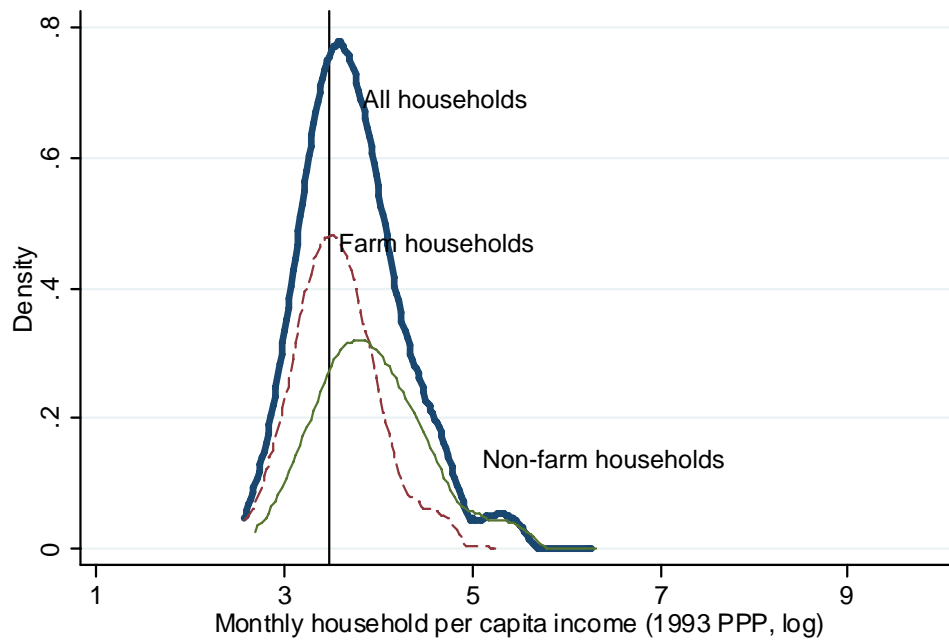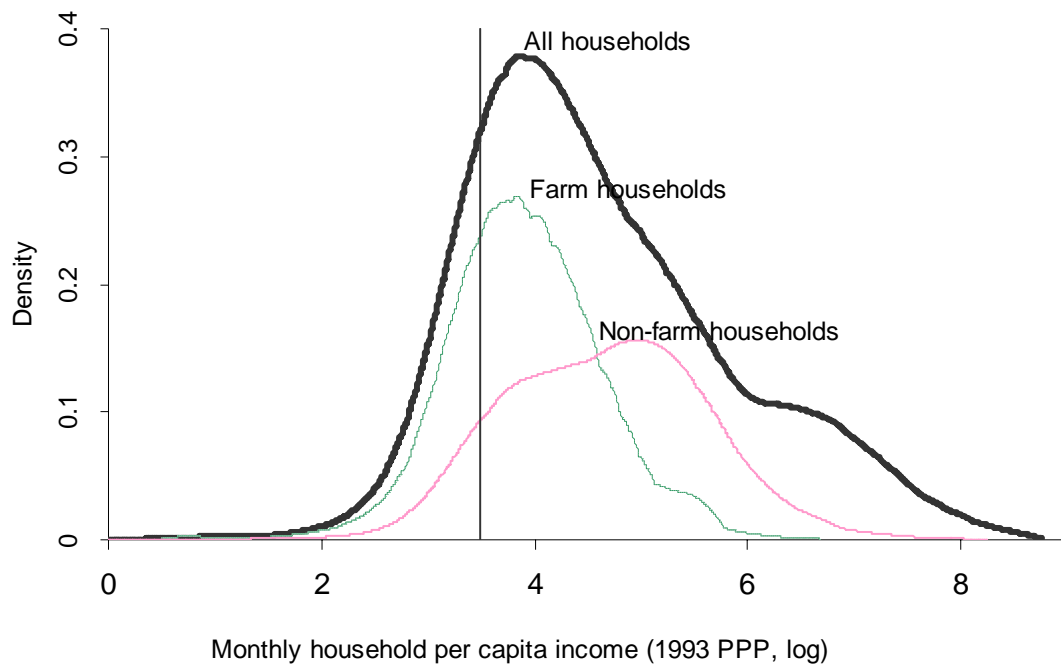
[a] The vertical line is the US$1/day poverty line in 1993 PPP terms

Source: Bussolo, De Hoyes and Medledev (2009).

