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Creating Good Employment Opportunities for the Rural Sector

Andrew Foster

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Panel Discussion

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Creating Good Employment Opportunities for the Rural Sector

ANDREW FOSTER

This paper examines the potential for sector-specific productivity growth, human capital, credit markets, and infrastructure to contribute to the development of stable, well-paid employment in rural areas of low-income countries. Particular emphasis is placed on the way that different sectors of the rural economy interact with each other and with local and regional product markets. A simple theoretical framework and descriptive analysis of panel data from India suggests that more emphasis should be placed on increasing the production of goods that incorporate local agricultural products as inputs.

JEL classification: J31; O12; O13; O15; O18

I. INTRODUCTION

Despite increasing urbanization in Asian countries, a large fraction of Asia's poor remain in rural areas. Many of these individuals work in casual labor markets in both the agricultural and nonagricultural sectors in which there are few returns to skill and labor market experience, and where earnings are thus limited by the marginal product of manual labor. Given overall supply and demand conditions, the return to this labor may not generate household earnings that are sufficient for a household that includes nonworking dependents to rise above the poverty line. While a system of transfers to low-income households may reduce poverty at least over the short term, such transfers provide a major drag on state budgets and may preclude the state from making productive investments in public resources that lead to long-term sustainable growth and development. On this basis it would seem desirable to better understand the nature of rural earnings growth with a view to how best to promote well-paying employment.

A great deal has been learned about the process of rural earnings determination in the last decade in large part because of the increased availability of long-term panel data sets that combine detailed household-level data with information on village characteristics and infrastructure. While there are some important differences in terms of patterns of change that may in large part reflect

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differences in the policy environment and openness to markets of different areas, the conclusions as a whole provide a consistent pattern and are generally supportive of economic models of competitive labor markets, in which wages are affected by local supply and demand and workers and employers allocate resources in response to economic returns. This consistency is useful because it provides a framework for considering alternative policy options.

Ultimately, allocation of public effort requires an empirical understanding of magnitudes of different policy effects. But even in the presence of detailed observational panel data, it is not so clear that one can uncover even internally valid estimates of policy effects. While experimental data can increase internal validity it often does so at the expense of external validity and is generally not well suited to capturing the kind of general equilibrium effects that are central to changing the returns to labor. Given the large flexibility in village labor markets and increasing mobility across villages, a very large experiment would be needed to determine whether a particular exogenously introduced experimental intervention actually has the desired effects. Multiple experiments of this sort would be necessary in order to determine the relative efficacy of different policy environments. Moreover, neither experimental nor nonexperimental data sets, nor to some extent, a competitive framework, is particularly well suited to uncovering the process of occupational diversification and expansion in scale economies, which is central to the process of economic development and arguably must ultimately be the source of rising rural earnings. As a result, while understanding off-farm rural employment has improved substantially in the last 20 years, there are important limits to what we know and, in a sense, to what we can know.

This paper provides a brief and somewhat parochial discussion emphasizing recent evidence by development economists examining expansion of rural employment and earnings. Central to this paper is the idea that an expansion of good jobs in rural areas is about increasing the productivity of rural workers. Ultimately, workers will have stable and reasonably well-paid employment if they have explicit or implicit ownership of productive assets. These assets include their own labor, of course, but can also include physical assets such as land, financial assets such as access to working capital, human assets such as education or experience, public assets such as access to electricity or low-cost transportation infrastructure, or social assets such as the ability to organize and coordinate other people. Moreover, how the returns to these different assets change depends importantly on the composition of local employment; the extent to which product and labor markets are integrated with the wider world; as well as access to credit markets, effective transportation, and other forms of basic infrastructure. In particular, the implications of farm and nonfarm productivity growth are quite different depending on whether nonfarm activity is present at all and, if so, whether it is dominated by the provision of local services, the production of

tradable factory-produced goods, or the production of value-added goods in agriculture.

The organization of the paper is as follows. Section II briefly discusses some recent empirical evidence on technology and rural nonfarm employment, then presents a framework for the process of rural employment change based in large part on the model in Foster and Rosenzweig (2005). In the context of effects of productivity growth on rural employment, three alternative sources of nonfarm rural employment are examined: value-added production in agriculture, expansion in the production of local services and other nontradable goods, and expansion in the production of manufactured tradable goods. In each case sources of growth are identified, as well as particular aspects of these sectors that are likely to increase worker productivity. The paper briefly examines data on almost 40 years of household earnings in rural India, extending the model to consider the implications of human capital (Section III), credit markets (Section IV), and infrastructure (Section V). Section VI concludes by examining the relative potential for employment generation and productivity growth in each of the different sectors.

II. TECHNOLOGY

One of the most basic issues that is debated in the literature on rural employment is the question of whether agricultural productivity growth is sufficient to generate good jobs in rural areas, either directly or through its effects on nonfarm employment. Put another way, is investment in productivity growth in agriculture, particularly among small farmers, the most effective mechanism to improve rural employment? An important element of this debate relates to the role of agricultural productivity growth in producing employment in other sectors. Here there seems to be some divergence in the literature. Foster and Rosenzweig (2004 and 2005), for example, provide evidence that improvements in agricultural productivity result in a significant reduction in nonfarm employment. In particular they find that a 10% increase in yields of high-yielding variety crops over the 1982–1999 period results in a 16% reduction in the number of factory or manufacturing workers. On the other hand, they find that the number of village service industries is increasing in agricultural productivity. In particular, a 10% increase in agricultural productivity results in a 7.9% increase in the number of village service enterprises. Overall, agricultural productivity has a significant negative effect on nonfarm income. While Felkner and Townsend (2011) do not explicitly consider the distinction between the production of tradable and nontradable services, they find that the level and activity of nonfarm enterprises is highest in those areas that are most productive in terms of agricultural output inclusive of high soil fertility, lower elevation, and less rainfall variability. In

particular they find that a 1 standard deviation increase in soil fertility results in an 11% increase in the growth rate of entrepreneurial income.

To make sense of these different results it is helpful to think through a series of models of rural labor markets. This approach puts a significant burden on the reader but is critical in terms of bringing to light the basic economic forces at work; it also provides a useful framework in which to consider the implications of other variables that may affect rural employment inclusive of human capital, credit markets, and infrastructure. The models contrast four sectors. The first sector is one that produces farm products for both local consumption and export (to other villages). This sector would include basic food crops such as grains and vegetables but could also include raw materials such as cotton. A key feature of this sector is that it is intensive in the use of land. The other sectors would, for the most part, be considered nonfarm. A basic list of nonfarm establishments, how they are categorized by sector, and their prevalence and employment in rural India in 2007 from the ARIS-REDS data used by Foster and Rosenzweig (2004 and 2005) are provided in Table 1. The second sector is one that provides basic local services that are consumed locally and includes such activities as tailor, tea houses, and bicycle repair. As one might expect, given the focus on providing for local needs, most of these establishments are present in the vast majority of villages, though employment per village is modest.

The third sector is manufacturing. Factory employment is only observed in about half of villages, but where such employment is observed, the level of employment is reasonably high. It is also worth noting that many of these factories are located outside of the villages and employ workers from a large catchment area. Average total employment in “factory” establishments that employ village workers is 479, while the number of workers employed in a particular village with some employment in a factory is 26.4 (Table 1).

Table 1. **Establishments and Employment in ARIS-REDS Villages, India, 2007**

Establishment Type	Activity Type	Villages with Workers in This Establishment Type (%)	Average Village Employment in This Establishment Type
Factory	Manufacture	0.53	26.4
Lime kiln	Manufacture	0.08	8.4
Brick kiln	Manufacture	0.59	25
Bakery	Service	0.64	5.2
Bicycle repair	Service	0.98	3.7
Vehicle repair	Service	0.84	5.3
Tea shop	Service	0.98	8.2
Eating House	Service	0.85	7.4
Tailor	Service	0.99	5.4
Blacksmith	Service	0.92	3.3
Mason	Service	0.88	13.0
Carpenter	Service	0.97	5.7
Cobbler	Service	0.62	2.7
Potter	Service	0.59	6.3
Handicraft	Service	0.19	6.5
Washerman	Service	0.85	6.8
Barber	Service	0.99	4.7
Cinema	Service	0.49	3.1
Vegetable shop	Service	0.93	6.5
Grocery shop	Service	0.95	6.8
Public call office	Service	0.96	6.7
Weaver	Value added	0.22	45.1
Grain dryer	Value added	0.21	10.0
Rice huller	Value added	0.68	6.2
Flour mill	Value added	0.89	3.5
Raw sugar (Gur)	Value added	0.18	28.5
Processed sugar (Kha.)	Value added	0.09	12.4
Vegetable oil extraction	Value added	0.58	4.2
Dairy farm	Value Added	0.45	4.5
Poultry farm	Value Added	0.34	5.0
Pig farm	Value Added	0.20	4.0

Sources: Author's calculations; Rural Economic and Demographic Survey, National Council of Applied Economics Research (2007).

The fourth sector is focused on value-added production—i.e., processing of agricultural goods for local or more distant markets. This sector includes grain mills and sugar making, and less conventionally, pig, dairy, and poultry farms. While these sectors would normally be considered farm products, from a modeling standpoint, they have much in common with more traditional value-added work. In particular, they can be used to turn locally grown crops into higher-value products such as meat and milk, and they need not be highly land-intensive.

Unfortunately the REDS 2007 survey, on which Table 1 is based, does not distinguish clearly between value-added processing or manufacturing for the local market and for more distant markets, a distinction that will be important in the model below. Nor does it distinguish whether local inputs are used in production.

Certainly bricks are largely being produced for the local market and thus sensitive to local demand. Weaving may be a small-scale activity for producing simple textiles for home use; or it may involve manufacture of textiles for exports. Also, weaving may make use of locally grown raw materials such as cotton but it also may import materials from elsewhere.

Overall, based on this categorization in the ARIS-REDS villages, 53% of nonfarm establishment-based workers are in services, 34.4% in manufacturing, and the remaining 12% in value-added production. This amounts to just over 94.6 village workers per village that averages 668 households. Given the interest in good and steady employment in rural areas, this focus on establishments seems appropriate, but it also should be noted that it substantially understates the contribution of nonfarm work to income. In particular, using household data from 1999, Foster and Rosenzweig (2004) report that 41% of income arises from nonfarm sources. The difference reflects the higher earnings in some nonfarm jobs and the fact that some nonfarm work is casual or carried on within the household on a part-time basis and is thus not linked to particular establishments.

Turning now to theory, a simple market is assumed, in which all labor is allocated to agricultural (crop) production, all goods are traded at fixed prices, and all households are of equal size with land area. In particular, agricultural profits are assumed for a representative household to be

$$y_g = \theta_g a f_g(l_g / a) - w l_g \quad (1)$$

where θ_g denotes agricultural technology, a denotes land, w denotes the wage, and l_g denotes agricultural labor. We assume that this household maximizes utility given income and prices by choosing levels of consumption of different goods inclusive of agricultural and manufactured goods. Households are endowed with labor l so each household has total income

$$y_g + w l \quad (2)$$

Agricultural and manufactured tradable goods are exchanged at world prices. The commodity balance for agricultural good dictates that

$$c_g(y, p) + \chi_g = \theta_g a f(l_g / a) \quad (3)$$

where $c_g(y, p)$ denotes agricultural good consumption a function of income and prices and χ_g denotes net exports of agricultural goods. Given that at this point there are no locally produced factory goods, all such goods must all be imported

$$c_m(y, p) + \chi_m = 0 \quad (4)$$

Given that all goods are traded with the outside world, the local and external prices are the same, and the equilibrium wage is determined by the marginal productivity of labor in agriculture when all workers are employed in that activity. That is,

$$p_g \theta_g f'(l/a) = w \tag{5}$$

It immediately follows that a doubling of agricultural productivity θ_g doubles wages. The only other way to have wage growth is to increase labor per unit of land either by expanding land by decreasing the number of households, or by decreasing the number of workers per household. At least in the presence of the constant returns to scale technology posited above, and because prices are set globally, a change in the distribution of land by, for example, allocating all land to a fraction ρ_A of households does not affect the wages, though of course it does affect incomes because all profits would be allocated to the landed households.

It is important to note that the fixed nature of land is critical to the above model. As a result, expanding rural wages without overall reductions in the quantity of rural labor would seem to be difficult without the introduction of a nonfarm sector. In general, as noted, the data suggest that there are three distinct sources of nonfarm rural employment with distinct implications for rural employment: local provision of nontradable services, manufacture of tradable goods, and value-added production of agricultural goods.

The nontradable service sector in rural areas of low-income countries may generally be thought of as relatively labor-intensive small family firms (Foster and Rosenzweig 2005). To capture the main implication of this sector we suppose that labor is the only input into this sector and that the sector exhibits constant returns to scale in labor, so profits are

$$y_s = p_s \theta_s l_s - w l_s \tag{6}$$

Demand for these services is $c_s(y, p)$. Because this good is not traded, the price for service goods, along with the wage, must be determined endogenously, balancing the demand and supply of service and equating the marginal revenue product of labor. That is, $c_s(y, p) = \theta_s l_s$ and $p_s \theta_s = w = p_g f'(l_g/a)$. Moreover, because a competitive labor market ensures services sector profits are zero in equilibrium, household income is just $p_g a f(l_g/a) + w l_s$.

In the special case of Cobb-Douglas preferences with service good share β the expenditure share is constant. So the labor allocated to agriculture is independent of agricultural technology and there is a unit elasticity of the wage with respect to that technology. Conversely, if the share of the service goods in consumption increases with income, as seems plausible, then the wage will rise more than proportionately with technology. Expansion in the technology of

production in the service sector tends to push labor out of the service sector because demand is fixed locally. In particular, for Cobb-Douglas preferences an increase in service sector technology means that the price of labor and the price of the service good falls, agricultural labor rises, and agricultural profits increase. In contrast to the case of the pure agricultural market, changes in the fraction of the poor will affect the equilibrium wage if landless and landed households consume different shares of the service good. If the income share of service goods grows with income the equilibrium wage will be lower when land is distributed more equitably, although of course the redistribution of profits will have salutary effects on equity.

Now consider the addition of a mobile capital sector that produces tradable goods. In particular assume that the profits in the factory or manufacturing sector are

$$y_m = p_m \theta_m k_m f_m(l_m / k_m) - w(1 + l_m / \delta_m) l_m - r k_m, \quad (7)$$

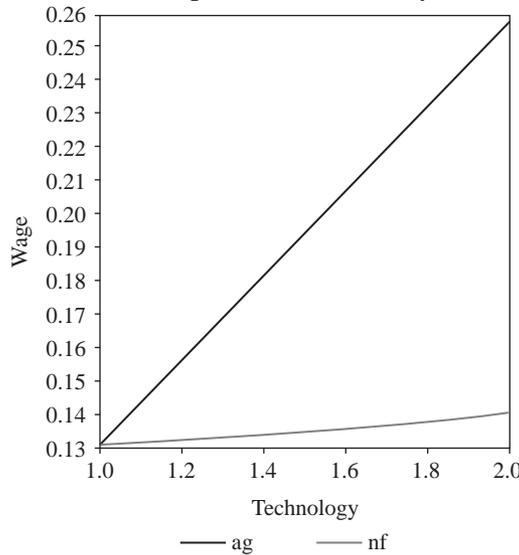
where these profits accrue to external owners of the capital and thus do not affect household income and therefore consumption in the village except through the wage. Note that capital is assumed to be supplied perfectly elastically but that there are increasing marginal costs of labor. This latter assumption is made for technical reasons (otherwise capital jumps discretely when the wage falls below a profitability threshold) but might be thought of as reflecting differential suitability of workers for this activity, logistical issues associated with employing a large number of workers or, as is the case in India (Foster and Rosenzweig 2005), increased legal structures that apply to larger employers.

A key element of this profit function is that the entry of capital depends on the price of labor, for example, if $f_m(x) = x^{\alpha_m}$ then $l_m = \kappa_1 - \kappa_2 w$. As a result, the effects of increases in agricultural productivity on the wage may be somewhat lower than they would be in the absence of endogenous entry of factory capital. As agricultural productivity pushes up the demand for labor there is exit of external capital and factory labor declines, although how the wages change depends importantly on what happens in the nontraded service sector.

While closed form results cannot be obtained for this model, simulations using parametric models can be useful in terms of understanding the basic nature of economic forces that arise in the presence of factories financed with external capital. In particular, we assume the production function for manufactures and agriculture are Cobb-Douglas, with labor share at one half and consumption share of service goods at one third. Shares of other goods are not relevant because prices of these goods are determined externally. The tradable factory and goods prices and the cost of capital are then set to 1, each household is endowed with 1 unit of land and 30 units of labor, and the increasing returns to labor parameter δ_m is set to 1 as well. The effects of increases from 1 to 2 in the technology for agriculture and for factory tradables are simulated separately, keeping in each

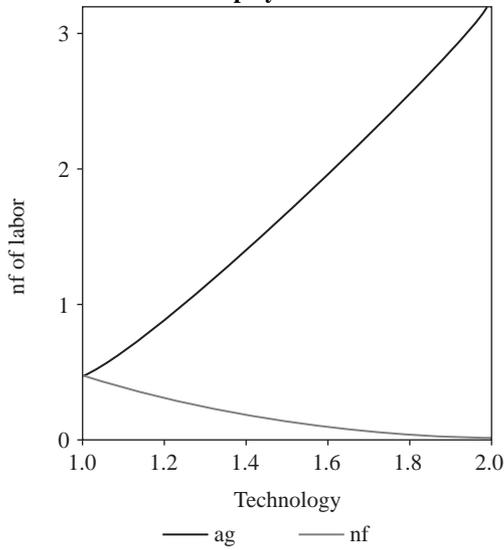
case the productivity of the other technologies at 1. The results appear in Figures 1–3. As seen in Figure 1, a doubling of agricultural technology leads to a doubling of the wage and substantial reduction in the factory labor force (Figure 2). The effects of an increase in factory technology on factory labor are large as expected but the effects on the wages are surprisingly modest. This latter result is best understood with reference to Figure 3, which plots household income, and illustrates the importance of the nontradable sector. In particular, as agricultural land is locally owned, an expansion in profits substantially increases income. This increases demand for the nontraded goods, bidding up the price of services that help support the increase in wages. On the other hand, as factory capital is assumed to be externally financed, there is limited feedback in terms of growth in demand for local services arising from growth in this sector. Of course this result is somewhat sensitive to the assumption that factory profits do not accrue to local residents. If businesses were locally owned then any profits that are generated would feed back into income. However, since unlike land, capital is flexible and externally traded, assuming competitive entry, profits net of finance costs will be small—only arising in this case because of the increasing cost of employment.

Figure 1. **Simulated Effects of Agricultural and Factory Technology on Wages**



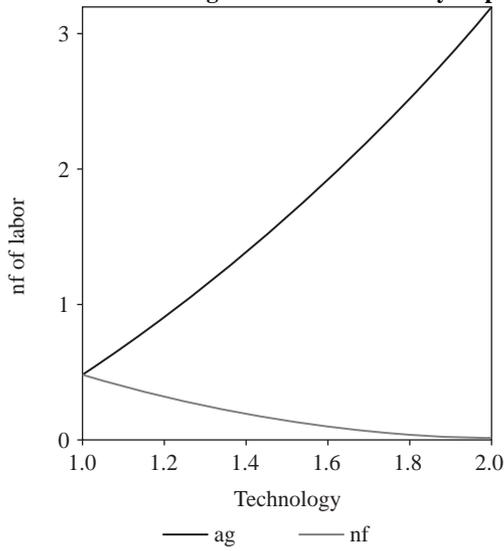
Ag = agriculture, nf = nonfarm.
 Source: Author's calculations.