Figure 1.11: Relationships between real GDP per capita, comparative advantage, and agricultural NRA and RRA,[a] Asian focus economies, 1955 to 2005

(a) Regression of ln real GDP per capita on NRA, with country fixed effects
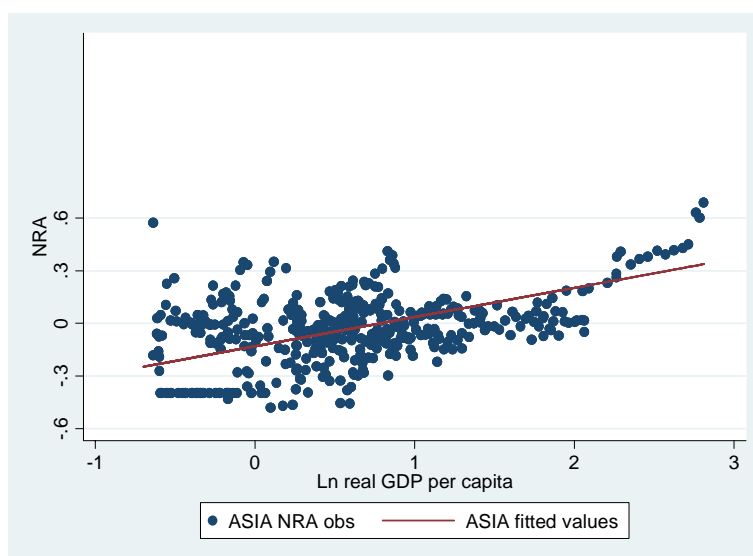
Coefficient	Standard error	R^2
0.17	0.01	0.19

(b) Regression of ln real GDP per capita on RRA, with country fixed effects

Coefficient	Standard error	R^2
0.27	0.01	0.46

Notes: Dependent variable for regressions is NRA or RRA by country and year, expressed as a fraction. Results are OLS estimates. The explanatory variable is the natural log of real GDP per capita expressed in $10,000.

Figure 1.11 (continued): Relationships between real GDP per capita, comparative advantage, and agricultural NRA and RRA,[a] Asian focus economies, 1960 to 2004

(c) Regression of revealed comparative advantage on NRA, with country fixed effects
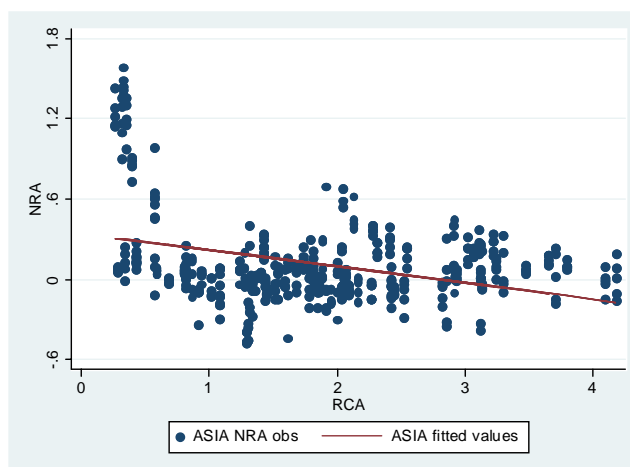
Coefficient	Standard error	R^2
-0.12	0.02	0.08

(d) Regression of revealed comparative advantage on RRA, with country fixed effects
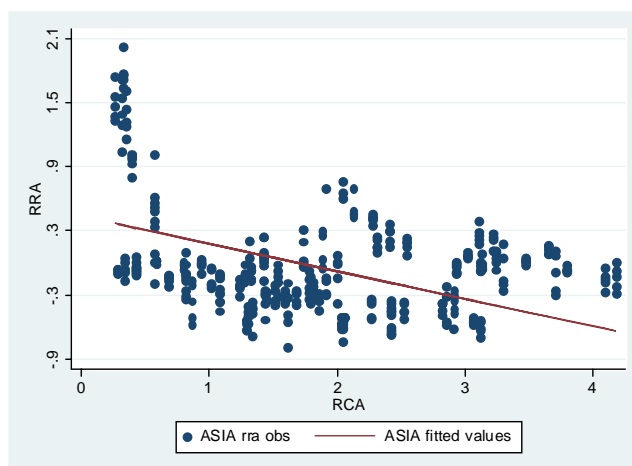
Coefficient	Standard error	R^2
-0.26	0.03	0.09