Figure 2. **Simulated Effects of Agricultural and Factory Technology on Factory Employment**



Ag = agriculture, nf = nonfarm.
Source: Author's calculations.

Figure 3. **Simulated Effects of Agricultural and Factory Capital on Income**



Ag = agriculture, nf = nonfarm.
Source: Author's calculations.

Another way of looking at this model is that it shows that entry of manufacturing capital provides an alternative mechanism for expanding rural employment in areas with relatively stagnant agriculture, for example, as a consequence of poor soil or climatic conditions. But this finding raises the alternative question of whether it is possible for nonfarm employment in the production of tradable goods to be complementary with good agricultural conditions. In particular, the notion that growth in agriculture can lead to the expansion of value-added production in agriculture needs also to be considered.

In order to capture value-added production that is complementary with agricultural production, two aspects of factory and capital need to be adjusted. First, agricultural goods should be an input in the production process and second, prices of agricultural commodities must be lower in higher-productivity areas so that it is advantageous for value-added industries to locate in those areas despite relatively high prevailing wages. In order to create such low prices, given the assumption that agricultural goods are generally tradable, one needs a degree of friction in the agricultural product market.

Thus the model is augmented to assume that it is costly to transport agricultural commodities. In particular, the profitability of transporting agricultural goods from the local market to the outside world is the value of the output on world markets minus the value on domestic markets minus a figure reflecting output lost in transit:

$$(p_g^* - p_g)\chi_g - \chi_g^2 / \delta_g \tag{8}$$

where the superscript * denotes world prices. It is assumed for simplicity that there is free entry into the export business and that the loss is based on total goods exported (rather than amount per exporter), so that in equilibrium, the zero profit condition dictates

$$\chi_g = (p_g^* / p_g - 1)\delta_g \tag{9}$$

This equation applies in principle to both net exports and net imports in the sense that in the presence of net imports the world price will be less than the agricultural price. The equilibrium condition balancing trade in agricultural goods is

$$c_g(y, p) + (p_g^* / p_g - 1)\delta_g + i_g = \theta_g af(l_g / a) \tag{10}$$

where i_g denotes the amount of agricultural input used as an input in value-added production.

To keep the model relatively simple, it is assumed that value-added goods can be bought and sold at world prices. This assumption, of course, creates a bias

in favor of exporting value-added goods relative to directly trading agricultural goods. In practice, there would also be some cost to exporting value-added goods (and importing manufactured ones), and the relative size of the value-added sector would depend on the relative transportation costs of agriculture and value-added goods. In fact, however, the notion that processed agricultural goods are cheaper to transport than are raw materials seems defensible and is, in any case, necessary to understand why on-site value-added production may be an important source of rural employment growth.

It is further assumed that value-added labor and agricultural inputs are perfect complements in the production of value-added services with a fixed ratio $i_g/l_v = \mu$. This assumption aids tractability and has minimal impact on the conclusions of the model, except that it shuts down one margin of adjustment in the value-added sector. In particular, in a more general model, if wages rise relative to the price of agricultural goods, one might expect to see increased use of the goods and lower levels of labor. In any case, given the assumption, one may write profits in the value added sector as

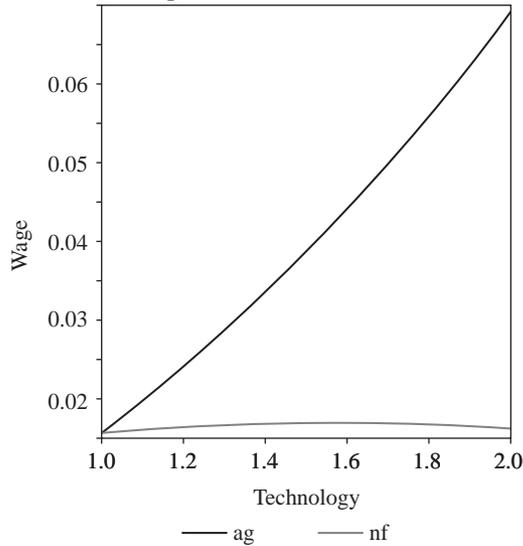
$$y_v = p_v \theta_v k_v f_v(l_v/k_v) - (w + l_v/\delta_v)l_v - p_g \mu l_v - rk_v. \quad (11)$$

The results of the simulated model using the same parameters as before with the addition that and are presented in Figures 4–6. Figure 4 plots wage growth arising from changes in the productivity of different technologies in the value-added production model. The results are quite different from those in Figure 1. In this case agricultural technology has almost no effect on equilibrium wages while value-added technology growth leads to more than tripling of wages. The reason for this difference is best understood with reference to Figure 5, which plots the local price of the agricultural good. Because of the costs of transporting agricultural goods, an increase in agricultural technology pushes down the local price of the agricultural goods thus offsetting the increases in agricultural productivity arising from technology change. By contrast, an increase in productivity of value-added production increases the demand for agricultural goods to be used as inputs. This bids up the price for agricultural goods and thus leads to an increase in the demand for agricultural labor. Of course, Figure 4 in a way oversells the consequences of agricultural technology on wages, because of the consequences for local prices. If local agricultural products (as opposed to value-added products which, in the model, are fixed at world prices) are a large share of consumption then the large rise in agricultural prices will erode the purchasing power of wage workers, leading in effect to lower increases in the real wage evaluated at local prices.

Figure 6 is quite surprising and again quite different from Figure 3. In particular, an expansion in value-added technology results in a modest increase in value-added labor while the corresponding increase in value-added labor arising

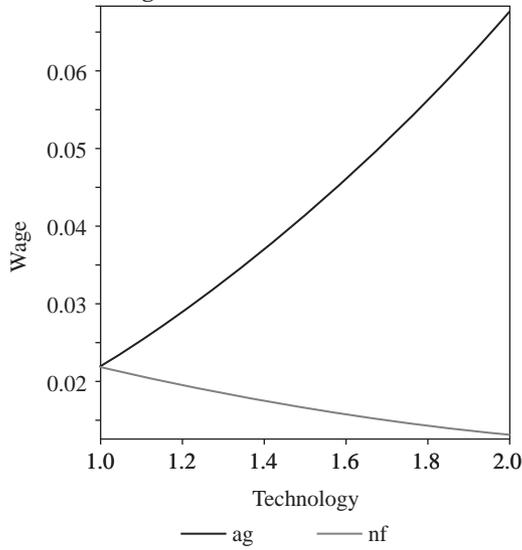
from an increase in agricultural technology is quite large. This pattern arises because of the importance of the local agricultural goods price in terms of the profitability of value-added technology. If agricultural technology improves, that lowers the price of agricultural goods, thus making value-added production relatively profitable. On the other hand, an increase in value-added technology bids up the price of agricultural goods, as noted, thus drawing more workers back into the agricultural sector.

Figure 4. **Simulated Effect of Agricultural and Value-Added Technology on Wages**



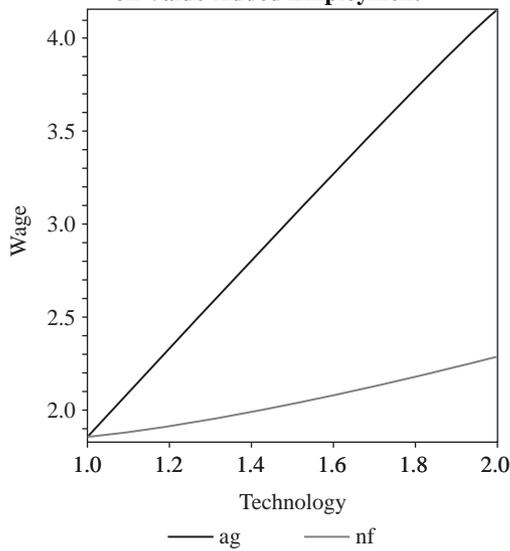
Ag = agriculture, nf = nonfarm.
 Source: Author's calculations.

Figure 5. **Simulated Effects of Agricultural and Value-Added Technology on Food Prices**



Ag = agriculture, nf = nonfarm.
Source: Author's calculations.

Figure 6. **Simulated Effect of Agricultural and Value-Added Technology on Value-Added Employment**



Ag = agriculture, nf = nonfarm.
Source: Author's calculations.

All the modeling thus far has been in terms of factor-neutral technology. In fact, however, there may be important differences in the factor intensity of different technologies. In a recent paper, Foster and Rosenzweig (2010) explore the issue of scale economies in agriculture in India. They show that over the period 1982–2007 in rural India, there was a substantial increase in mechanization, particularly among larger farmers. While traditionally it has been suggested that small farmers in rural India are more productive than larger farmers, Foster and Rosenzweig show that at least in the last decade and after appropriately accounting for supervisory costs, potential search costs for off-farm employment, and potential endogeneity of land with respect to productivity, larger farmers are more profitable than small farmers, and this profitability is largely a result of the labor saving that is possible through increased mechanization. Maximal profitability per acre is achieved in farms ranging 10 acres in size, which while tiny in comparison to the average farm in the United States, is large indeed given that 60% of Indian farmers farm less than 1 acre, and 95% farm less than 5 acres according to the Indian Census of 2001 (Foster and Rosenzweig 2010).

The fact that mechanization is both labor-saving and importantly scale-dependent has two implications. First, in order to take advantage of this new technology, one may need to have farms that operate at effectively greater scale. This scale dependence is important in terms of earnings of poor households because it means that a larger share of the population would—barring some contractual arrangement where they shared in the profits of land being farmed in larger units—be dependent on labor-market earnings rather than combining labor market earnings and profits. Second, mechanization can displace substantial amounts of labor which, in the context of the model, should result in lower wage rates. Moreover, while cooperatives and other forms of coordination of smaller farmers to capture returns to scale can ensure that small farmers continue to accrue the rents of land ownership, they do not avoid the problem of labor displacement if the primary source of scale economies is through mechanization. In this light, the value-added model of nonfarm labor developed here seems particularly attractive. Increased agricultural productivity through mechanization will release labor but, by pushing down the local price of agricultural goods, increase entry of value-added producers that in turn can absorb labor.

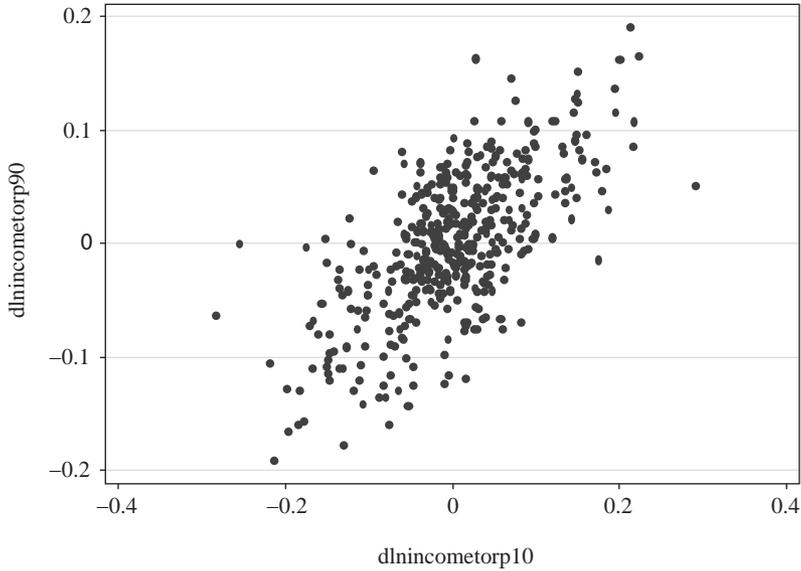
Data collected from the ARIS-REDS panel surveys of rural India provide some descriptive evidence that provide general support for the notion that value-added agricultural activity can play a particularly important role in nonfarm income growth. A particular feature of these data that has rarely been exploited empirically are the listing files, which provided a basis for each of the sampling frames in 236 villages in each of the years 1969, 1982, 1999, and 2006. These data provide levels of income for the census of households in these villages, including also data on occupation and source of income for 1969 and 2006.

Overall the data sets contain information on 34,187 households in 1969 and 115,429 households in 2006.

To capture differences in different parts of the income distribution and how these changed over time, quantiles of the income distribution in each year and village are constructed and then adjusted for inflation over time. The data show a remarkable amount of village-specific income growth. Figure 7 plots the 1969–2006 change in the log of household income for the 10th and 90th percentiles of the income distribution and show a high level of correspondence in economic growth. Figure 8 plots the change for the 25th and 75th percentile and show an even closer correspondence. Indeed the correlation matrix in quantile village growth within India (Table 2) shows a high correlation of patterns of growth. The lowest correlation is for the 10th and 90th quantiles of 0.671. The 25th and 75th growth in income quantiles correlation is 0.876. This overall high correlation is indicative of the importance of thinking about employment growth in terms of what happens at the village level. Some villages show substantial growth across all quantiles while others do not.

It is then helpful to consider what features of economic growth are correlated with income growth in the different quantiles. While these regressions should not be interpreted causally, they do give some sense of what basic features of the village economy predict overall income growth at different quantiles of the distribution. In particular, village fixed effects are controlled and the log income of the corresponding quantile is used as the left-hand side variables, with several measures of economic activity on the right-hand side. These include village-level estimates of the fraction of workers employed in each of three categories of occupations (traded manufacturing, nontraded services, and value-added in agriculture); the share of income from agriculture, self-employed nonfarm, and salaried work; yields in agriculture; population; and the distance to the nearest town (which changes over time due to the process of transformation of large villages into towns [settlement of at least 20,000]).

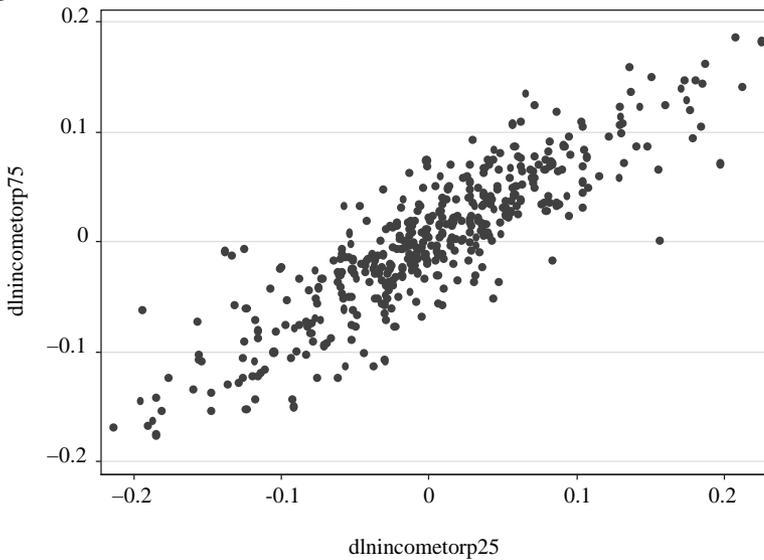
Figure 7. Growth in 10th and 90th Quantiles of ln Income by Village in Rural India, 1969–2007



dlnincometorp10 = growth log(income) of the 10th percentile, dlnincometorp90 = growth log(income) of the 90th percentile.

Source: Author's calculations.

Figure 8. Growth in 25th and 75th Quantiles of ln Income in Rural India, 1969–2007



dlnincometorp10 = growth log(income) of the 10th percentile, dlnincometorp90 = growth log(income) of the 90th percentile.

Source: Author's calculations.

Table 2. **Correlation Matrix of Growth Income Quantiles in Rural India, 1969–2007**

	10%	25%	50%	75%	90%
10%	1				
25%	0.9156	1			
50%	0.8488	0.9529	1		
75%	0.7662	0.8756	0.9489	1	
90%	0.6714	0.7641	0.8455	0.9325	1

Sources: Author's calculations; Additional Rural Income Survey and Rural Economic and Demographic Surveys, National Council of Applied Economics Research (1969–2007).

The results are presented in Table 3 (random effects) and Table 4 (village fixed effects). We first note that, as expected given the correlation figures, the predictors of income growth are very similar across quantiles. In terms of significance, three variables are consistently significant—(i) the per capita number of workers in value-added agricultural activity; (ii) agricultural yields, share of income from agriculture, and population; and (iii) distance to the nearest town. The mean of workers per capita in the sample in 2006 is 0.03 with a standard deviation of 0.05. Thus the coefficient in Table 3 suggests that a doubling of workers per capita as value-added employees results in an 8.0% additional income at the 10th percentile and 8.8% at the 90th percentile. The fixed effects estimates in Table 4 are smaller and not significant for the lower quantiles but still suggest growth of 5.3% from a doubling of workers per capita as value-added workers. While these figures are not large, the fact that overall levels of employment in this sector are low indicates there may be substantial opportunity in this regard.

Yields have a positive effect on income in each sector as one might expect, although the effects are larger at high incomes, presumably reflecting the role of agricultural profits. It is worth noting, however, that the yield elasticities are substantially less than 1, a result that is at least consistent with the notion that nonfarm employment responds endogenously to high wages.

In terms of the other coefficients, the fact that the share of agricultural income has a negative relationship with income is also indicative of the general importance of nonfarm activity as a source of rural earnings growth. As the mean share of agricultural earnings is 0.63 with a standard deviation of 0.33, these results indicate that a 1 standard deviation increase in the agricultural earnings share is associated with a 9% reduction in incomes at the 10th percentile. Note also that these effects are largest for the smallest households, which is indicative of the particular importance of nonfarm earnings as a source of growth of wages, which are the primary source of income in lower-income households. The strong positive population effects, particularly at the lower quantiles, and negative distance to town effects, particularly at the higher quantiles, are indicative of the adverse effects of relative isolation on income in rural India.

To conclude, the effects of agricultural technology growth on the nonfarm sector are complex with relatively small theoretical specification differences, leading to quite large differences in conclusions. In particular, agricultural productivity growth increases nonfarm activity in the services sector by increasing demand for local goods, decreases it in the factory sector by raising wages and thus discouraging capital entry, and increases it in the value-added sector by lowering the price of a key input. It is no surprise that empirical work on the effects of agricultural technology on nonfarm activity has led to quite mixed results. A brief empirical analysis provides some support for the potential importance of value-added employment as a source of earnings growth in rural India.