[a] Dependent variable for regressions is NRA or RRA by country and year, expressed as a fraction. Results are OLS estimates. The explanatory variable revealed comparative advantage, which is the share of agriculture and processed food in national exports as a ratio of that sector's share of global merchandise exports.
[b] Using 5-year average data for revealed comparative advantage.

Source: Based on economic data in Sandri, Valenzuela and Anderson (2007) and NRA estimates from Anderson and Valenzuela (2008) which are drawn from Chapters 2-12 of this book.

Figure 1.12: Rice NRA and international rice price, Asian region, 1970 to 2005
(left axis is int'l price in USD, right axis is NRA in percent)

(a) South Asian focus economies
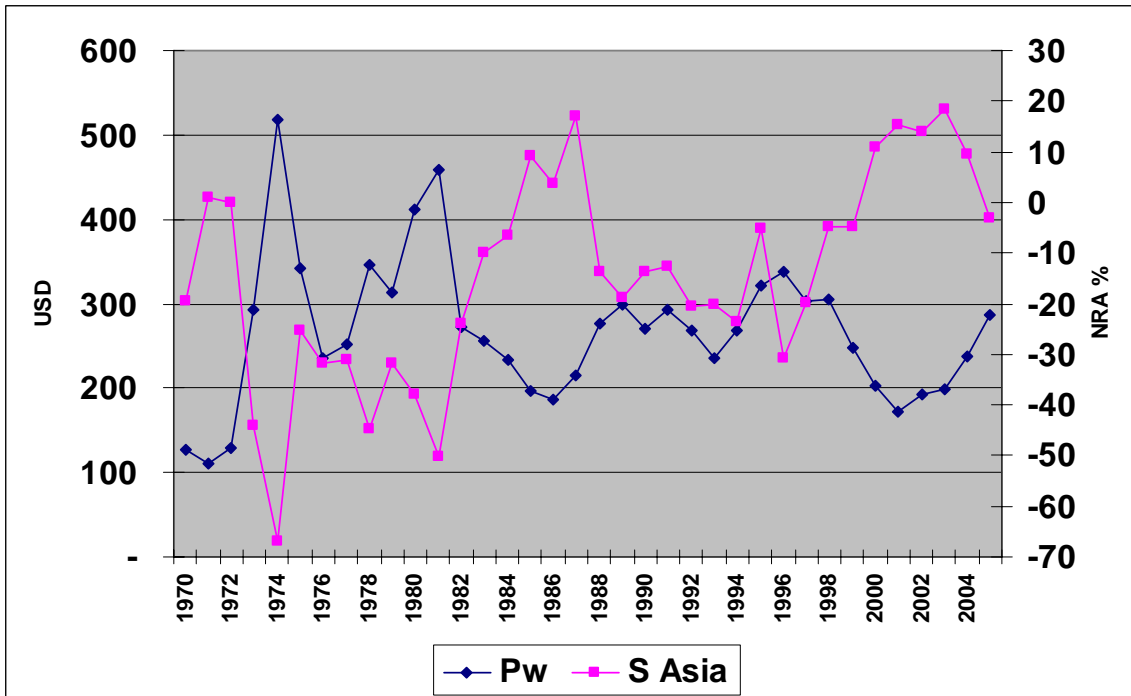
Correlation coefficient is -0.75
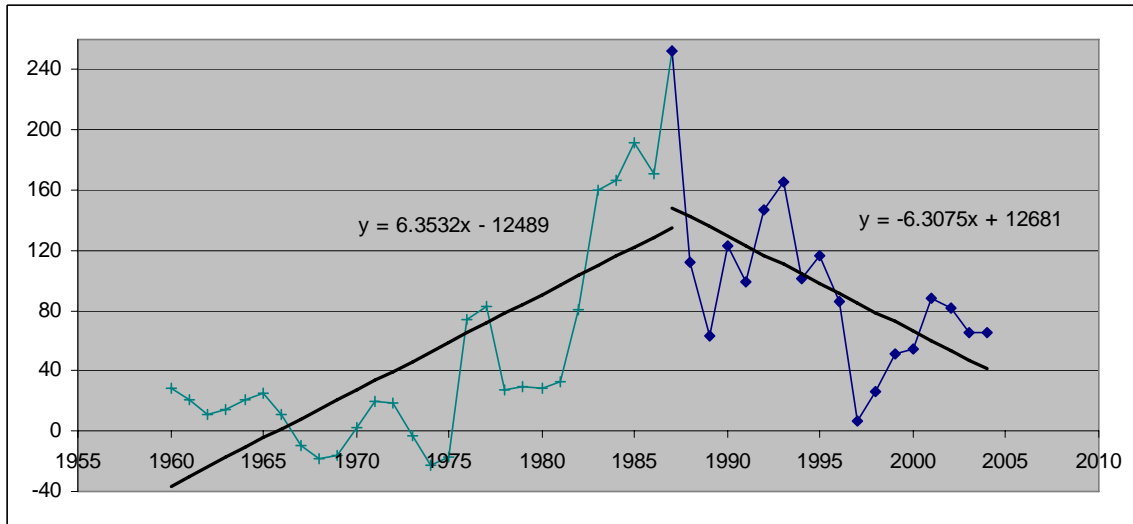
(c) Southeast Asian focus economies
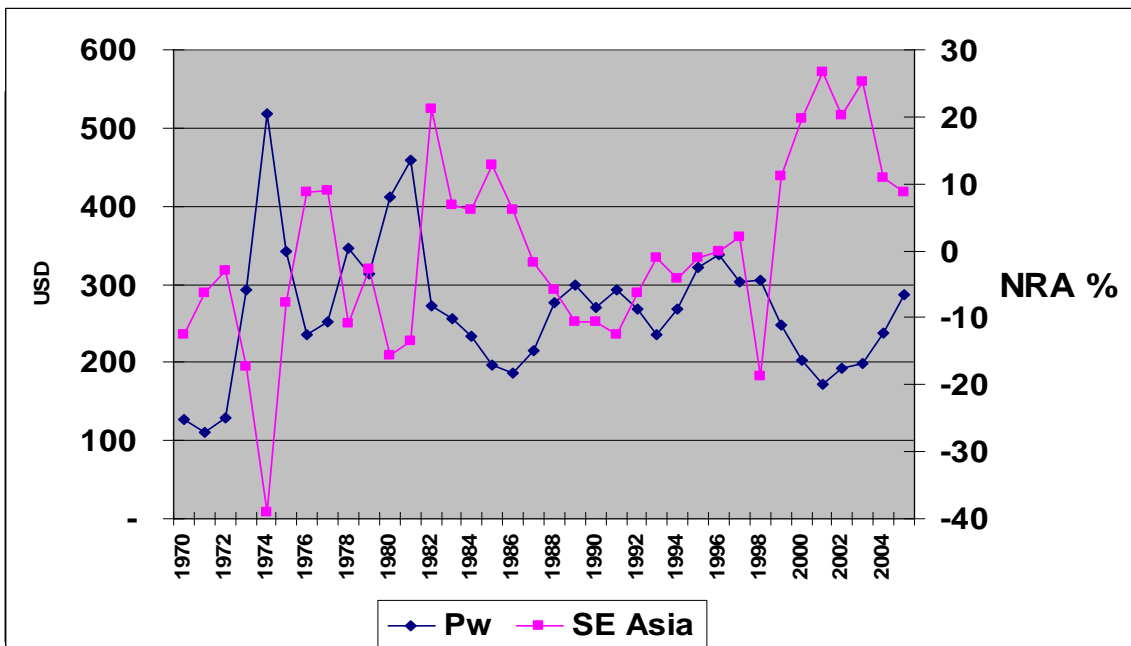
Correlation coefficient is -0.59
Source: Authors' compilation based on data in Anderson and Valenzuela (2008)