Table 3. **Random Effects Estimates of Relationship between Log Income Quintile, Sources of Income, and Infrastructure**

	10%	25%	50%	75%	90%
Traded workers/capita	0.133 (0.75)	0.172 (1.05)	0.219 (1.37)	0.274 (1.70)	0.263 (1.63)
Service workers/capita	-0.034 (0.23)	0.051 (0.36)	0.009 (0.07)	-0.091 (0.67)	-0.246 (1.79)
Value-added workers/capita	2.655 (3.63)**	2.172 (3.22)**	2.140 (3.27)**	2.859 (4.31)**	2.919 (4.41)**
Ln yield	0.105 (3.19)**	0.123 (4.03)**	0.134 (4.52)**	0.149 (4.94)**	0.133 (4.42)**
Agricultural income share	-0.163 (4.66)**	-0.122 (3.77)**	-0.095 (3.02)**	-0.020 (0.63)	-0.036 (1.15)
Self-employment income share	-0.074 (1.17)	-0.074 (1.25)	-0.043 (0.74)	0.046 (0.79)	0.019 (0.32)
Salaried income share	-0.085 (5.46)**	-0.080 (5.52)**	-0.078 (5.57)**	-0.065 (4.55)**	-0.050 (3.44)**
Ln population	0.027 (1.05)	0.040 (1.68)	0.036 (1.57)	0.050 (2.07)*	0.048 (1.89)
Ln distance to nearest town	-0.206 (3.05)**	-0.226 (3.64)**	-0.208 (3.45)**	-0.204 (3.32)**	-0.209 (3.39)**
Observations	403	403	403	403	403
Number of villages	234	234	234	234	234
R-squared	0.36	0.39	0.34	0.28	0.28

* significant at 5%; ** significant at 1%.

Note: Absolute value of t statistics in parentheses.

Sources: Author's calculations; Rural Economic and Demographic Surveys, National Council of Applied Economics Research (1982–2007).

Table 4. **Fixed Effects Estimates of Relationship between Log Income Quantile, Sources of Income, and Infrastructure**

	10%	25%	50%	75%	90%
Traded workers/capita	-0.016 (0.06)	0.093 (0.38)	0.232 (1.01)	0.347 (1.54)	0.342 (1.61)
Service workers/capita	0.010 (0.04)	0.100 (0.41)	0.045 (0.20)	-0.092 (0.41)	-0.268 (1.28)
Value-added workers/capita	0.321 (0.30)	0.052 (0.05)	0.094 (0.10)	1.231 (1.30)	1.775 (1.99)*
Ln yield	0.103 (2.04)*	0.151 (3.14)**	0.168 (3.74)**	0.167 (3.77)**	0.141 (3.39)**
Agricultural income share	-0.185 (3.90)**	-0.112 (2.48)*	-0.065 (1.55)	-0.008 (0.19)	-0.039 (0.99)
Self-employment income share	-0.036 (0.39)	-0.080 (0.91)	-0.027 (0.34)	0.091 (1.14)	0.064 (0.84)
Salaried income share	-0.071 (2.58)*	-0.069 (2.64)**	-0.057 (2.35)*	-0.046 (1.91)	-0.045 (1.98)*
Ln population	0.242 (3.10)**	0.203 (2.74)**	0.152 (2.20)*	0.148 (2.17)*	0.136 (2.11)*
Ln distance to nearest town	-0.168 (1.62)	-0.199 (2.02)*	-0.185 (2.00)*	-0.176 (1.93)	-0.210 (2.45)*
Observations	403	403	403	403	403
Number of villages	234	234	234	234	234
R-squared	0.35	0.38	0.38	0.36	0.39

* significant at 5%; ** significant at 1%.

Note: Absolute value of t statistics in parentheses.

Source: Author's calculations; Rural Economic and Demographic Surveys, National Council of Applied Economics Research (1982–2007).

III. HUMAN CAPITAL

Whether expansion in human capital is necessary or sufficient to encourage an expansion in good jobs in rural areas is also a complex question. Some of the complexity arises in this case from the fact that human capital can mean different things. While economists typically think about human capital as arising from schooling, it is often helpful to think of human capital as anything that enhances worker productivity, including physical strength, schooling, experience, and entrepreneurial skill. Moreover, each of these attributes may have different returns in different sectors and within sectors based on one's role. Specifically, for example, Foster and Rosenzweig (1996) find substantial evidence that schooling increases the profitability of management of new agricultural technologies, but in other work find that if anything, schooling lowers agricultural wage rates at the individual level (Foster and Rosenzweig 1996). Recently, work

by Pitt, Rosenzweig, and Hassan (2011) looks specifically at the issue of differential investment in physical strength and schooling and find evidence that the returns to strength and schooling vary substantially by type of activity.

As with the case of agricultural technology, consideration of the effects of human capital on worker productivity benefits from taking a general equilibrium perspective. This idea is most obviously evident in the finding that investments in schooling tend to have a large effect on probabilities of migration. As documented in Foster and Rosenzweig (2008), for example, more educated individuals are more likely to move, presumably as a result of higher returns to schooling in rural areas. Given that overall wages in rural areas are importantly determined by the supply of workers as illustrated above, this increased migration may lead to higher wages in areas with higher levels of schooling, even if there are no effects of schooling on productivity per se.

How schooling, or human capital more broadly, affects earnings in rural areas more generally is a complex question. There is substantial debate, for example, with regard to the question of whether schooling is necessary to be employed in nonfarm activities in rural areas of low-income countries. Lanjouw and Murgai (2008) for example, report that in rural India in 2004, levels of illiteracy are substantially higher among agricultural laborers and cultivators (35.9% and 32.5%, respectively) but substantially lower than those in regular nonfarm employment (2.2%). Illiteracy rates for self-employed and nonfarm casual are also low but more intermediate (11.6% and 11.8%, respectively). Evidence from Foster and Rosenzweig (2005) suggests, for example, that while areas with more secondary school graduates tend to have more factory jobs, the level of secondary education is not correlated with factory employment within villages. On the other hand, they do find evidence that an increased supply of schooling in the village is associated with higher business income as might be expected if education increases entrepreneurial ability. The pattern may also simply reflect ecological variation arising from other sources.

Regardless of whether schooling itself is considered a critical input in the production of nonfarm employment, the organization of employment suggests that there is an important element of skill to many nonfarm jobs that may affect wages. The vast majority of agricultural employment in many low-income areas of rural countries is casual. For example, Lanjouw and Murgai (2008) report that 46% of all agricultural employment and 97% of agricultural workers by noncultivators is casual. By contrast, 25% of all nonfarm workers are casual and just 57% of nonself-employed nonfarm workers are casual. The casual labor market in agriculture is reflective at least in part in the shifting nature of agricultural labor demand but it is also indicative of a lack of specialization in a particular land or task. By contrast, in the nonfarm sector, most self-employed workers and most factory workers are doing the same thing at different points in time. A bicycle repairman has a specific skill that cannot easily be replaced by

someone working in another sector. If so, then presumably the rents associated with these skills should appear in terms of labor market earnings. The presence can also help us understand why there seems to be a wage premium to many forms of nonfarm employment (Lanjow and Murgai 2008) even though on observable criteria there may be little *ex ante* differences between farm and nonfarm workers.

Interesting evidence on the presence of variation in nonschooling human capital is presented by Kodithuwakkua and Rosa (2002). They study sources of household earnings in an area that was part of a settlement project in the previous 10 years. Because of the way the settlement was carried out, households started off with similar land endowments, and village residents did not start off with strong internal social networks as they had previously lived in different areas. But after 10 years there were substantial differences in income among households, and these differences were importantly tied to entrepreneurial activity. Arguably, most of the business activities were available to most households, though it was clear that many were successful because they exploited social connections such as with particular traders or credit providers external to the village. Among the activities were bicycle repair shops, contracting irrigation channel maintenance, hiring out equipment, acting as a paddy broker, money lending, and selling agricultural inputs. Moreover, most of those who were successful were successful in a number of different, largely unrelated, ventures.

What is unclear from this fascinating study is whether and how entrepreneurship can be encouraged, for example, by training or other forms of human capital development. While entrepreneurship training is often packaged along with microcredit programs, the relative value-added of the different components is difficult to identify. One important exception is Karlan and Valdivia (2006) who studied a randomized treatment adding business training to an existing microcredit program. They find evidence that in this population the training increased repayment and increased business revenue for the clients. They also find that those showing the most benefit to the training were those who *ex ante* expressed the least interest in the program. Evidently there are important management skills that can be taught. However, since this is a study of people already using microcredit for business activity, it is not clear whether the training affects entrepreneurship *per se*.

A helpful way to incorporate human capital into the above model of rural employment is as a distinct endowment in the household. That is, one might imagine that in addition to being endowed with l units of labor, a representative household would be endowed with h units of human capital. Employers purchase the labor and human capital as a joint good in much the same way that a farmer might hire a tractor with a driver, evaluating each element based on its opportunity cost. Thus for example, in the service good case, one might imagine that service profits are

$$y_s = p_s \theta_s l_s f_s(h_s/l_s) - w l_s - \nu h_s, \quad (12)$$

and that the effective wage received by a worker is the sum of the wage he would receive in the agricultural labor market as well as the rents on human capital per unit labor,

$$w_s + \nu h_s/l_s. \quad (13)$$

If the service sector is the only place in which such human capital can be used, clearing in the human capital market implies

$$p_s \theta_s f'_s(h/l_s) = \nu. \quad (14)$$

As a result, an increase in service employment, given these assumptions, raises the rents on human capital and thus increases effective wages paid in this sector even if the wage in the agricultural sector stays fixed.

The presence of such an effect can have an appreciable effect on the patterns observed in the model on agricultural technology discussed above. For example, if factory labor is relatively dependent on skilled workers, then an expansion in factory technology that increases factory labor demand will also raise the effective earnings of households by raising the return to human capital. This effect in principle could reverse the patterns in Figure 1 so that the effective wage in the factory sector, for example, rises faster with factory technology than it does with agricultural technology. Note also that the model yields implications for the effects of differences across communities in endowments of human capital. If labor and human capital are complementary, then areas with higher endowments of human capital will have higher demand for factory labor, and this demand itself will push up the wage paid in sectors that do not use human capital.

IV. CREDIT MARKETS

Like technology and human capital, the effects of credit markets on rural jobs are multifaceted. In Section I, the role of capital markets in terms of financing of factory employment has been incorporated. But credit markets can also clearly have a profound effect on agricultural productivity and self-employment through the provision of working and start-up capital. Unfortunately, access to credit markets is even more difficult to measure than access to human capital. While there is ample evidence that household behavior falls well short of what might be expected if they had access to as much credit as needed at a market interest rate, until recently, few observational studies have said anything definitive about sources of variability in access to credit. And while the growing

experimental literature on microcredit literature has shown that there are important sectors of the market that can make good use of access to structured credit in terms of higher productivity in small family businesses and better living standards, it is unclear whether these effects are often large enough to extend beyond the employment of family workers.

There is a growing body of evidence with relatively compelling sources of inference suggesting that increased access to banks has real effects on the nature of employment. This includes work by Burgess and Pande (2005), which examines the effects of India's social banking experiment that targeted banks to underserved areas of India; and Feler (2010), which uses bank privatization in Brazil to examine the consequences of reducing subsidies to rural banks. In the latter case, there was evidence that those areas losing subsidized banks and not having alternative sources of credit had reduced economic activity and decreases in skilled workers. These results broadly conform with evidence on the effects of bank deregulation on small business activity in rural areas of the United States (Beck, Levine, and Levkov 2010). Kaboski and Townsend (2010) also find evidence of increased business economic activity associated with Thailand's million Baht fund, although they argue that the social costs of the program exceeded the social benefits. Overall, Townsend (2011) argues that financial deregulation has had substantial positive effects on economic growth in Thailand by providing a better match between entrepreneurial skill and access to capital, but notes that in some cases, subsidized credit has led to an inefficient overdispersion of economic activity. Foster and Rosenzweig (2010b) in their detailed study of scale economies in rural agriculture find evidence that low levels of access to credit seem to adversely affect profitability in smaller farmers, leading to underuse of inputs such as fertilizer, and to lagged profits on current input use and profitability. Taken as a whole, this work confirms that credit markets are far from perfect, and that imperfect access to credit is an important barrier to efficient economic behavior.

It is unclear however if and when this necessarily creates a compelling case for public intervention. Fundamentally, problems of imperfect information plague credit markets and it is not obvious that the public sector can sufficiently overcome these difficulties to make public credit a cost-effective mechanism to increase the quality of rural employment, although it also is not obvious that it cannot. At the very least it is important to recognize, in the context of the above models of nonfarm employment, that increased access to working capital that increases agricultural or small-scale service sector profitability affects not only those directly receiving the credit but also other workers in general, by changing the wage and possibly other locally determined prices.

V. INFRASTRUCTURE

There is also emerging new evidence on the role of infrastructure in helping to support development of effective employment. Felker and Townsend's (2011) recent study on the geographic concentration of enterprises in Thailand considers the proximity of areas to local roads. They conclude that there is a 1.8% reduction in the number of enterprises per kilometer of distance from a major highway. Enterprise income falls by 11.5 Baht per kilometer. There is also evidence of increasing growth in areas proximate to other areas that are quite active. Overall the picture that emerges is one where there are substantial positive agglomeration economies affecting enterprise development in rural areas. Aragon and Rud (2010) show additional evidence of the role of demand effects in generating local economic activity by looking at the effects of proximity to mines that are affected by commodity price booms.

Donaldson (2010) finds evidence that the introduction of railroads in India leads to greater economic activity by exploiting gains to trade between different regions. Overall Donaldson's results can be incorporated in the above structure through explicit modeling of transportation costs as was done in the case of the value-added model. Note, however, that better transportation may decrease the relative merits of value-added production particularly if there are returns to scale in processing. In particular, there is less opportunity for the kind of local agricultural goods prices effects that encourage value-added production in that model.

Electrification also seems to have important effects on rural employment. Dinkelman (2010) in South Africa takes advantage of patterns of electrification to examine effects on rural employment. She finds evidence that electrification leads to increases in labor supply on the part of men and women and decreases in female wages. Basic results suggest that electrification has primary effects on small-scale family enterprises by releasing time needed by women for domestic chores. Overall this pattern might be characterized as an effective expansion in household labor, with the reduction in wages being indicative of the kind of local labor market hypothesized above. Rud (2010) argues that firms faced with poor and unreliable electricity supplies must invest in a relatively costly replacement technology.

VI. CONCLUSION

The primary purpose of this paper has been to consider factors that lead to the development of good jobs in rural areas of developing countries. Central to the discussion is the question of how technological change, whether a consequence of changes in production technologies or indirectly through better provision of infrastructure, leads to increasing worker productivity and thus wages. If landholdings are equally held and all workers are employed on their own farm, then expansion in agriculture technology will increase household earnings. But this simplified model fails in two respects. First, land is unequally distributed in most parts of the world. Whether due to a legacy of inequality or due to returns to scale in farming activity, there are substantial differences in landholdings across individuals and thus there is substantial labor market activity. For farmers that do not hold land, the earnings from agriculture depend importantly on the wages that they receive. It does not in general follow that increases in agricultural technology will improve wages. For example, if agricultural technology improvements result in increasing mechanization, which substitutes for labor, then wages may fall.

Second, agriculture is not the only source of earnings in most low-income countries. In fact, nonfarm earnings now approach almost half of all earnings of rural areas in developing countries. Thus what happens to wages will depend critically on what happens to the nonfarm sector. But the nonfarm sector is quite heterogeneous. On one hand, the nonfarm sector can consist of small-scale farms selling services on the local market. Since demand in this market is generated locally and the products of this market are not easily transferred across space, it seems plausible that this sort of nonfarm activity will increase with agricultural incomes, thus having a salutary effect on agricultural wages, at least if there is some reasonable degree of mixing between working in such small-scale services and working in agriculture as seems plausible. On the other hand, the nonfarm sector can consist of firms that produce tradable goods for the external market. Here, the situation is less clear. Increases in agricultural productivity that increase demand for agricultural labor will increase overall labor demand and thus bid up wages in the factory sector as well. But the overall consequences for wages depend on how this sector responds. If the higher wage results in exit from the factory sector, the effect of agricultural productivity on rural wages may be dampened. A further complication arises with respect to the potential for value-added production in agriculture. Since value-added production uses agricultural production as an input, growth in this sector tends to both create greater employment in that sector and to increase the demand for labor in the agricultural sector. This pairing of changes has a particularly salutary effect on wages.

There is both theoretical and empirical basis to believe that value-added production in agriculture is a potentially valuable source of rural earnings growth.

But if this is indeed the case it raises questions about how it may be best encouraged. While we see preliminary evidence that employment in this sector is correlated with income growth in India, for example, its incidence is quite low. There is also the evident difference in the correlation of nonfarm and farm activity between Thailand as documented in Townsend (2011) and in India. One obvious question that arises is how this process is affected by government intervention in grain markets. For example, one might conjecture that the large-scale procurement programs in India—up to 40% of grain in the market for some areas—decrease rural growth in value-added activities by reducing incentives for farmers and local entrepreneurs to seek out new opportunities in this area.

The paper also explored the role of human capital, credit markets on infrastructure and worker productivity, and thus earnings. Again the results are multi-faceted and depend on particular issues and structures. It seems clear that all three inputs can have a substantial effect on rural employment. But the presence of such effects need not necessarily imply that these interventions are cost-effective, particularly with regard to relatively remote areas or those with unfavorable conditions for productive agriculture. In such areas, policies that promote migration, inclusive of improved schooling and better access to urban labor markets, may also have salutary effects on rural employment by encouraging workers to move to areas where they can find better job, by reducing labor supply in sending areas, and by stimulating local demand through remittances from successful migrants.

There also may be substantial complementarity across interventions in these areas in which a series of inputs creates the conditions for a substantial increase in the local labor market that feeds back on itself through greater productivity in agriculture, higher demands for local service goods, and increased production of both manufactured tradables, particularly value-added agricultural goods. Expansion in rural employment is likely to be most responsive to a broad spectrum of different interventions with particular attention to how individual programs and effects affect the operation of local markets for products and labor and the broader connections of these markets to the wider world.

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Winners and Losers of Multinational Firm Entry into Developing Countries: Evidence from the Special Economic Zones of the People's Republic of China

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This paper examines the impact of multinational firm entry into local labor markets on employment, productivity, and wages. It exploits the People's Republic of China's rapid implementation of economic reforms and assignment of cities to special economic zone status in the 1980s and 1990s. Using data on both firms and workers, it is found that these policies increased foreign direct investment, which raised average labor productivity in these labor markets. However, only modest increases in real median wage rates across these cities are observed in the face of large increases in wage inequality and rising local prices, limiting the benefits to most workers in these cities. Evidence is presented that corporate profits captured most of the increase in productivity in these areas.

JEL classification: F13, F16

I. INTRODUCTION

In 1978, the People's Republic of China's (PRC) premier Deng Xiao Ping launched the country's efforts to open its doors to the world. Since the changes that he envisioned were drastic, he initiated a policy in which key strategic cities would be chosen as experimental zones with privileged status. The special economic zones (SEZs) and closely related free trade zones (FTZs) were spectacularly successful and attracted foreign direct investment (FDI), as well as an agglomeration of domestic firms hoping to do business with multinational corporations. While the strategies used to attract investment were extremely successful, little is known as to the success of the policy's intention of foreign investment inducing productivity improvement in domestic PRC firms. It is even less clear whether foreign investment has translated into wage increases for Chinese workers, especially those with low skill levels.

Has the PRC's phenomenal growth created a tide that "lifted all ships"? Many fear that corporate profits have captured the bulk of the surplus generated

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by lower costs of production in the PRC, leaving labor with a smaller share of an albeit larger pie. If wage increases for workers are modest, rising average price levels may leave many workers *worse* off as a result of trade, in terms of purchasing power. Examining the PRC experience in these tax-privileged zones is important for evaluating the potential of globalization to reduce poverty in developing countries, as the PRC experience has been hailed as a model. It has been used to encourage other countries to pursue similar development strategies, although in some countries such as India, local groups have blocked the implementation of SEZs due to concern about their impact on the local economy. Thus, an accurate assessment of the economic impact of these policies on such factors as employment, wages, and income inequality is of significance both in the PRC and in developing countries around the world.