Figure 1.13: NRA for rice, Malaysia, 1960 to 2004
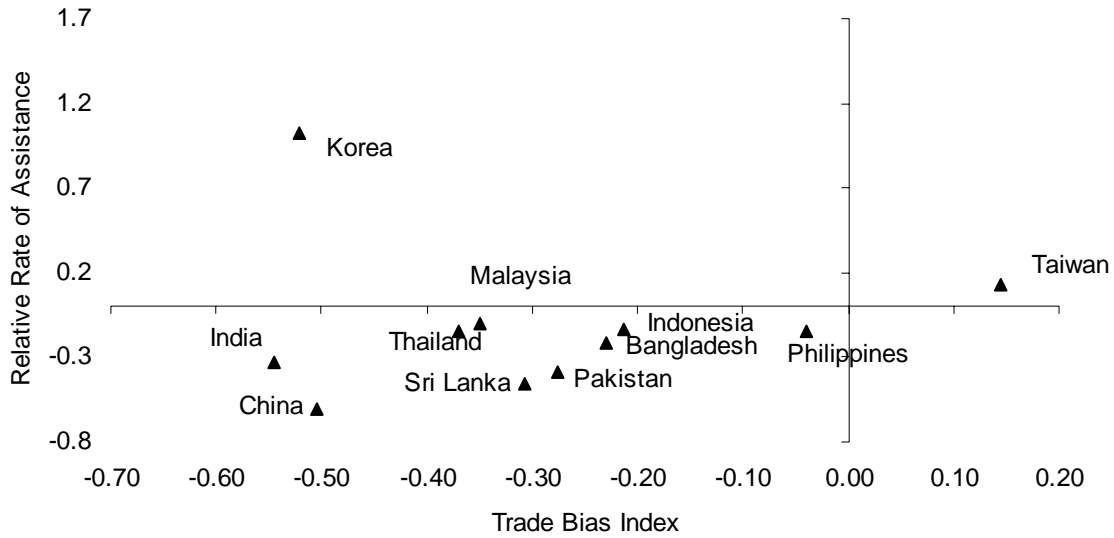
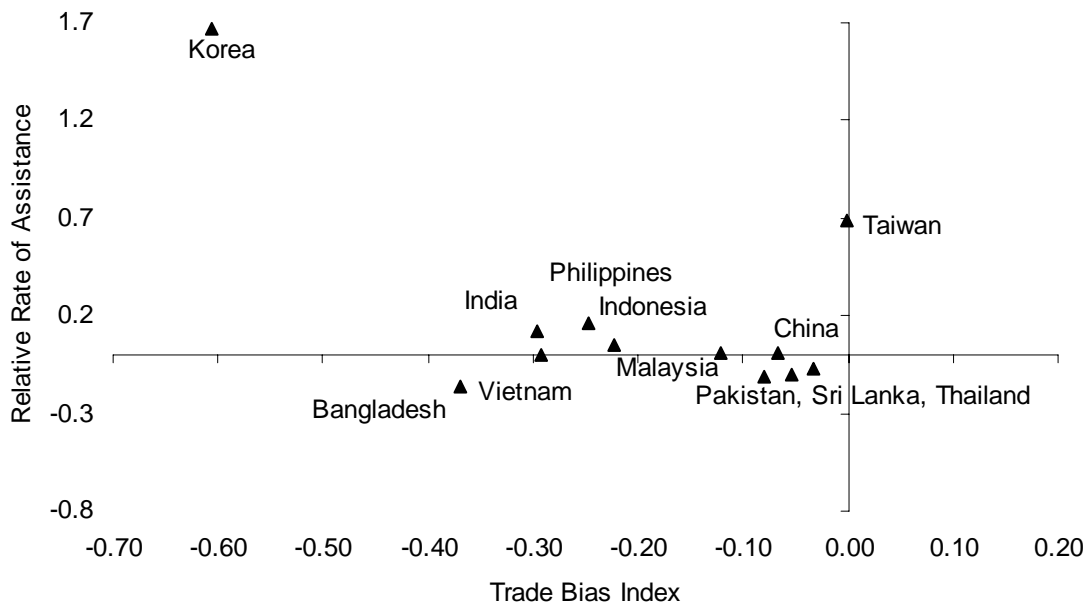(percent)

Source: Authors' compilation based on data in Anderson and Valenzuela (2008)