This study exploits the phased rollout of the PRC's SEZs, and closely related FTZs¹, to assess the impact of multinational activity on local labor markets, and the welfare of workers in these cities. A key challenge in the analysis is that these areas were chosen endogenously, as the majority of these areas were in coastal areas that may have benefited from the PRC's growth in the absence of special treatment. The study exploits a quasi-experiment associated with Deng Xiao Ping's famous "southern tour" in 1992. His visit and policy statements in favor of economic liberalization provided political impetus for expanding the number of cities with special status, and increasing autonomy within the existing SEZs.

This paper examines a panel of PRC cities—its firms, workers, and whether the cities are tax-privileged each year. The sample period for firms (1951–2002) and for workers (1988–2002) was characterized by large increases in FDI to the PRC, with much of the increase occurring in the SEZs. Since the timing of the establishment of the zones varied across cities, it is possible to estimate models that exploit variation within a city in terms of FDI and other outcomes of interest such as labor productivity (proxied by valued added per worker) and average wage levels. Importantly, the paper also examines whether existence of higher productivity firms leads to higher real wages for the average worker, for only the highest earning worker, or if the extra productivity is completely captured by an increasing return to capital.

The paper is organized as follows. Section II discusses the background of how SEZs and FTZs were established, and the special treatment they provided to multinational firms. Section III presents data on firms, workers, and the rollout of special-status zones in the PRC. Section IV presents the estimation strategy and

¹As will be discussed, there are several other special zones similar to SEZs and FTZs included in the analysis. Specifically, export processing zones (EPZ) and coastal open cities (COC) are included in the analysis. An area is generally referred to as a "special economic zone" when it has any of these four designations (SEZ, FTZ, EPZ, or COC).

Section V the empirical results. Section VI concludes with a brief discussion of the policy implications of the findings.

II. BACKGROUND

A. The PRC's Special Economic Zones

The SEZ experiment began soon after Deng Xiaoping's 1978 policy statement in which he argued for greater economic liberalization, and more interaction with firms from overseas (Yeung et al. 2009). These zones were envisioned as small laboratories to explore the economic potential of further opening up of the PRC's economy, and so four southern cities were chosen for SEZ status, in which they were able to operate with administrative autonomy from the provincial government, and foreign firms were allowed tax exemptions. The SEZs were strategically located in coastal areas close to islands with capitalist economies, including Xiamen (near Taipei, China); Zhuhai (near Macao, China); and the most successful SEZ, Shenzhen, which capitalized on its proximity to Hong Kong, China. While the areas chosen were in locations convenient to foreign firms, they were by no means already developed areas. In fact, the government focused on undeveloped cities to minimize resistance to the new policies, and to limit damage should the experiment fail. For example, prior to obtaining SEZ status in 1980, Shenzhen was a small fishing village without even a single traffic light (CCPR, 1987). Twenty years later, its population had exceeded 10 million. The SEZs were successful at attracting foreign investment and cheap migrant labor from nearby provinces almost immediately (Yeung 2009). By 1985, the SEZs accounted for more than 20% of the PRC's FDI. The success of the original SEZ cities spurred the government to open 14 coastal cities to foreign investment in 1984 (Yeung and Hu, 1992). This also began to attract additional foreign firms attempting to capitalize on the PRC's cheap labor and goods for lucrative overseas consumer markets.

During the late 1980s, however, many policy makers in the PRC felt that the country's entry into the world economy was proceeding too slowly. Some believed that the PRC's reform efforts were stagnating and meant to develop faster, yet they met resistance from conservative elements of the country who wished to maintain the status quo. Deng Xiao Ping's famous visit to the South in 1992 was intended to promote reform policies, and embolden those who wished to continue the PRC's move to capitalism. In the wake of Deng's visit, FTZs were established in several other coastal cities, including Shanghai's highly successful Putong Economic Zone. Smaller-scale economic and technological development zones were also opened throughout the country, with many zones being created in the country's interior.

These zones have generated some controversy, however. Several scholars have questioned the sustainability of SEZs due to a phenomenon known as “development zone fever”: the opening of development zones beyond what is economically efficient or feasible, which results in a waste of resources and arable land (Wong and Tang 2005, Zhang 2011).² Other scholars note that the preferential policy treatment accorded to the SEZs are largely responsible for the sustained rise of regional disparity in the PRC, particularly between the coastal provinces and the more Western provinces (Demurger et al. 2002, Jones et al. 2003). According to one observer, the inequalities between provinces in the PRC will lead to a rebellion “as long and as arduous a struggle as the Civil War in the United States” (Tyler 1995).

B. Theoretical Predictions

In the wake of globalization, a rich theoretical literature has developed to explain the changes observed in both developed and developing countries. This section examines how it may guide the analysis of the experience of the PRC’s SEZs. Trade theory that examines the expected impact of the PRC’s entry into global markets often begin with the standard insight of the Heckscher-Ohlin (H-O) model, which predicts that countries will specialize in goods that require a resource-abundant input good. In the PRC, cheap unskilled labor is a relatively abundant resource and developed economies, such as the United States (US), have a greater supply of other resources, such as capital and high-skilled labor. As predicted by the H-O model, in the wake of the PRC’s liberalized trade policy, the US data reflect a decline in employment in industries that employ workers who perform “routine” tasks, and a concurrent increase in imports in these industries (Ebenstein et al. 2009). Insofar as routine tasks can be performed easily by foreign workers, and are easily monitored by multinational parent corporations (Rossi-Hansberg and Grossman 2009), it is logical to assume that SEZs will attract industries that require large numbers of low-skilled production workers, thereby increasing demand for their services.

The model suggest that increased relative demand for low-skilled production workers in SEZs and other areas would raise the wages of unskilled Chinese workers, but lower the wages of their counterparts in developed countries. The implication is that wage inequality can be expected to rise in developed countries, but the prediction is more ambiguous for developing countries. Antras et al. (2006) present a model that predicts offshoring’s impact on high-skilled workers in developing countries, such as Chinese managers who may

²In 1991 there were only 117 development zones in the PRC, but by 1992 that had mushroomed to 2,700, the overwhelming majority of which were independent initiatives by local authorities, from provincial governments to township governments. In the mid-1990s the government began to clean up the development zone scene, cancelling about 1,200 zones and returning more than 2 million mu of vacant land to agriculture (Deng and Huang 2004).

be less talented than their foreign counterparts. They consider a one-sector, two-country model in which large declines in communications costs enable the formation of North–South teams. They argue that the “globalization” equilibrium, wherein Northern workers can team up with Southern workers at no additional expense, will lead to international teams in which Northern managers supervise teams of Southern workers. Their model generates the prediction that inequality will rise in the North *and* in the South: “Globalization improves the quality of managers with whom Southern workers are matched, thus raising the productivity of these workers, and thereby leading to an increase in the return to skill. This effect is reinforced by an occupational choice effect: more agents become workers, hence increasing the range of abilities in the worker distribution.” This prediction fits the PRC’s SEZ experience, as its rural population left agriculture and entered into production jobs in the SEZs, potentially increasing the heterogeneity of skills among workers and contributing to Chinese wage inequality.

Another strand of literature has focused on firm productivity, and the potential for high-productivity multinational firms to create technology spillovers to domestic firms in these cities. The empirical evidence is mixed, however. Abraham et al. (2010) find evidence of positive spillovers, while Lin et al. (2009) fail to find evidence of any meaningful spillover in productivity. Hu and Jefferson (2002) report a *negative* effect on domestic firms examining the electronic industry, leaving no consensus. In a recent paper, Ito et al. (2010) examine the spillover effect on domestic firms in two areas: total factor productivity (TFP) and invention patent application. They find that spillovers are present both within and across different industries, but the spillovers operate differently. Domestic firms in direct competition with foreign invested enterprises (FIEs) located in close proximity to FIEs benefit from knowledge spillovers, whereas non-competing domestic firms benefit from the FIEs production spillovers. Du et al. (2011) also find positive productivity spillovers from FDI in both vertical and horizontal linkages with local firms. They find that vertical linkages grew stronger after the PRC’s entry into the WTO, and that tariffs are associated with a negative effect on vertical and horizontal linkages.

Other scholars have focused on the role of trade in forcing the exit of less competitive firms. In an influential paper, Melitz (2003) posits that only the most productive firms will engage in multinational activity, and that trade can lead to welfare gains if lower-productivity firms are forced to exit the market. Indeed, empirical evidence suggests that this claim is borne out by the data (Helpman et al. 2004). In combination with evidence that domestic firms in the PRC are of lower productivity than American firms through poor capital allocation (Hsieh and Klenow 2009), it may be that the SEZs create an environment where domestic firms in the PRC are forced to either compete or exit the market. The

ensuing data analysis will examine how SEZ status has affected the composition of firms, their productivity, and the wages of workers in these local labor markets.

III. DATA

The data on the timing and location of SEZs are the first attempt to catalogue these events systematically.³ For each special zone, the year in which it was established, the special privileges associated with the zone, and the county in which it is located are recorded. The data cover six different types of zones: Special Economic Zones (SEZ), Free Trade Zones (FTZ), Coastal Open Cities (COC), Economic Technology Development Zone (ETDZ), Export Processing Zone (EPZ), and High Technology Development Zone (HTDZ). The principal focus is on the SEZs, FTZs, EPZs, and COCs as these provided much more substantial financial incentives to foreign multinational firms to enter the market. There was a proliferation of these special-status areas between 1985 and 1995, with a large number of special zones being established in the early 1990s after Deng Xiao Ping's visit to the South.

The firm data are taken from the 2003 Annual Survey of Industrial Production by the National Bureau of Statistics. The sample is composed of all nonstate firms with more than 5 million Yuan in revenue (about \$800,000) plus all state-owned firms. The raw data consist of over 100,000 firms. Importantly, for each firm, both ownership type and year of establishment are observed. As shown in Figure 1, foreign-firm entry rose precipitously in the early 1990s, following the expansion of SEZs and expanded incentives within existing zones. Summary statistics for the sample of firms are reported in Table 1.

³These data are available for download at the author's website, matched to the PRC's 2000 census data at the 4-digit and 6-digit levels. See demog.berkeley.edu/~ebenstei/research/sez/datafiles/all_economic_zones_citygb.data.

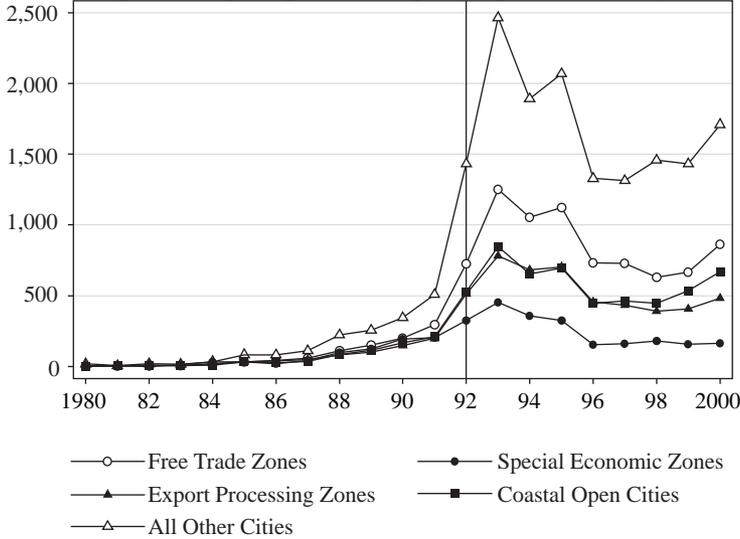
Table 1. Summary Statistics for Sample of Firms in Manufacturing, 2003

	Established Prior to Economic Zones (1950–1979)			Established After the Economic Zones (1980–2002)		
	Regular City (1)	Special Economic Zone (ever) (2)	Difference (2)-(1) (3)	Regular City (4)	Special Economic Zone (ever) (5)	Difference (5)-(4) (6)
Foreign Firm (1=yes)	0.01 (0.10)	0.02 (0.13)	0.00715* (0.004)	0.20 (0.40)	0.37 (0.48)	0.178*** (0.04)
Number of Employees (*000s)	99.30 (784)	113.24 (864)	13.94 (19.44)	56.23 (365)	89.03 (766)	32.80*** (9.93)
Total Annual Sales (million yuan)	527.36 (1673)	460.54 (1717)	-66.82 (63)	233.45 (605)	245.65 (639)	12.21 (23)
Value Added (million yuan)	28.95 (229.69)	29.05 (212.81)	0.10 (5.06)	15.20 (94.46)	23.39 (229.57)	8.187*** (2.65)
Total Annual Profit (million yuan)	3.10 (57.03)	3.77 (57.02)	0.67 (1.20)	2.62 (29.71)	5.33 (90.41)	2.709*** (0.82)
Value Added per Worker (thousand yuan)	41.43 (98.88)	47.21 (83.08)	5.78 (4.90)	73.42 (244.11)	93.26 (246.66)	19.84*** (6.60)
Share of Annual Sales Paid in Wages	0.134 (0.14)	0.136 (0.14)	0.002 (0.01)	0.076 (0.08)	0.084 (0.09)	0.00774** (0.00)
Profit per Worker (thousand yuan)	1.554 (37.62)	2.310 (28.19)	0.756 (1.75)	11.079 (66.01)	17.065 (90.78)	5.986*** (1.98)
Special Economic Zone (1=yes)	0.00	0.00	0.00	0.00	0.69 (0.46)	0.691*** (0.09)
Observations	14,937	4,064		105,957	42,567	

Note: The sample is composed of all manufacturing firms in 2003 that have annual revenue greater than RMB5 million (\$800,000). The designation of a city as a special economic zone also includes cities that are free trade zones, export processing zones, or coastal open cities. The firms in columns 1 and 4 are located in cities without a special zone. Firms in columns 2 and 5 are located in cities with special economic status, or cities that would eventually be given special economic status. Statistics are reported using 2003 firm data, stratifying them by the year of opening.

Source: [People's Republic of] China Annual Survey of Manufacturing Firms (2003).

Figure 1. **Foreign Firm Openings in the People’s Republic of China, 1980–2000**



Note: A vertical line is placed at 1992, the year in which Deng Xiao Ping visited the PRC’s special trade areas and initiated additional autonomy and tax exemptions for foreign firms.

Source: [People’s Republic of] China Annual Survey of Manufacturing Firms (2003).

Data on workers and their wages are drawn from the Urban Household Surveys (1988–2002). For each worker in the sample, age, sex, years of education, broad measures of industry and occupation, city, and monthly wage income are observed. The sample is restricted to those workers in the labor market: men aged 16–59 and women aged 16–55. Excluded from the sample are those who report being either retired or disabled. These data are matched by city to the sample of firms, and to the catalogue of SEZ status by county and year. Summary statistics are reported in Table 2. The analysis of the causal effect of foreign entry on local labor markets is based on the assumption that SEZ status assignment induces higher-productivity firms to locate in these areas, and this is exogenous to the existing composition of workers in the city. As shown in Table 2, the workers are quite similar in the two sets of cities—but workers in the SEZ cities are more likely to be working in a year X city cell with a zone in place.

Table 2. Summary Statistics for Sample of Workers in the PRC, 1988–2001

	Prior to Deng's Southern Tour (1988–1992)			After Deng's Southern Tour (1993–2001)		
	Regular City (1)	Special Economic Zone (ever) (2)	Difference (1)-(2) (3)	Regular City (4)	Special Economic Zone (ever) (5)	Difference (4)-(5) (6)
Log Wages	7.44 (0.58)	7.60 (0.57)	0.160*** (0.05)	8.75 (0.78)	8.97 (0.78)	0.220* (0.12)
Real Log Wages	7.00 (0.57)	7.14 (0.54)	0.144*** (0.04)	7.76 (0.83)	7.83 (0.76)	0.07 (0.18)
Age	36.67 (9.91)	37.18 (9.88)	0.511*** (0.21)	38.12 (15.48)	39.37 (15.15)	1.248*** (0.45)
Male (1=yes)	0.52 (0.50)	0.52 (0.50)	0.00 (0.00)	0.51 (0.50)	0.51 (0.50)	-0.00 (0.01)
Years of Education	10.60 (2.69)	10.73 (2.63)	0.14 (0.10)	10.15 (3.83)	10.45 (3.56)	0.30 (0.29)
Consumer Price Index	156.46 (17.17)	158.83 (15.80)	2.38 (1.87)	288.32 (70.73)	317.24 (37.31)	28.92 (20.09)
Value Added per Worker ¹	41.31 (19.73)	65.02 (17.09)	23.71*** (3.85)	66.55 (22.74)	77.55 (16.09)	11.01* (6.51)
Special Economic Zone (1=yes)	0.00 0.00	0.62 (0.49)	0.619*** (0.10)	0.00 0.00	0.85 (0.36)	0.852*** (0.08)
Observations	73,084	16,944		111,417	49,601	

¹Value added per worker is defined by taking the average among firms operating in the worker's city in a particular year, using the 2003 firm-level data set.

Notes: The designation of a city as a special economic zone also includes cities that are free trade zones, export processing zones, or coastal open cities. The workers and firms in columns 1 and 4 are located in cities without a special zone. Workers and firms in columns 2 and 5 are located in cities with special economic status, or cities that would eventually be given special economic status. The workers sample is restricted to individuals earning wage income among men aged 16–59 and women aged 16–55.

Sources: [People's Republic of] China Urban Household Survey (1988–2001), [People's Republic of] China Annual Survey of Manufacturing Firms (2003).

IV. ESTIMATION STRATEGY

A. Firm Entry and Average Productivity in Special Economic Zones

The proposed mechanism for workers to benefit from an economic zone is that foreign firms are more productive on average, and their presence will induce increases in average productivity, which may then lead to higher wages. Since special zones attract foreign firms and higher-productivity domestic firms, of interest are the reduced form relationship between SEZ status and labor productivity, as well as the mechanisms behind the relationship. As a prelude, it is demonstrated that FDI and domestic firms (DOM) are drawn to an SEZ in city j in year t , after accounting for city and year fixed effects. Models can be estimated by regressions of the following form:

$$FDI_{jt} = \alpha + \beta_1 SEZ_{jt} + \mu_j + \mu_t + \varepsilon_{jt} \quad (1)$$

$$DOM_{jt} = \alpha + \beta_2 SEZ_{jt} + \mu_j + \mu_t + \varepsilon_{jt} \quad (2)$$

Next, the relationship between average firm productivity and the status of the city as a special zone is determined. Since the adoption of an SEZ may lead to foreign firm entry which are on average more productive, it is anticipated that less productive firms will leave the market, and spillovers between foreign firms and domestic firms will lead to increased productivity as well. Labor productivity averages across firms by city and year are calculated; these are considered to be the primary mechanisms for an SEZ to attain better labor market outcomes. Note that since there is limited data on firms for the period by year, in the empirical results the firm data from 2003 is used to estimate analogues of (1) and (2), where the location and timing of the firm's establishment is used to assign zone status and estimate whether these policies attracted more productive firms.

The valued added per employee of all firms i already opened in city j is calculated as follows:

$$LP_j = \sum_{i=1}^{i=l} \frac{VA_i}{EMP_i}$$

These data are then averaged among all firms opened by year t in city j . This allows calculation of labor productivity and estimation of the reduced form relationship between labor productivity in city j and year t , after accounting for year and city fixed effects.⁴

⁴In the empirical results, province fixed effects are included instead due to data constraints.

$$LP_{jt} = \alpha + \beta_3 SEZ_{jt} + \mu_j + \mu_t + \varepsilon_{ijt} \quad (3)$$

Note that in the empirical results, in the absence of complete firm data for all years, data are taken from 2003 and back-cast to approximate the city's firm composition using information on the year each firm was established. This is discussed further in the empirical results section.

B. Firm Profits and Worker Wages in Special Economic Zones

Multinational firms, relative to their domestic counterparts, are more capital-intensive and have higher productivity (Hsieh and Klenow 2009). In combination with the tax advantages granted to these firms, their access to low-wage Chinese workers and high-price product markets in developed countries an increase the profits of firms in these cities can be anticipated. The extent to which workers share the benefits is an open empirical question. While standard microeconomic theory suggests that workers will earn their marginal revenue product, and that SEZ status will lead to higher wages, many fear that the surplus labor from rural areas will lead to firms holding an "upper hand" in wage bargaining. Of interest here are both the impact on corporate profits and the impact on workers' wages. Equations (4) and (5) estimate the reduced form relationship between firm profits, workers' wages, and SEZ status.

$$\Pi_{jt} = \alpha + \beta_4 SEZ_{jt} + \mu_j + \mu_t + \varepsilon_{ijt} \quad (4)$$

$$w_{ijt} = \alpha + \beta_4 SEZ_{jt} + \mu_j + \mu_t + \varepsilon_{ijt} \quad (5)$$

Since equation (2) can be thought of as a first-stage equation for equation (5), there is need to estimate models of the following form, where fitted values from equation (2) and controls for individual characteristics X are used.

$$w_{ijt} = \alpha + \beta_3 \widehat{LP}_{jt} + \mu_j + \mu_t + X_{ijt} + \varepsilon_{ijt} \quad (6)$$

C. Returns to Skill, Wage Inequality, and Special Economic Zones

A voluminous theoretical literature on how foreign firm entry affects skill prices exists, but there is little real-world evidence. Here, models of the return to education within a city-year cell, and how it relates to conversion of a city to SEZ status are considered. To determine the impact on wage inequality, how individual-level wages are responsive to the presence of an SEZ, and whether these have led to increases in wage inequality, are examined. This includes impact of SEZ status on workers at the k th percentile of wages. An alternative strategy is

to consider how skill prices themselves have changed, as proxied by years of education, in SEZ cities versus other cities. While the empirical analysis will only examine these issues in a descriptive manner, the models are presented for expository purposes.

$$w_{jt}^k = \alpha + \beta_6 SEZ_{jt} + \mu_j + \mu_t + \varepsilon_{jt} \quad (7)$$

$$w_{ijt} = \alpha + \beta_7 SEZ_{jt} \cdot Yrsed_{ijt} + \mu_j + \mu_t + X_{ijt} + \varepsilon_{jt} \quad (8)$$

V. EMPIRICAL RESULTS

A. Firm Entry

Table 3 estimates equations (1) and (2) to examine the link between firm entry and SEZs. Focusing on SEZs, FTZs, EPZs, COCs and a variable, which is a combination of the four different zones, a regression is run on a city's number of firm openings for each type of zone, with year and city fixed effects. The sample is the 345 distinct prefectures (or cities) for the period 1951–2002, yielding 17,940 observations (345 x 52). Columns 1–3 differentiate between foreign firm openings, domestic firm openings, and state-owned firm openings.

Table 3. Firm Entry in the PRC's Economic Zones

	Foreign Firm Openings (1)	Domestic Firm Openings (2)	State-Owned Firm Openings (3)
Any Zone	33.74*** (9.96)	21.56*** (7.37)	19.60*** (6.39)
Special Economic Zone	31.20** (12.93)	2.06 (2.66)	2.11 (1.45)
Free Trade Zone	80.36*** (25.39)	53.44** (21.43)	36.27*** (13.93)
Export Processing Zone	14.64*** (4.83)	22.15*** (7.21)	16.57*** (4.19)
Coastal Open City	25.77*** (7.94)	26.42** (10.29)	18.43** (7.70)

Note: N=17,940. Each observation is a city X year cell for the period 1951–2002 (345 x 52). Each cell in the table represents the coefficient from a separate regression. In each regression, a city's number of firm openings in a given year is regressed on the listed zone status. Each regression has year and city fixed effects. Standard errors are clustered at the city level.

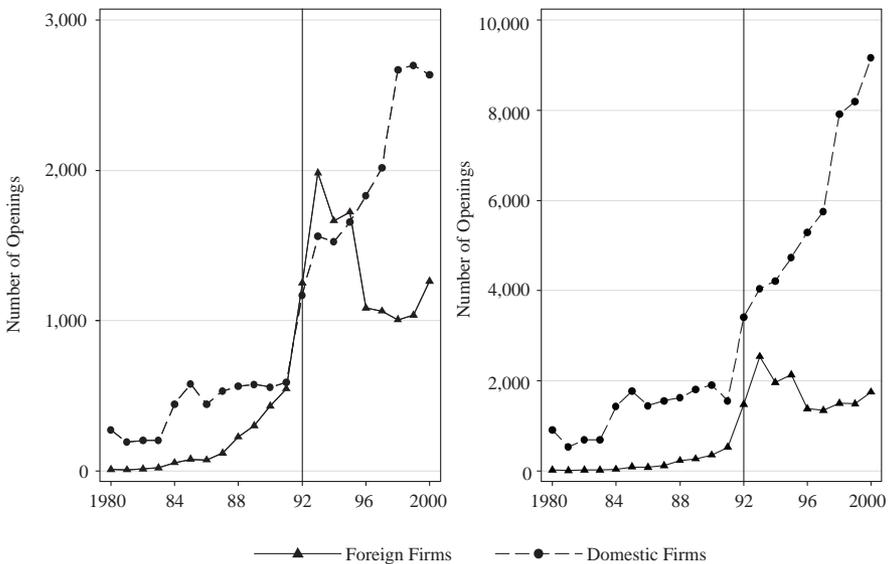
Source: [People's Republic of] China Annual Survey of Manufacturing Firms (2003).

The results show a positive and statistically significant relationship between all types of firm entry and a city's status as an SEZ. Interestingly, the different types of economic zones had different effects on the entry of firms. As shown in row 1 of Table 2, the cities assigned to SEZ status had a strong impact

on foreign firm openings (21.41) but a very small effect on domestic firm entry. As intended, these SEZ cities enabled foreign firms to produce goods in the PRC for export—but did not generate a large number of new domestic firms in these areas. In contrast, a city’s assignment to FTZ status increased the number of foreign firm openings by 80.36 per year, and also resulted in an additional 53.44 new domestic private firms, and 36.27 state-owned firms. This is logical since FTZs were established to enable trading of intermediate goods between foreign and domestic firms. The results for EPZs and COCs are similar, with these areas generating a statistically significant number of new domestic and foreign firms.

These patterns are shown graphically in Figure 2, which tracks the expansion of firms in the SEZs and all other cities. The zones were characterized by rapid increases in the number of foreign firms, followed shortly thereafter by increases in the number of domestic firms. In nonzone cities, domestic firm openings have been consistently higher than foreign firm openings. As will be shown in the next section, foreign firms are on average more productive, implying that these differences could generate differences in profits and wages across cities.

Figure 2. Foreign and Domestic Firm Entry into the PRC’s Cities
 Special Economic Zones All Other Cities



Notes: A vertical line is placed at 1992, the year in which Deng Xiao Ping visited the PRC’s special trade areas and initiated additional autonomy and tax exemptions for foreign firms.

Source: [People’s Republic of] China Annual Survey of Manufacturing Firms (2003).

B. Productivity, Profits, and Aggregate Wages

Table 4 estimates modified versions of equations (3), (4), and (5) to examine the link between economic zones and several measures of economic performance of firms: total revenue, total employment, value added per worker, profit per worker, wages per worker. Ideally, the sample would include firms for the entire period (1951–2002), where the entry and exit of firms in SEZ cities relative to other cities is observed. Instead, in the absence of data for this period, the analysis focuses on a sample of manufacturing firms that are observed in 2003. While these data are limited, they allow for comparison of firms established in SEZs versus other cities.

The results presented in Table 4 document significant productivity and pay differences between firms in SEZ cities, even controlling for a rich set of firm characteristics. The models are estimated with industry, province, and year fixed effects. Ideally, the models would include city fixed effects to control for time-invariant differences between cities since there may be differences between cities that are chosen for zone assignment. However, since the sample is composed of only large manufacturing firms, and many cities such as Shenzhen only attracted large firms *after* they became an SEZ, it is infeasible to robustly estimate models with city fixed effects, and the results should be interpreted with this caveat. The sample is also stratified by whether the firm is domestic or foreign-owned so that it can be assessed whether zone status affected these firms differently. The results shown in Panel A indicate that foreign firms which entered SEZs are significantly more productive than foreign firms not in SEZs. Firms in SEZs are no larger than firms not in SEZs as measured by sales or employment, but firms in SEZs have significantly higher value added per worker, profit per worker, and wages per worker. The results indicate that being in an SEZ for foreign firms is associated with higher value added per worker of 6.24 percent, profits per worker of 13.4 percent, wages per worker of 16.2 percent, and all estimates are statistically significant at the 1% level. However, it is worth noting that the share of firm revenue going to workers is no higher in the SEZs.

The results for domestic firms indicate that firms in SEZs have higher sales (6.31 percent) but are no larger as measured by employment. Like foreign firms, domestic firms in SEZs have higher value added per worker (5.54 percent) and pay higher wages per worker (18.82 percent), but are only modestly more profitable than firms in not in SEZs. This is consistent with claims that SEZs have contributed more to multinational profits than the profits of domestic Chinese firms. However, the data do indicate the policy's success at attracting productive and well-paying foreign and domestic firms. Note however, that these large manufacturing firms generally pay higher wages than smaller firms, and it is unclear from these results if workers in SEZ cities benefited in general, and

whether *real* wages rose after accounting for the higher cost of living there. This is examined in detail in the next section.

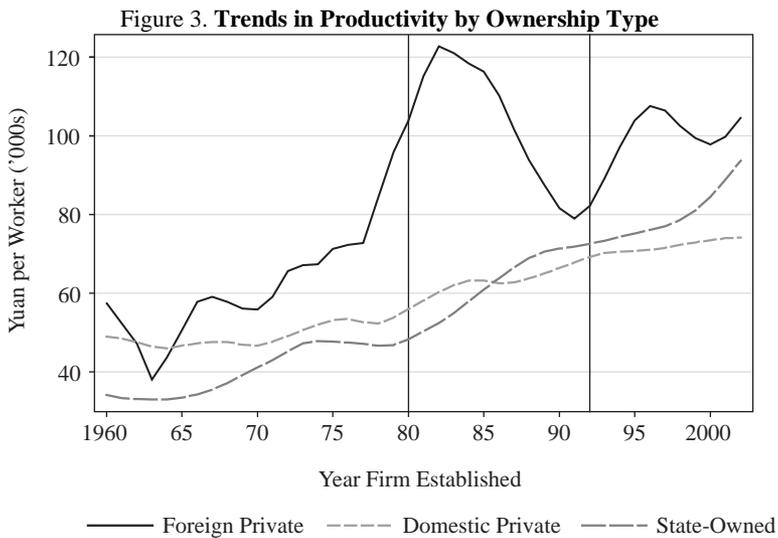
Table 4. **Employment, Value Added, and Profit in Cities with Economic Zones**

LHS: Levels				
	Total Employment (1)	Value Added per Worker (2)	Profit per Worker (3)	Wages per Worker (4)
Any Zone	170,359*** (40,779)	17.65*** (4.48)	5.510*** (1.31)	0.63 (0.71)
Special Economic Zone	155,481* (87,431)	33.61*** (9.56)	6.687*** (2.33)	2.67 (2.88)
Free Trade Zone	336,888*** (101,340)	11.11 (7.10)	6.529** (3.18)	0.20 (0.71)
Export Processing Zone	241,742*** (59,245)	13.83*** (4.35)	6.213*** (1.51)	-0.45 (0.35)
Coastal Open City	143,404*** (45,095)	12.32** (5.58)	4.113*** (1.44)	-0.04 (0.60)
LHS: Logs				
	Total Employment (5)	Value Added per Worker (6)	Profit per Worker (7)	Wages per Worker (8)
Any Zone	0.587** (0.28)	0.07 (0.09)	0.738*** (0.15)	0.00 (0.06)
Special Economic Zone	2.202** (0.92)	0.394*** (0.13)	0.910*** (0.26)	0.20 (0.21)
Free Trade Zone	0.500*** (0.19)	-0.06 (0.14)	0.681** (0.29)	-0.05 (0.06)
Export Processing Zone	-0.17 (0.16)	-0.07 (0.07)	0.664*** (0.14)	-0.123*** (0.03)
Coastal Open City	0.30 (0.19)	-0.03 (0.12)	0.643*** (0.21)	-0.05 (0.06)

Note: N=17,940. Each observation is a city X year cell for the period 1951–2002 (345 x 52). Each cell in the table represents the coefficient from a separate regression. In each regression, the listed zone status is regressed on a city's aggregate employment, value added per worker among firms, or profit among firms. Each regression has year and city fixed effects. Standard errors are clustered at the city level. The sample used in this table is constructed by creating a pseudo-panel of firm averages across cities and years by exploiting the firm's year of establishment and creating a set of firms thought to be operating in a given city and year. It is assumed that the firms operate at 2003 levels of productivity, profit, employment, and wage levels in all years.

Source: [People's Republic of] China Annual Survey of Manufacturing Firms (2003).

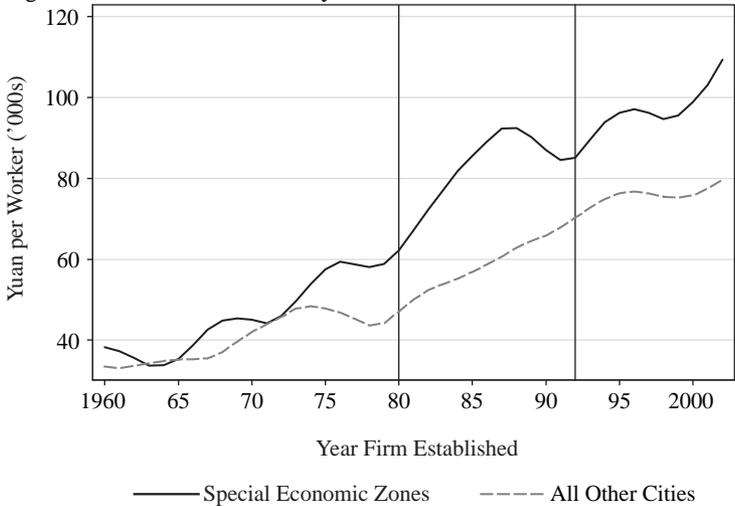
Figures 3 and 4 confirm graphically that firm productivity was higher in the economic zones (SEZs, FTZs, EPZs, COCs) than in other cities. As shown in Figure 3, when firms are stratified by the year in which they were established and by foreign or domestic ownership, foreign firms are more productive than domestic firms, a difference persisting throughout the sample period. However, the figure does indicate that the productivity gap between the different types of firms is narrowing—which may indicate a technology spillover between foreign firms and domestic/state-owned firms. In light of the productivity difference between foreign versus domestic firms, Figure 4 presents differences in productivity between SEZs and other cities. Cities with SEZs experienced an average firm productivity increase from 60,000 yuan per worker in 1980 to 110,000 yuan per worker in 2003. Growth in productivity, however, was more sluggish in others cities, increasing from 50,000 yuan in 1980 to just 80,000 yuan per worker in 2003. These results suggest that a widening gap has emerged between firms in the zones versus other parts of the country. Whether this productivity improvement has induced an improvement in the real wage paid to workers is examined further.



Note: The sample is composed of all firms with greater than RMB500,000 in 2003. The graph is created using loess smoother with bandwidth .20 on annual averages of value-added per employee in special zones versus all other cities. The special zones include special economic zones, free trade zones, export processing zones, and coastal open cities. Vertical lines are placed to indicate (i) the establishment of special economic zones in 1980, and (ii) the expansion of zones and their privileges in 1992 following Deng Xiaoping's visit to the South.

Source: [People's Republic of] China Annual Survey of Manufacturing Firms (2003).

Figure 4. **Trends in Productivity: Economic Zones and All Other Cities**



Notes: The sample is composed of all firms with greater than RMB500,000 in 2003. The graph is created using lowess smoother with bandwidth .20 on annual averages of value-added per employee in special zones versus all other cities. The special zones include special economic zones, free trade zones, export processing zones, and coastal open cities. Vertical lines are placed to indicate (i) the establishment of special economic zones in 1980, and (ii) the expansion of zones and their privileges in 1992 following Deng Xiao Ping's visit to the South.

Source: [People's Republic of] China Annual Survey of Manufacturing Firms (2003).

C. Wage Effects and Responses to Inequality

Table 5 estimates equations (4) and (5) to examine the link between average labor productivity and wages, with a focus on whether the productivity boost generated by SEZ status leads to higher wages. Both ordinary least squares and two stage least squares models are used to estimate these separately for all workers (column 1), manufacturing workers (column 2), and nonmanufacturing workers (column 3). All regressions include year fixed effects and province fixed effects.⁵ A rich set of demographic controls including age, age squared, years of education, and sex, isolate the impact of firm composition in the city on the compensation of workers.

⁵While ideally, city fixed effects are included, data on workers before and after the rollout of zones are insufficient to estimate stable models with city effects. The results should therefore be interpreted with caution, as city-specific factors that affect wages cannot be accounted for.

Table 5. OLS and 2SLS Models of the Impact of Average Labor Productivity on Wages Using SEZ Status as an Instrument

	Dependent Variable: Real Log Wages		
	Overall (1)	Manufacturing (2)	Other (3)
Panel A: Reduced form OLS models of real log wages on a city's SEZ status			
City is an SEZ (1=yes)	0.09 (0.07)	0.08 (0.08)	0.09 (0.07)
R-squared	0.51	0.46	0.55
Panel B: OLS models of real log wages on log of average labor productivity			
Log of Average Labor Productivity	0.203*** (0.04)	0.234*** (0.05)	0.195*** (0.04)
R-squared	0.52	0.47	0.56
Panel C: OLS models of log of average labor productivity on SEZ status			
City is an SEZ (1=yes)	0.235** (0.09)	0.221** (0.09)	0.243** (0.10)
R-squared	0.58	0.59	0.58
Panel D: 2SLS models of real log wages on log of average labor productivity using SEZ status as the instrumental variable			
Log of Average Labor Productivity	0.37 (0.22)	0.38 (0.30)	0.370** (0.17)
R-squared	0.51	0.46	0.55
Demographic Controls	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes
Observations	137,320	51,540	85,780

OLS = ordinary least squares, SEZ = special economic zone, 2SLS = two-stage least squares.