Figure 1.14: Relationship between RRA and the trade bias index for agriculture, Asian focus economies,[a] 1980–84 and 2000–04
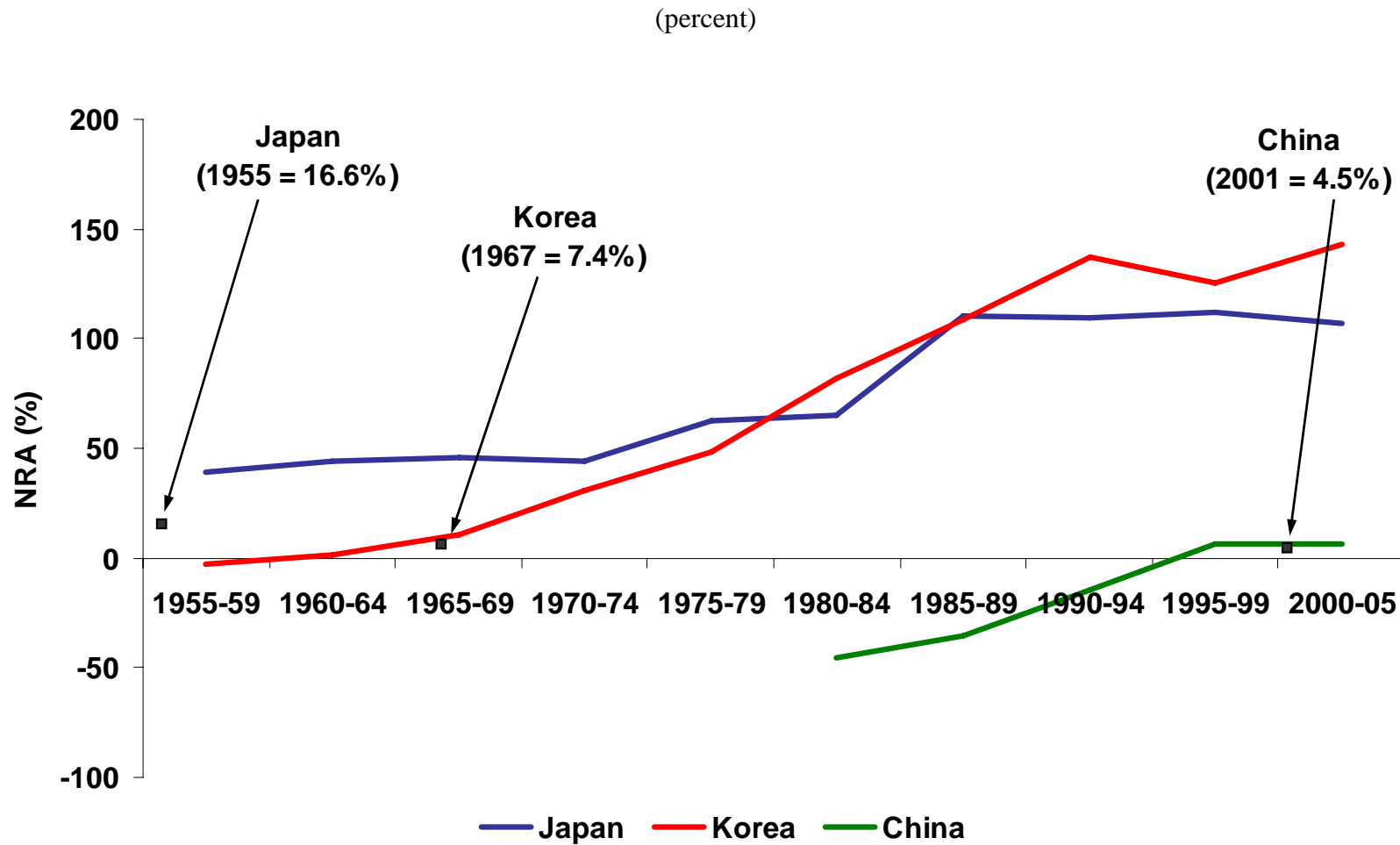
a. 1980–84

b. 2000–04

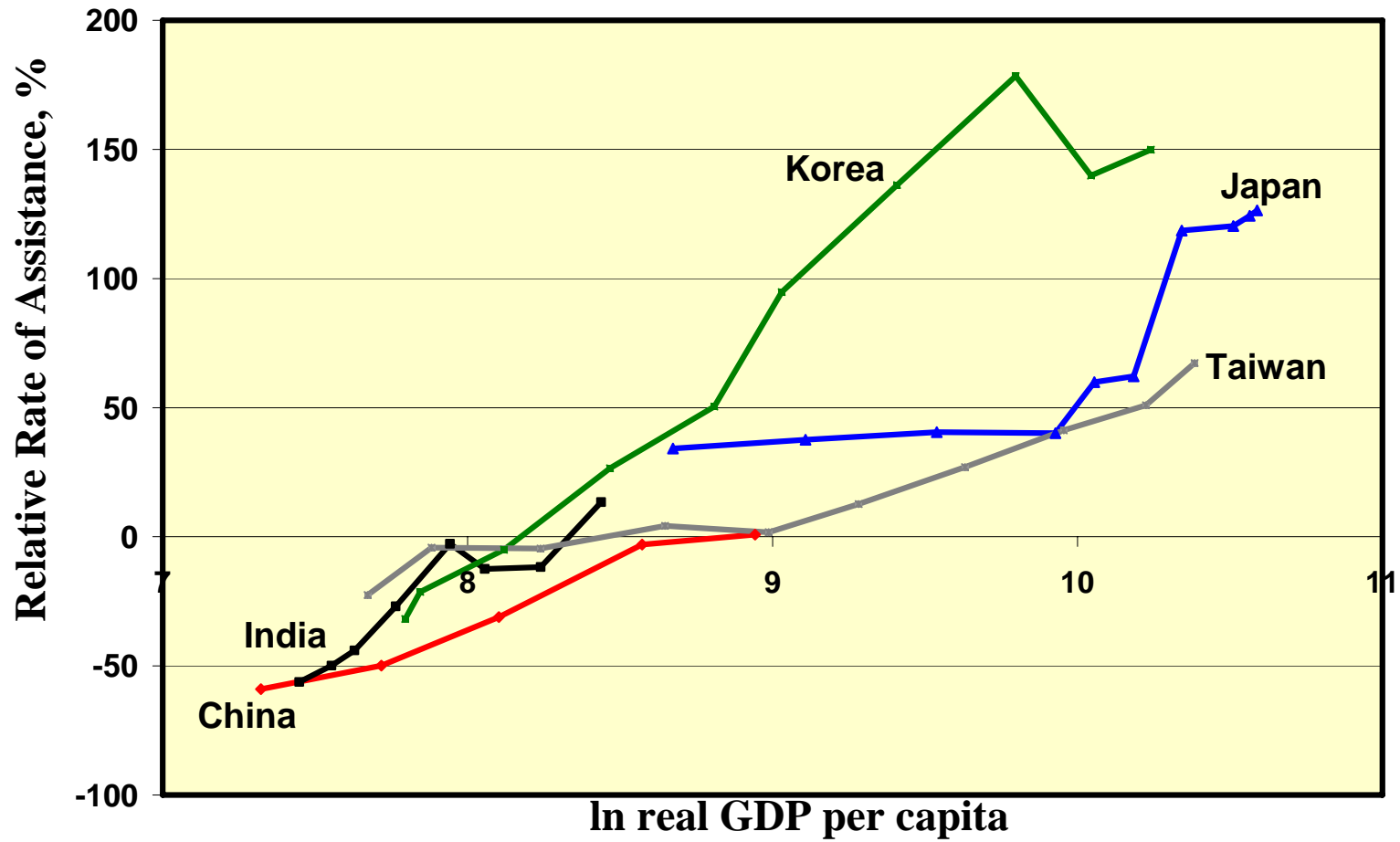[a] There are no data for Vietnam in 1980–84.

Source: Authors' compilation based on data in Anderson and Valenzuela (2008)

Figure 1.15: NRAs for Japan, Korea and China and date of accession to GATT or WTO, 1955 to 2005

(percent)

Source: Based on estimates in Anderson and Valenzuela (2008)

Figure 1.16: RRAs and log of real per capita GDP, India and Northeast Asian focus economies, 1955 to 2005

Source: Based on estimates in Anderson and Valenzuela (2008)