Note: Each cell in the table represents the coefficient from a separate regression. Our designation of a city as a Special Economic Zone also includes cities that are Free Trade Zones, Export Processing Zones, or Coastal Open Cities. Average labor productivity is measured among all firms that were operating in the city in the year, assuming they were operating at their 2003 levels of productivity. The sample is restricted to individuals with wage income. Demographic controls for age, age squared, years of education, and sex are suppressed. Standard errors are clustered at the city level.

Source: [People's Republic of] China Urban Household Survey (1988–2001), [People's Republic of] China Annual Survey of Manufacturing Firms (2003).

As shown in Panel A, workers in SEZs are paid somewhat better than workers in other cities. These workers enjoy an 8–9% premium in real wages, but the difference is not statistically significant. An important and open research question is whether workers in SEZ cities are able to benefit from the presence of more efficient firms. Specifically, it is worth examining whether the presence of high value-added per worker firms leads to higher wages among workers in general. Unfortunately, data for the entire sample period (1951–2002) that would reliably account for economic performance at the sub-national level are unavailable. Instead, the analysis relies on the 2003 firm survey and the distribution of years in which the firms opened. This enabled a back-cast generated distribution of firms by city in each year. This heroically assumes that firms operate at their 2003 levels, and no exit and entry. This as an attempt to analyze what types of firms entered cities before and after the SEZ assignment, and in the absence of data for the period, a potentially reasonable proxy for the composition of firms by city and year during the period.⁶

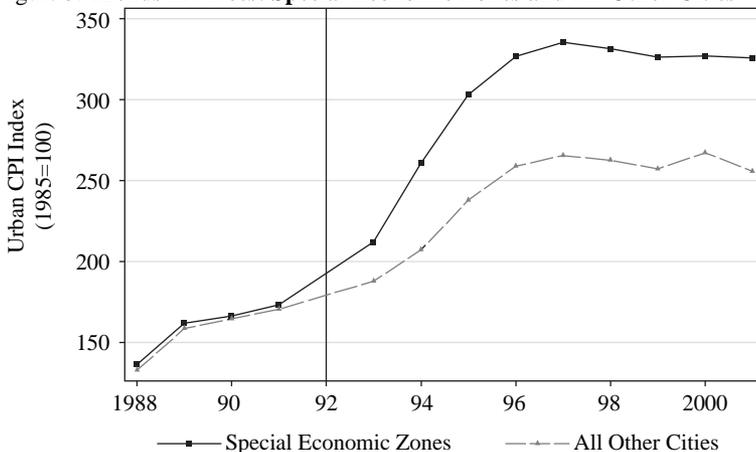
Upon examination of the relationship between wage rates and labor productivity, as proxied by value added per worker among the manufacturing firms in the sample, Panel B shows a robust relationship between wage rates and the log of average productivity among firms in the city, with a 1% increase in average productivity increasing real wage rates by 0.2%. This is statistically significant at the 1% level for manufacturing and nonmanufacturing workers, suggesting a spillover into other sectors of the economy. However, it is worth noting that this relationship may be endogenous. If workers who are more productive sort into cities with more productive firms, it may be that the causal link is more modest. Alternatively, if productivity is poorly measured relative to wages, it may be that the relationship is even stronger than the findings. Panel C and D examines the link between average firm productivity and wage rates exploiting the SEZ status of a city. Panel C reports the first-stage results, where a city's average productivity is regressed on its status as an SEZ. SEZ status increases productivity by 23.5% among firms, significant at the 5% level. Using the fitted values from this regression to examine the relationship between average productivity and real wages, workers are rewarded with 37% of the increase in average labor productivity, leaving 63% presumably to firms. However, these estimates are imprecise and statistically insignificant. While the results are not

⁶This analysis assumes that firms neither exit nor enter, which is heroic. There are caveats that make this assumption palatable, albeit not ideal. First, since this data set is only for firms that are sufficiently large (with greater than 5 million RMB in annual sales), it is a presumably less volatile sample than a survey aimed at smaller businesses. Second, while it is not ideal to assume that firms operated at their current levels of productivity, this may be a conservative assumption for the purpose of evaluating whether there are productivity differences between domestic and foreign firms. If foreign firms provide technology spillovers to domestic firms, assuming domestic firms operate at their 2003 levels will presumably understate the true productivity differences between foreign and domestic firms over the course of the earlier period, as catch-up during the sample period (1960–2002) will narrow the differences in the late period relative to the early period. Still, the results in this section must be interpreted with caution in light of our lack of direct observations of firms for the entire period.

definitive, they suggest that workers have received, at most, one third of the increase in firm productivity in increased wages. In combination with evidence from firms that SEZ status *is* associated with increased firm productivity and firm profitability but *is not* associated with a higher share of revenue going to wages, it can be concluded that firms have not passed on the increased productivity to their workers. Poor bargaining power among workers due to large numbers of surplus labor in rural areas of the PRC has led to a situation in which economic expansion leads to *more* jobs but not necessarily *better paying* jobs within these cities in real terms.

Figure 5 indicates that one mechanism for tepid growth in real wages in the SEZ areas was the rapid increase in prices. The figure indicates that from 1988 to 2001, the urban consumer price index rose from a level of 100 in 1985 to 350 by 2001, a stunning 250% increase. The price increase was slightly more modest in other cities, reaching 250 in 2001. The rapid increases in prices suggest that the workers and consumers were not able to enjoy fully the fruits of the PRC's expansion. In particular, if SEZs attract foreign firms, and this leads to higher prices but no increases in the real wage, the welfare impacts of these policies are ambiguous.

Figure 5. Trends in Prices: Special Economic Zones and All Other Cities



CPI = consumer price index.

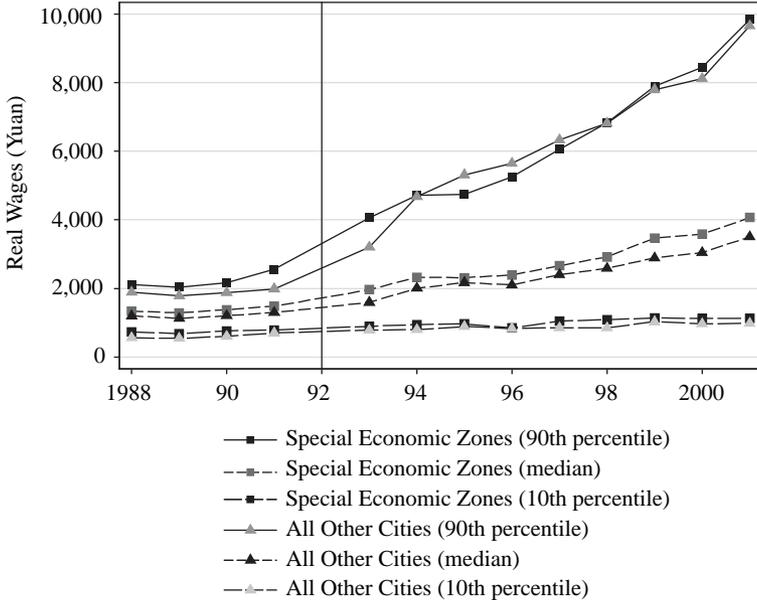
Note: The sample is composed of all workers. The urban CPI is available by province and year, and assigned to the workers in the sample. A vertical line is placed at 1992, the year in which Deng Xiao Ping visited the PRC's special trade areas and initiated additional autonomy and tax exemptions for foreign firms.

Sources: [People's Republic of] China Urban Consumer Price Index (1988–2001), [People's Republic of] China Urban Household Survey (1988–2001).

This possibility is highlighted by Figure 6, which indicates that among the sample of workers, little difference is observed in wage trends between SEZs and all other cities. From 1988 to 2001, the pace of increase of workers' wages has remained similar in the two groups, despite the productivity gap between firms in

SEZs versus other cities. In addition, the figure suggests a dramatic increase in inequality for both SEZs and other cities.⁷ In 1988, while the gap between the 90th percentile and the 10th percentile for real wages was less than 2000 yuan (in 1985 units), the difference in 2002 was nearly 10,000 yuan. If the PRC’s economic boom is generating a windfall for firms but large increases in inequality, it is unclear whether the growth will generate welfare improvements for the majority of the population.

Figure 6. Trends in Real Wages: Special Economic Zones and All Other Cities



Note: The sample is composed of all workers. A vertical line is placed at 1992, the year in which Deng Xiao Ping visited the PRC’s special trade areas and initiated additional autonomy and tax exemptions for foreign firms.

Source: [People’s Republic of] China Urban Household Surveys (1988–2001).

The combination of rising inequality and anemic wage growth while corporate profits have surged is a potential recipe for unrest or at least dissatisfaction. This possibility is investigated in Table 6. The results indicate that workers in SEZs are more likely to believe the city’s income distribution is “very unfair.” Workers in SEZ cities are 2.67 percentage points more likely to characterize the city as such, which is a 10% increase over a 30% sample mean (who report the city’s wage distribution is very unfair). Almost no difference by gender is observed but a large gap by income and education is exhibited. A 10% increase in log wages is associated with a 6 percentage point decline in the

⁷Quantile regressions as an analogue to this figure are also estimated. The results indicate no significant gap between SEZ cities or non-SEZ cities at various points in the wage distribution. The results are available upon request.

probability of perceiving the wage distribution as unfair, or a 20% decline. The table also indicates that the SEZ status of a city is associated with the belief that the wage distribution is unfair only among those with less than a high school degree. Being young (under 40) and having more education are both negatively correlated with the perception that a city's income distribution is unfair. This suggests that young and highly educated workers perceive a fair return to education, and are therefore less likely to feel that the city's income distribution is unfair.

Table 6. Perception of Fairness of Income Distribution, Chinese Workers (2002)

Sample Average	Dependent Variable:		
	Is the city's income distribution very unfair? (1=yes)		
	Overall	Less than HS Education	HS Graduates
	(1)	(2)	(3)
City is an SEZ (1=yes)	0.0267** (0.013)	0.0457*** (0.017)	0.000 (0.019)
Sex	0.0049 (0.012)	0.0087 (0.017)	0.0047 (0.018)
Log wage	-0.0620*** (0.009)	-0.0511*** (0.012)	-0.0669*** (0.014)
Communist Party member (1=yes)	-0.002 (0.012)	0.0316* (0.018)	-0.022 (0.017)
Observations	6,581	3,722	2,859
R-squared	0.013	0.011	0.013

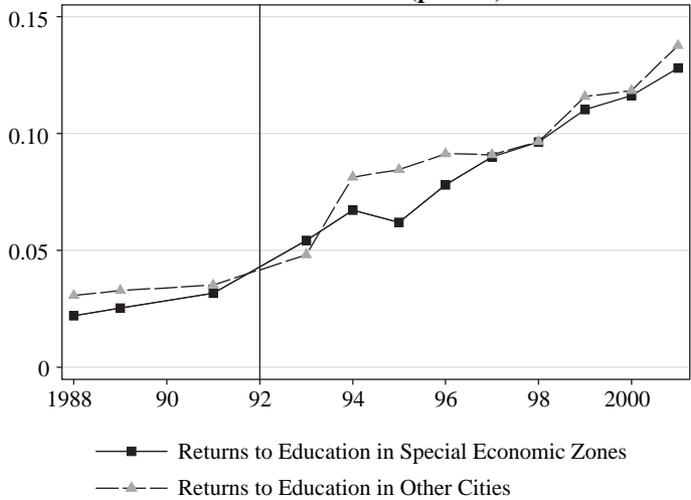
HS = high school, SEZ = special economic zone.

Note: SEZs include cities that are free trade zones or export processing zones. The sample is restricted to household heads. Also included are controls for age and age squared, which are suppressed. Standard errors are robust.

Source: [People's Republic of] China Household Income Survey (2002).

Figure 7 provides evidence in favor of this hypothesis. The figure indicates rapid increases in the returns to education in the PRC, with the return rising from 3% to 4% in 1988 to almost 14% in 2001. These trends are similar, however, in both SEZs and all other cities. While it is not possible to identify noticeable gaps in the return to education in the two areas, it may be that the PRC's foreign firms have generated an increase in the return to skill, but the effect is felt across the PRC rather than in a specific set of labor markets. This topic could be an area for future work, though it is clear that rapid increases in skill prices in combination with rising price levels could have important welfare implications and lead to declining purchasing power among the PRC's least skilled workers.

Figure 7. Trends in Returns to Education: Special Economic Zones and All Other Cities (percent)



Notes: The sample is composed of all workers. For each year, log wages are regressed on a worker's years of education, age, age squared, and sex. The figure reports the coefficient on years of education among workers in special economic zones and other cities. A vertical line is placed at 1992, the year in which Deng Xiao Ping visited the PRC's special trade areas and initiated additional autonomy and tax exemptions for foreign firms.

Source: [People's Republic of] China Urban Household Surveys (1988–2001).

VI. CONCLUSION

This paper examined the impact on both firms and workers of assigning a city special economic zone status. While these areas have been hailed as a model for other Asian countries looking to capitalize on globalization and access to foreign markets, the Chinese experiment proves there are both winners and losers. Foreign multinationals raise employment levels in manufacturing, and both foreign and domestic firms in these cities experience rising productivity as well as rising profitability. However, the record is more modest with regard to generating high-paying jobs for workers. No evidence is found that average wage rates have increased in SEZs relative to other cities, in spite of large increases in average productivity of firms in these areas. In fact, since the zones have been characterized by rising prices, the welfare implications for residents of these cities are ambiguous. While SEZs have provided the opportunity for millions of rural workers to find urban employment, these areas have not yet experienced real wage growth.

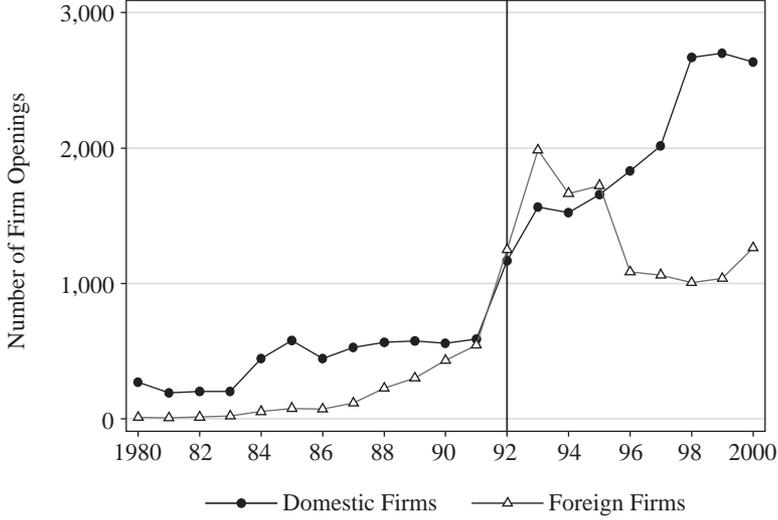
As the PRC's economy matures, it stands to reason that workers will increase their bargaining power, and that increases in productivity will induce real wage increases. In the short run, however, policy makers should consider

measures that prevent workers from poor rural areas having a “race to the bottom”, where firms can pay individuals subsistence wages and capture the lion’s share of the benefits to trade. Inequality within the PRC’s cities is also a potential trigger for social unrest. Recent riots by low-wage workers suggest that the status quo is problematic, as workers complain of unscrupulous managers and corrupt local officials.⁸ Future policy should be designed with the strategy of promoting growth but also providing a framework for establishing standards of worker compensation and protection that will generate robust growth and a fairer distribution of the benefits of trade.

⁸http://edition.cnn.com/2011/WORLD/asiapcf/06/17/china.riot.town.yoon/index.html?hpt=hp_t2

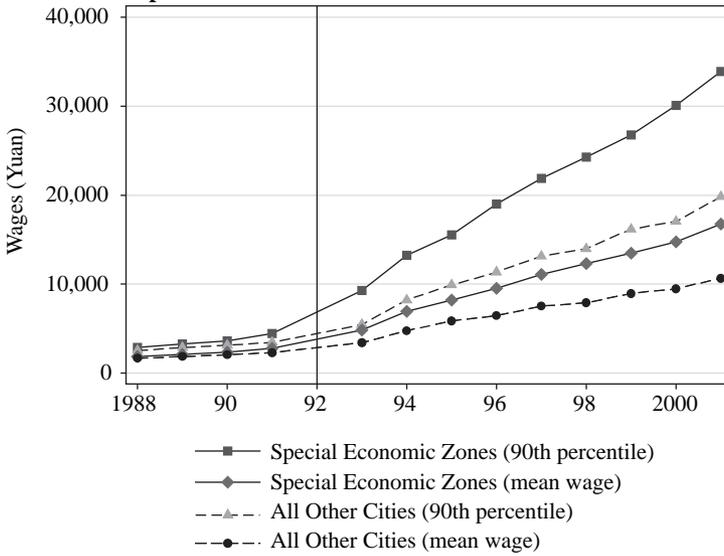
APPENDIX

Appendix Figure 1. Firm Openings in the PRC's Special Economic Zones



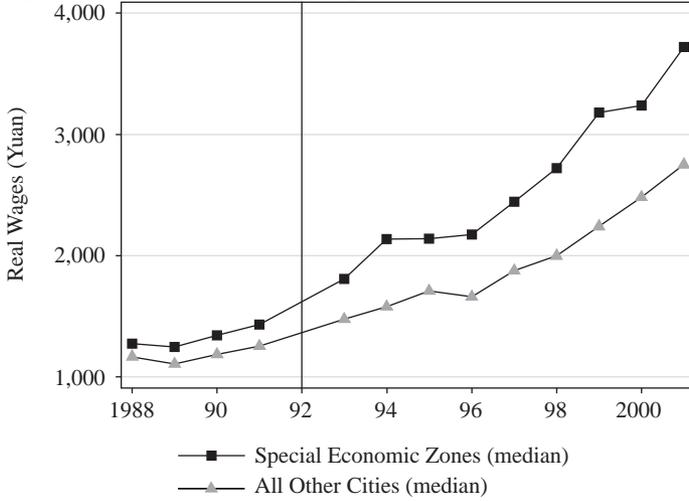
Source: Author's calculations.

Appendix Figure 2. Trends in Nominal Wages: Special Economic Zones and All Other Cities



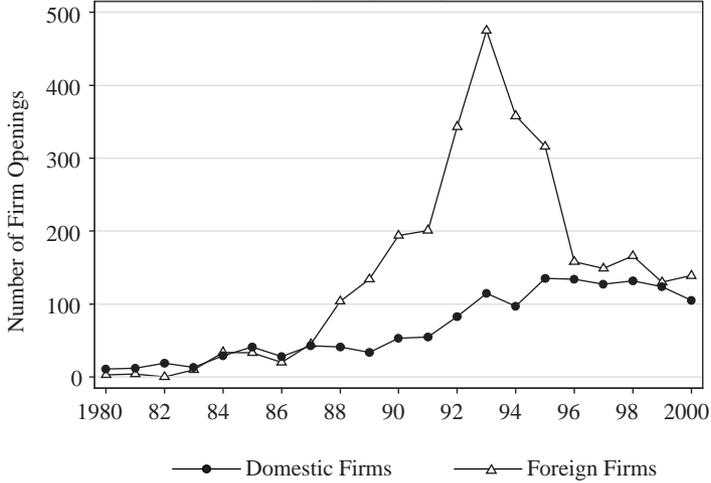
Source: Author's calculations.

Appendix Figure 3. **Trends in Real Wages: Special Economic Zones and All Other Cities**

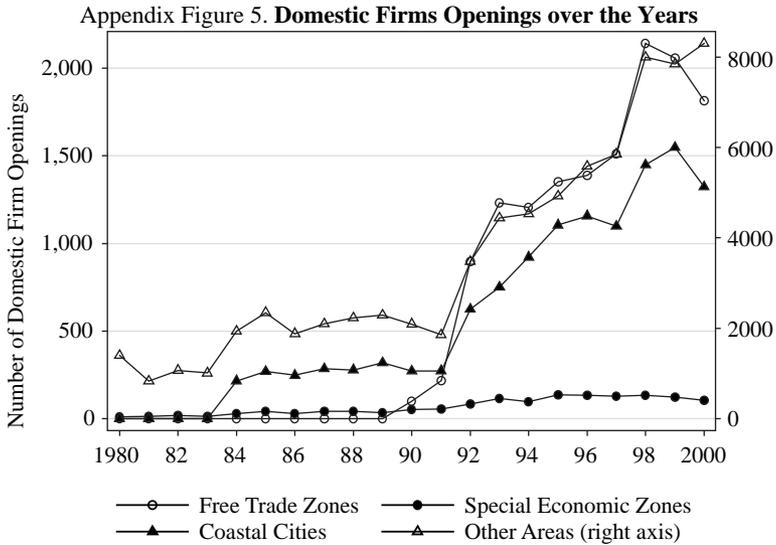


Source: Author's calculations.

Appendix Figure 4. **Firm Openings in Special Economic Zones**



Source: Author's calculations.



Source: Author's calculations.

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Rural–Urban Migration and Employment Quality: A Case Study From Thailand

MULUBRHAN AMARE, LENA HOHFELD, SOMCHAI JITSUCHON,
AND HERMANN WAIBEL

This study investigates the effects of rural–urban migration on economic development in Thailand. It draws upon a panel database of 2,000 rural households collected from 2008 to 2010 in three provinces from Northeast Thailand and a survey of 650 migrants in the Greater Bangkok area conducted in 2010. The study offers some new findings on migration in Thailand. First, there is evidence that there is a need for better social protection for urban migrants. Second, the study shows that migration offers the benefit of income growth for rural households but is less effective in reducing inequality and relative poverty in rural areas. Generally, migrants are more educated albeit at an overall low education level in the rural areas. The message emerging from this paper is that poor rural households tend to produce poor migrants which could be one of the reasons for the continuous existence of a wide rural–urban divide in welfare. The crucial importance of good quality education for migrants to achieve higher quality employment calls for more investment in education quality in rural areas.

JEL classification: O15, O53, I3, J81

I. INTRODUCTION

The movement of rural people out of agriculture in order to find jobs in urban centers is a major ingredient of the development process especially in emerging market economies. Thailand is a particularly good example not only because of its long history of rural–urban migration, high rates of economic growth, and good records of poverty reduction, but also because of its experience with economic and political shocks and a still large share of the population living in rural areas. The country has developed social protection policies for the poor, but empirical evidence on their success is still sparse.

Migration has profound consequences for the rural areas, i.e., the migrants' natal villages. For a household in a rural village, temporary out-migration is a labor-diversification-based livelihood strategy, as migrants send remittances to

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their natal household. For migrants, the rural household remains the nucleus. Mostly, migrants are still members of the rural household regardless of their duration of absence, frequency of home visits, or place of official registration. However, not all migration decisions lead to the expected success. Sometimes migrants end up in so-called “bad employment” including prostitution and child labor. Policy makers tend to accept these negative externalities as an unavoidable by-product of development with the notion that it is still better to be “poor in the city” than “poor in the village”.

The aggregate effect of migration can have strong implications for the institutional and social conditions in the village. When the younger and economically more active population moves out of agriculture a decline in production and productivity can result unless structural change and agricultural modernization is facilitated. Most empirical studies on migration investigate either the impact on urban development or on the rural areas (e.g., Brown and Jimenez 2008, Shen et al. 2010, Goedecke and Waibel 2011). Hence, there is a need for more empirical evidence of the effects of migration on both the rural village and on the prospects of the migrants in their urban environment.

Both aspects are addressed in this paper by asking the following three questions. First, what are the underlying forces that motivate rural households to send some of their members to urban industrial centers for work? Second, what determines the success of such livelihood strategies from the point of view of the rural household and from the point of view from of a migrant? The third question is to what extent the migrant’s success of finding quality employment is supportive to the welfare of her natal household.

The empirical basis of this study is a rural household panel database that includes over 2,000 rural households from three provinces in Northeast Thailand combined with a migrant tracking survey carried out in the Greater Bangkok area. The database is unique as it combines comprehensive household level data and information on migrant household members.

The paper proceeds as follows. In Section II, a brief review of the migration literature in the context of economic development is provided. This allows establishing some hypotheses for this study. In Section III the database used for the descriptive and econometric analysis is introduced. Section IV describes the methodology including the econometric models, while Section V presents the results of the study including the factors that determine migration and migration success. Section VI concludes and identifies remaining gaps.

II. CONCEPTUAL FRAMEWORK

Quantitative modeling of migration processes date back to Harris and Todaro (1970) who emphasized the wage differential hypothesis. Microeconomic models of migration (e.g., Sjaastad 1962, Todaro and Maruszko 1987) consider migration as an investment in human capital. Traveling costs, costs of job search and training, and also psychological costs are included on the cost side. On the benefit side, the expected wage differential as well as nonmarket benefits of migration such as better access to health are considered. In later papers, e.g., Taylor and Fletcher (2007) and Hagen-Zanker (2008), migration is seen as a measure of ex ante risk mitigation and ex post coping, hypothesizing that the risks in rural areas are mostly uncorrelated or negatively correlated with those in urban areas. The net benefits of migration are also influenced by social network variables (Massey 1990), e.g., interpersonal relationships among, as well as between, migrants and their natal household. Lucas (2004) in a seminal article has proposed thinking of rural–urban migration in terms of “life learning”. In his models, urban areas are places where migrants can accumulate the skills required by modern production technologies. Thus, he introduces the notions of a skills differentiation with high skills jobs available for people who migrated some time ago and low skills jobs for new arrivals. He also points to the aspect of timing and speed on migration with returns to the migrant’s human capital investment as a major factor.

Models of migration provide a good benchmark for the factors that can determine the success of migration. However, few studies have established the impact of migration on rural households and the impact of the migrant’s employment quality on migration success. In theory, if migration is successful after several decades of migration one should be able to observe a declining gap in welfare between rural and urban areas. However, as shown in the 2008 World Development Report (World Bank 2007), this is not the case, and Thailand remains among the countries with a very high rural–urban divide.

Inequality as a result of economic growth of poor countries was first postulated by Kuznets (1955). It has been shown that industrialization and urbanization change the distribution of income in a developing economy. Urbanization through rural–urban migration raises the gap in per capita income between the urban and the rural population as productivity in urban areas grows faster than in rural areas. During the first stages of industrialization, urbanization pursued by the migration process inherently raises inequality. Invariably, this process has implications for poverty. As the population moves from rural to urban areas, a change in aggregate poverty incidence will occur even if respective poverty incidences for rural and urban areas remain constant. Overall poverty is expressed as the shares in population and poverty incidence between rural and urban areas

$$P = N_p / N = (N_p^R + N_p^U) / N = \alpha^R P^R + \alpha^U P^U \quad (1)$$

where P is the ratio of the poor in the population N , R stands for the rural population and U for the urban population, while α is the proportion of the poor in these groups.

Consequently, a change in the poverty (dP) of a country can be viewed subject to the change in population shares and the changes in the relative rates of poverty

$$dP = \alpha^R dP^R + \alpha^U dP^U + (P^R - P^U) d\alpha^R \quad (2)$$

and can be decomposed as the change in rural poverty and the change in urban poverty. The reduction in poverty is adjusted by the movement of populations from rural to urban areas and is weighted by the difference in poverty. Kuznets hypothesized that migration will benefit the rural population and eventually close the gap in poverty between urban and rural areas. However, Lipton (1980) has pointed out that rural–urban migration tends to increase inter-household inequality within and between villages. Rodriguez (1998) found that migration increases inequality in the Philippines while Brown and Jimenez (2008) showed that remittances helped to decrease poverty in Fiji and Tonga with little impact on reducing inequality.

Rural–urban linkages have received considerable attention in Thailand and have been explicitly mentioned in the Ninth Development Plan of Thailand. Official data are problematic however. For example in 2000, only some 20% of the population of Thailand resided in urban areas according to United Nations data (Yap 2002). The problem was that many migrants residing in urban areas did not change their civil registration and were therefore counted as part of the rural population. Many studies on female labor migration in Thailand focus on the country's sex industry (e.g. Pasuk et al. 1998). Mills (1999) complements this line of research with a study of female migrants working in less visible occupations such as factories and sweatshops in the Bangkok metropolis. To our knowledge, none of the studies on migration in Thailand has explicitly addressed the question of employment quality as a means to assess long-term migrant success from an economic point of view. This paper therefore provides an empirical test for this hypothesis by comparing rural households with migrants and without migrants from three provinces in Thailand.

In the next section we describe the data that we used in the analysis of migration and migration success both for the migrant and the rural household.

III. DESCRIPTION OF THE DATA

We use data from the 2008 and 2010 panel waves of a household survey carried out in the context of the DFG FOR 756 Research Grant project “Vulnerability to poverty in Thailand and Viet Nam” which also includes interviews with the village headmen and a migrant survey in 2010.¹ Initially, 2,200 rural households were selected in a three-stage sampling process. The sample was designed in such a way that it is representative of the target population and would allow drawing conclusions for the vulnerability of rural households in the selected provinces and areas with similar conditions. The sampling procedure consists of a three-stage cluster sampling design with district, subdistrict, and village classifications. The ultimate cluster size of 10 households in a village was chosen based on organizational aspects of the survey. The primary sampling unit was the subdistrict, assuming homogeneity within a province, which is quite reasonable for the northeastern region of Thailand especially with regards to the natural resource conditions.

The survey was conducted in three provinces, namely Buriram, Nakhon Phanom, and Ubon Ratchathani. All three provinces belong to the northeastern region, still considered the “poverty pocket” of Thailand (Healy and Jitsuchon 2007). In all three provinces, income from agriculture and natural resources is less than from other income sources including nonfarm wage employment, self employment and remittances (Hardeweg et al. 2012). This suggests that migration is an important component of the livelihood strategies of these households.

The migrant survey applied in this study followed the concept of tracking surveys such as those carried out in the Nang Rong project in Thailand (Rindfuss et al. 2004) and in World Bank health studies in Tanzania (Beegle et al., 2008). Based on national statistics (NSO 2008), over 80% of migration from the northeastern region of Thailand is directed to Bangkok or its surrounding areas. This general pattern of migration was also confirmed by the results of the second panel in 2008 of the rural household survey in the three provinces. Hence, in our migrant database, the survey was limited to the Greater Bangkok metropolitan area including the surrounding provinces of Samut Sakhon, Samut Prakan, Samut Songkhram, Nonthaburi, Nakhon Pathom, Pathum Thani, Ayutthaya, Saraburi, Nakhon Nayok, Chachoengsao, and Chonburi. For the tracking survey, migrants were already identified during the parallel household interviews based on the information provided by the respondent. The survey took place during the height of a political crisis, which nearly paralyzed parts of Thailand’s capital city during May to July 2010. This severely constrained the implementation of the survey and therefore restricted the number of interviews to 643 out of nearly 1100 migrants in the database.

¹<http://www.vulnerability-asia.uni-hannover.de/>

IV. METHODOLOGY

To address the research objectives, we have developed two models. We use a difference-in-difference matching estimator to examine the drivers of rural–urban migration and estimate the impact of migration on rural household well-being. Furthermore, we establish the relationship between household and migrant characteristics and finding better employment in urban areas. Finally, we quantify the impact of finding better employment on rural household well-being. This triangulation method will help to articulate who benefits from migration and clarify the implication for inequality.

A. Empirical Model 1: Determinants of Migration and its Impact on the Well-being of Rural Households

In the first model we investigate the factors that influence the decision of a rural household in rural Thailand to send one or more members to the Greater Bangkok area for employment. To choose the variables to be included in the model, one can refer to the review of the micro economic migration theories as summarized in Section II. In the migration literature, the decision of a rural household to send one or several of its members to an urban center for employment is driven by the expectation of increasing welfare for the entire household. The literature summarizes that demographic characteristics (household level human capital and demographic variables), economic indicators (wealth and income), location (access to information), and risk diversification are the main drivers of migration.

One problem of assessing the impact of migration on the well-being of rural households is a potential selection bias, which stems from the fact that we cannot measure the well-being of households with migrants in comparison to their situation without a migrant. In complete experimental designs, the outcome of non-migrant households can serve as a good counterfactual. However, if migrant households' characteristics differ from those of non-migrant households, the comparison of the outcome between the two groups will be biased. One way to minimize this problem is to use a difference-in-difference propensity score matching estimator. The estimator constructs a plausible comparison group by matching migrant households to similar non-migrant households using a large set of control variables

Our main interest to assess the average treatment effect (migration) on the treated (*ATT*), i.e., the rural households with migrants, which can be written as:

$$ATT = E(P_1 - P_0 | D=1) = E(P_1 | D=1) - E(P_0 | D=1) \quad (3)$$

where D is the indicator variable equal to 1 if the household receives treatment and 0 otherwise. P_1 and P_0 are the outcome variables for treated and untreated outcomes. Since we cannot observe both $E(P_1 | D=1)$ and $E(P_0 | D=1)$ at the same time in the data, we employ the propensity score matching method. Here, a plausible comparison group is established by matching migrant households to similar non-migrant households using a set of covariates comparing the outcomes of the migration decisions across these two groups before and after migration. The propensity of migration decision is presented as:

$$MD_i^* = F(HHC_{2008}, IF, DD, WI_{2008}, Shocks) \quad \text{with} \quad (4)$$

$$MD_i = \begin{cases} 1 & \text{if } MD_i^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

The propensity score matching presented in equation (4) matches migrant and non-migrant households based on observable factors used in the analysis. These can be divided into five categories: household background variables (HHC_{2008}) at 2008, infrastructure facilities (IF), district dummies (DD), wealth indicators (WI_{2008}), and shock experience ($Shocks$). We expect households with more adults and educated members to have a higher probability of sending a household member away, while it is also argued that better-off households will have a lower propensity to send a member to the urban labor market. Migration decisions are also affected by existing institutional and structural labor market conditions and geographic disparities in economic opportunities and services (Bilsborrow et al. 1987). However, the relationship between migration and rural service improvements is ambiguous. For example, infrastructure that facilitates access to input and output markets could improve agricultural productivity, consequently reducing an individual's need to migrate away from consumption or security concerns, while new economic and other opportunities may smooth rural–urban information flow and facilitate migration to urban areas.

The primary assumption underlying matching estimators is the conditional independence assumption (CIA). This assumption states that, given a set of observable characteristics X , non-migrant households have the same mean outcomes as migrant households would have if they had not been engaged in migration as well as those of a carefully defined group of individuals unaffected by migration after conditioning on the vector X (Rosenbaum and Rubin 1983, Heckman and Navarro-Lozano 2004).

If both groups differ on unobserved variables which affect simultaneously the assignment to treatment and the outcome variable a “hidden bias” might arise. However, due to the panel nature of our data the matching difference-in-difference estimators can be assumed to be robust (Smith and Todd 2005). Thus,

equation (3) can be improved through propensity score matching, by subtracting the outcome of interest based on the baseline dataset between migrant households and the matched comparison group of non-migrant households. This measure estimates the difference in income between migrants and non-migrants in 2008, minus the difference in their income in 2010. We rewrite equation (3) as:

$$ATT = [Y_{2010}^1 - Y_{2008}^1 \mid X_{2008}, D = 1] - [Y_{2010}^0 - Y_{2008}^0 \mid X_{2010}, D = 0] \quad (5)$$

where ATT denotes the average treatment effect and the subscripts 2008 and 2010 denote baseline income 2008 and income 2010 respectively. The propensity score is estimated by a simple binary choice model. Based on the propensity scoring results, the sample is split into equally spaced intervals of the propensity score. Treated and control households are matched on the basis of their scores in order to identify for each household the closest propensity score for both treated and control using the kernel matching and neighborhood methods. A household is considered a treatment household if it has at least one member who migrated to another province for at least one month for employment or educational purposes in 2010. A household is considered a comparison group household if it has no migrant member for education or employment outside the province in 2010.

B. Empirical Model 2: Quality of Migrant Employment and its Impact

Another main issue that this paper attempts to address is how rural–urban migration opens up more opportunities for the rural population to get into more productive employment opportunities. In this paper, we specifically attempt to investigate determinants of finding better employment opportunities in urban areas conditional on migration decision. In this framework, endogeneity is the main concern since unobservable heterogeneities may be correlated with each other and affect both the migration decision and obtaining a better quality job. In this case, the use of standard logit or probit models yields biased and inconsistent estimates (Cameron and Trivedi 2010). The probit estimate of the maximum likelihood estimators may also be inconsistent if one of the regressors is endogenous. To correct for endogeneity, an instrumental variable (IV) probit for a subjective indicator of quality employment and two-step sequential estimates using an index of quality employment in urban areas are used in this study. Both models define a residual for the equation of the employment quality model and use the IV estimator based on the originality of instruments and this residual. Following Cameron and Trivedi (2010), we consider the following linear model, where the first-stage (migration decision) equation is specified as

$$MD_i = \beta + \alpha HHC_{i2008} + \delta IF_{i2010} + \lambda DD + \lambda WI_{i2008} + \mu Shocks_{i2010} + \varepsilon_i \quad (6)$$

The second-stage equation (for quality employment determinants) is specified as:

$$QIE_i = \eta + \kappa MD_i + \pi MIC_{i2010} + \theta HHC_{i2008} + \rho WI_{i2008} + \sigma Shocks_{i2008} + \nu_i \quad (7)$$

where QIE is the outcome indicator of quality employment of a migrant, MIC_i presents migrant characteristics such as age and education, and IF denotes infrastructure facilities (access to public services market, health, and telecommunications).

The infrastructure facilities are used as IVs that can be excluded from equation (6) as they do not directly affect the quality employment indicator. Identification requires the assumption that (ε_i, ν_i) are jointly normally distributed. To access the impact of migration on quality employment, we run the job outcomes equation (7) of a migrant conditioning on the migration decision equation (6) which serves as a source of identifying instruments with a number of variables on migrant characteristics. Other variables are defined as before.

While developing a measure for quality employment is a complex issue, one can start with using proxies. In a first approximation, we considered the migrant's subjective assessment regarding the improvement in her job. The migrant was asked if working conditions improved or not (including getting worse) since she changed her job. Here, we consider two categories, 0 if the conditions did not improve (or got worse) and 1 if they did.

Second, we construct a simple index that lists a variety of indicators that describe employment quality. For each parameter, a value of 1 was assigned if the response was positive and 0 otherwise. Eight indicators were identified as follows: (1) general improvement of the migrant's working situation since the last job, (2) living conditions improved since the departure from the village, (3) migrant feels better off than in the previous year, (4) migrant has a written contract of employment, (5) migrant reports a stable income, (6) migrant's income is above average, (7) migrant has accumulated savings, and (8) migrant has one or more insurance contracts.

V. RESULTS AND DISCUSSION

In the following, the results of our analysis using the rural household panel database and the corresponding migrant survey are presented. As a first step, a descriptive analysis from the 2010 migrant survey is presented. In the second part of the section, the econometric results are discussed.

A. Descriptive Results on Various Aspects of Migration

The selected descriptive statistics in this section illustrate important characteristics of the migrants and the migration process that can support some of the underlying hypotheses of the study and further qualify variables for the later modeling exercise. Summary statistics comparing migrant and non-migrant households are presented in Table 1. Some important variables which are used in the model estimates in the later section show statistically significant differences in mean values. Migrant households have more educated household members. This supports the notion of human capital drain from rural to urban areas. Income from remittances (in 2008) was higher for households engaged in migration than for households that did not engage in migration in 2010. This may indicate that remittance income motivates households to participate in migration insistently. Total income (in terms of PPP\$ in 2010) is significantly higher for migrants compared to non-migrant households. Health shocks occur more frequently in non-migrant households, which may suggest that household members stay behind because of caregiving for those with ill health.

For describing the migration process, we asked the migrants their main reasons for migrating (Table 2). While it is recognized that the decision to migrate is not necessarily an independent decision of the migrant herself, the answer categories provide some insight for the push and pull factors of migration. As expected, the most frequent reason was employment, which may also be a part of the other remaining categories of answers. Quite obviously, pull factors are dominant.

Table 3 shows the earnings per day of migrants with wage employment (which is the majority). Almost 70% earn less than 300 baht (around \$8) and only about 2% of the migrants would earn around \$20 per day, which would roughly correspond with the level of the new Asian middle class. Around 20% earn less than the minimum wage for Bangkok.

Table 1. Summary Statistics of Households by Migration Status

Variable Description	Unit	Migrant Households	Non-Migrant Households	Difference (Significance)
Household size	No.	3.95	4.13	ns
Female headed	%	0.28	0.26	ns
Household head age	years	53.11	54.48	ns
Mean age of the household (years)	years	36.26	37.48	ns
Household head schooling (years)	years	4.68	5.34	**
Households members below primary school	No.	1.70	1.61	ns
Households members who completed primary school	No.	2.66	2.11	**
Households members who completed secondary school	No.	1.13	0.67	***
Households members who completed above secondary school	No.	0.29	0.17	***
Dependency ratio		1.67	1.61	ns
Income from remittance per month per capita	\$PPP	0.47	0.28	**
Land per capita	ha/HH member	0.60	0.57	ns
Households reporting demographic shocks	%	0.21	0.20	ns
Households reporting health shocks	%	0.35	0.39	*
Households reporting agricultural shocks	%	0.48	0.46	ns
Households reporting economic shocks	%	0.31	0.28	ns
Total income per capita per month in 2010	\$PPP/HH member	161.41	123.26	***
Time needed to reach the hospital	minutes	21.55	20.41	ns
Time needed to reach the market	minutes	20.13	18.34	ns
Distance to other public infrastructure	minutes	14.2	13.8	ns

Note: Household demographics, income, asset, and remittance data are from 2008 unless otherwise specified.
Source: DFG Rural Household Surveys (2008 and 2010).

Table 2. **Why Do People Migrate?**

Reasons for Migration (N=643)	Percent
Job opportunity	46.81
To follow family	17.88
Lack of money/Food/Debt	12.29
Family/friend wanted me to go	11.,5
Education	11.35
Others	0.31
Total	100.00

Source: DFG Bangkok Migrant Survey (2010).

Table 3. **Daily Wage Income of Migrants**

Daily Wage Income (in baht)	Percent
<200	19.4
201–300	48.8
301–400	16.0
401–600	11.1
601–800	2.5
>800	2.3
Median of Wage Income	264.29
Mean Wage Income	350.45
Minimum Wage, Bangkok Area, 2010	206

Source: DFG Bangkok Migrant Survey (2010).

Table 4 presents the results regarding the employment quality proxy and the employment quality index. It shows that over 77% of the migrants judged that their working conditions had improved since their last job. Looking at the index, migrants at first glance seem to have improved their conditions since they left their village. However, the picture is bleaker when looking at some indicators of social protection. For example, almost 70% of migrants do not have any written work contract and only less than one-fourth have an unlimited written contract. Also, only 21 % have a private insurance contract in addition to the government-provided health schemes.

**Table 4. Employment Quality Proxy and Employment Quality Index:
Selected Indicators for Migrants' Working and Living Conditions**

Number	Indicator	Percent
Employment Quality Proxy		
I.	Working conditions improved since last job	80
Employment Quality Index:		
I.	Working conditions improved since last job	80
II.	Living conditions improved since leaving the rural area	67
III.	Feels better off than last year	59
IV.	Written and unlimited work contract	24
V.	Migrant reports stable income	60
VI.	Income above mean	40
VII.	Have savings	80
VIII.	Private insurance contract	21

Source: DFG Bangkok Migrant Survey (2010).

Table 5 presents the mean and standard deviation of the variables used in the models for assessing employment quality of migrants in Bangkok.

**Table 5. Definition and Summary Statistics of Variables Used in the Migrant Quality
Employment Model**

Variable Description	Unit	Mean	Std. Dev.
Migrant Characteristics			
Age of migrant	years	31.03	8.73
Hours working per day	hours	8.91	2.77
Months stayed in current job	month	53.02	62.56
Government support	yes=1	0.21	0.41
Insurance	yes=1	0.21	0.49
Owning land dummy	yes=1	0.80	0.40
Years of schooling of migrant	years	9.19	3.51
Female migrants (female =1)	female=1	0.54	0.50
Daily Wage income (\$PPP)	\$PPP	16.50	23.77
Debt of migrant dummy (yes=1)	yes=1	0.40	0.49
Household Characteristics			
Households experienced agricultural shocks	yes=1	0.57	0.66
Households experienced economic shocks	yes=1	0.30	0.46
Household head schooling years	years	4.40	2.42
Household size	persons	4.01	1.91
Mean age of household members	years	33.25	7.92
Total income per capita per month in 2008	\$PPP	140.10	249.20
Land per capita	ha	0.54	0.68
Wealth of the rural household per capita in 2008	\$PPP	5899.11	891

Source: Authors' calculation based on DFG Rural Household Survey (2008 and 2010).

B. Econometric Results

To better understand the factors behind rural households' decision to send away one or more of its household members for employment in the Greater Bangkok area and to assess the impact of that migration decision on the welfare of the rural households, a counterfactual group using propensity score matching had to be established as described in Section III. To construct the propensity score of the migrant households, we use a broad set of covariates, including household characteristics, economic indicators, and infrastructure facilities.

Table 6 shows the results of the probit estimates. The overall results are robust and most coefficients show the expected signs. Since we use panel data and a rich set of covariates we consider the endogeneity problem to be insignificant. The model confirms some of the hypotheses that were derived from theory. Foremost, the education variables show that if a household has better educated members, there is a higher probability of migration. On the other hand, households with a low dependency ratio are less likely to engage in migration. This confirms the typical age pyramid found for rural households in the three provinces with a gap in the age group comprising those 20 to 35 years old (Hardeweg et al. 2012). The household income variable "log total income" is significant and negative, which suggests that one of the motivating factors for migration is poverty. Community variables such as the time needed to reach district or provincial infrastructures are included to assess the push factors that can motivate migration. Two infrastructure variables are negative and significant, one is positive. For example, access to markets and other infrastructures is negative, while access to health care (hospital) is positive. This may indicate that, on one hand, remoteness is not a push factor for migration as such households may have less incentives to leave, while on the other, the prospects of better health care in urban areas could be a pull factor for migration.

Table 6. **Determinants of Migration Decision (Probit estimates)**

Variables	Coef.	Std. Err
Female headed	0.09	0.07
Total number of households members who completed primary school	0.14***	0.01
Total number of households members who completed secondary school	0.05***	0.00
Total number of households members who completed above secondary school	0.09***	0.02
Mean age of the household	-0.30***	0.03
Household head schooling	0.02	0.04
Dependency ratio	-0.09***	0.03
Log total income per capita	-0.05***	0.02
Income from Remittance	0.28***	0.08
Time to reach the hospital	0.13**	0.06
Time to reach the market	-0.23*	0.13
Distance to other public infrastructure (log)	-0.27***	0.09
Ubon province	0.09	0.10
Buriram province	-0.05*	0.03
Land per capita	0.03	0.04
Log-Wealth per Capita	-0.01	0.08
Households experienced demographic shocks	-0.15**	0.06
Households experienced health shocks	-0.02	0.06
Households experienced agricultural shocks	0.04	0.07
cons	-0.38	0.61
LR chi-square (24)	501.58	
Log likelihood	-1178.54	
R ²	0.18	
N	2096	

Note: Household demographics, income, asset and remittance data are from 2008 unless otherwise specified.

*** = significant at the 1% level, ** = significant at the 5% level, * = significant at the 10% level.

Source: Authors' calculation based on the DFG Rural Household Survey (2008 and 2010).

The migration model suggests that generally it is the poorer households who tend to have migrants. However, migrants tend to have better formal education, which is consistent with the results of Cherdchuchai and Otsuka (2006).

The next question is whether migrants are successful in urban settings and will be able to support their native household.

C. Effects of Migration on Rural Household Well-Being

As discussed in Section II, from the point of view of the rural household, migration is a livelihood strategy that uses labor diversification as means to increase household welfare, as an ex post coping strategy to respond to shocks as well as an ex ante measure to insure against risk. The next step therefore is to

empirically assess the impact of a migration decision on future household income. As explained in the methodology section, the estimation of such impact is problematic in the absence of a perfect experimental design, i.e., a “double difference” dataset. While we have a dataset from 2008 and 2010 that allows distinguishing between households with and without migrants in 2008 and their household income in 2010, mean separation tests suffer from the non-comparability of the two subsamples and the possibility that other covariates have an influence. To overcome these problems to the extent possible, we use difference-in-difference matching estimates on the basis of their scores for kernel and neighborhood methods comparing households with and without migrants (Table 7). Based on our quality of employment index, we compare households with successful migrants versus those with less successful migrants.

Table 7 shows that on average migration has a significant impact on rural household income growth. The estimated treatment effect for two propensity score methods are 17% for the kernel method and 22% for the neighborhood method. Comparing provinces, we find that the impact of migration is more pronounced in Ubon and Buriram, while there is no significant difference in Nakhon Phanom, which is the poorest among the three provinces.

Table 7. Impact of Migration on Rural Household Income Growth for Two Propensity Score Matching Methods

Income Growth (%)	PPS Method	With Migrant	Without Migrant	Difference in the Average Outcomes
All provinces	Kernel	1.28	1.10	0.17***(2.87)
All provinces	Neighborhood	1.28	1.06	0.22***(2.88)
Ubon province	Kernel	1.90	1.43	0.47***(2.15)
Buriram province	Kernel	1.02	0.67	0.35*(1.93)
Nakhon Phanom	Kernel	0.61	0.26	0.35(1.52)

*** = significant at the 1% level, ** = significant at the 5% level, * = significant at the 10% level.

Note: Absolute value of t-statistic in parentheses, bootstrapped standard errors using 1000 replications of the sample.

Source: Authors' calculation based on the DFG Rural Household Survey (2008 and 2010) and the Bangkok Migrant Survey (2010).

Taking income growth as criteria, migration on average is a beneficial livelihood strategy for rural households. However, as we can observe from the descriptive analysis above, not all migrants will be engaged in employment activities that enable them to contribute to the well-being of their natal households. Therefore the next question is to assess the impact of a migrant's employment quality on income growth of her rural household.

D. Determinants of Employment Quality

In addressing the question of employment quality we first identify the factors that are responsible for a migrant's employment quality. We have used two indicators to describe employment quality—first, the migrant's subjective

assessment on the change of her working conditions as a proxy for employment quality; and second, an employment quality index based on the eight criteria described above.

The first column in Table 8 shows the results of the model for the employment quality proxy, while the second column presents the results for the model for the employment quality index. The first model is an IV probit model. The dependent variable takes the value 1 if the migrant perceives her condition to have improved and 0 otherwise. The second model is a two-stage sequential estimation for the index of quality of employment of migrants. In the first stage, the migration model is estimated and the predicted values for migration are used in the second stage. In Table 8 only the second stage estimates are presented.

For the IV probit model, we can show that the following migrant characteristics significantly increase the chances for better quality employment conditional on migration: the level of migrant's education, if they have a job with longer working hours per day, and if they received government support. Indebtedness, meanwhile, negatively influences employment quality. Also, characteristics of the natal household observed in 2008 affect the chances of a migrant for better quality employment. Households with relatively higher income have higher odds of migrants finding better employment, while economic shocks have the opposite effect. However, a gender effect could not be detected. The significant positive coefficients of the two provincial dummies suggest that there are regional differences in the probability of finding quality employment.

The model results suggest that migration in 2008, which was the year of the financial and economic crisis, nevertheless was still a good strategy for some households, as migrants were able to find quality employment. This might suggest that the crisis was less severe than initially expected, and that government support might have absorbed some of the negative effects of the crisis.

For the two-step sequential estimate model using the employment index as dependent variable (second column in Table 8), the results of the probit model are largely confirmed except for a few variables. Overall, one could say that if a rural household has a migrant, there is a chance that he will move up the social ladder based on the criteria chosen for quality of employment. However, one important additional variable in this model is the wealth status of the rural household, which is significant and positive. This reinforces the conclusion that relatively better rural households make better migrants, which might be one possible explanation for the Kuznets paradox of rising inequality in the rural areas described in Section 2.

Table 8. Results of Employment Quality Models

Independent Variables	Employment Quality Proxy	Employment Quality Index
	IV Probit Model	Two-Stage Estimation Model
Migration	3.451**(1.54)	0.192***(0.09)
<i>Migrant characteristics</i>		
Age of migrant	-0.006(0.01)	0.008(0.01)
Owning land dummy	-0.247(0.18)	-0.177(0.20)
Hours working per day	0.055**(0.03)	0.076***(0.03)
Months stayed in current job	-0.001(0.00)	0.006***(0.00)
Years of schooling of migrant	0.046*(0.02)	0.114***(0.02)
Female migrants	0.047(0.11)	-0.071(0.13)
Government support	0.258*(0.15)	0.741***(0.13)
Debt of migrant	-0.276**(0.12)	0.033(0.14)
Average of years of schooling of household members	-0.020(0.02)	-0.120(0.22)
<i>Household characteristics</i>		
Household size	-0.014(0.09)	-0.19(0.67)
Total income per capita per month in 2008	0.133***(0.05)	0.082**(0.10)
Land per capita	0.018(0.07)	0.021(0.23)
Log wealth of the rural household per capita in 2008	0.029(0.08)	0.190***(0.07)
Households experienced agricultural shocks	0.132(0.22)	0.208(0.39)
Households experienced economic shocks	-0.321*(0.38)	-0.818*(0.48)
Ubon province	0.342**(0.17)	-0.031(0.20)
Buriram province	0.266*(0.16)	-0.028(0.19)
Cons	-3.918***(1.46)	0.264(1.35)
Rho	-0.669***(0.24)	
Sigma	0.174***(0.02)	
N	545	545
Wald chi2	72.96	
Log pseudo likelihood	-77.80	
R ²	0.18	0.21
Test of endogeneity		4.45**

*** = significant at the 1% level, ** = significant at the 5% level, * = significant at the 10% level.

Note: Household demographics, income, asset and remittance data are from 2008 unless otherwise specified. Absolute value of standard t-statistics in parentheses.

Source: Authors' calculation based on the DFG Rural Household Survey (2008 and 2010) and the Bangkok Migrant Survey (2010).

E. Impact of Quality Employment on Rural Household Well-Being²

The final question of whether migrant success measured in terms of quality employment and good living conditions can further augment the positive income effect from migration is answered in Table 9. The estimated differential gain in income growth of households with migrants with quality employment and those with migrants without quality employment is obtained using a two-stage difference-in-difference propensity score matching model. We introduce a threshold for index values of 4 and above from our employment quality index to obtain a binominal dependent variable. In the first stage, we use a probit model to predict the probability of quality employment. The main purpose of the propensity score estimation is to balance the observed distribution of covariates across the two groups of migrant households. We check the appropriateness of the matching procedure, i.e. whether the matched comparison group can be considered a plausible counterfactual. We have conducted several types of balancing tests, including a test for standardized differences, a test for equality of means before and after matching, and common support graphs to evaluate whether the assumptions are valid for our dataset. All results were found satisfactory.³

Both the neighborhood and kernel estimates of the average income growth impact are presented in Table 9. The results presented show a statistically significant impact of employment quality of migrants on household income per capita growth between 2008 and 2010. Households with migrants that have better quality employment have higher income growth than households with migrants without quality employment—by 40% under the kernel method and 46% under the neighborhood method.

Table 9. **Impact of Quality Employment on Rural Household Income Growth Using Two Propensity Score Matching Methods**

Income Growth (%)	PPS Method	Migrants with Quality Employment	Migrants without Quality Employment	Difference
All provinces	Kernel	1.54	1.13	0.40***(2.47)
All provinces	Neighborhood	1.51	1.06	0.46**(2.08)

*** = significant at the 1% level, ** = significant at the 5% level, * = significant at the 10% level.

Note: Absolute value of t-statistic in parentheses, bootstrapped standard errors using 1000 replications of the sample.

Source: Authors' calculation based on the DFG Rural Household Survey (2008 and 2010) and the Bangkok Migrant Survey (2010).

²In this section, we first estimated the determinants of finding better employment opportunities in urban areas conditional on migration. Before examining the impact of finding employment opportunity on the well-being of the household, we checked whether tracked migrants were not systematically different from non-tracked migrants using household characteristics. The results showed that there was no systematic difference between them. This supports the robustness of our impact estimation.

³Results are available based on requests.

VI. CONCLUSIONS AND POLICY RECOMMENDATIONS

This study presents empirical evidence on the effects of rural–urban migration for economic development in Thailand using a panel database of some 2,000 rural households in three provinces from Northeast Thailand and a migrant tracking survey in the Greater Bangkok area conducted in 2010.

The data were analyzed by means of selected descriptive statistics from the migrant survey and two econometric models. The descriptive statistics provide some information on the reasons for migration and their living and employment conditions. A probit model was developed to help identify the factors that make rural households in Thailand decide in favor of or against the migration of one or more of their household members. We also built a model that specifically looks at the quality of employment of migrants, identifying the factors behind a migrant’s relative success in terms of employment quality and living conditions. To achieve this objective, we have defined two different variables—a binary variable that measures short-term improvements in migrant conditions over their previous employment and an employment quality index consisting of eight indicators. Finally, a difference-in-difference treatment effects model with a propensity score matching estimator was used to assess the income effect of migration and migration success on the welfare of rural households.

Summarizing the results of this study, a number of interesting points are found that can improve our understanding on the role of migration for development:

- (i) The decision of a rural household in Northeast Thailand to send one or more members for work or education to the Bangkok metropolitan area is strongly related to household characteristics. Generally, it is rural households with lower resource endowments that send mostly younger family members away for work in the Greater Bangkok area. Also, there seem to be strong push factors of migration embedded in poor access to social and physical infrastructure at district or provincial levels. Most importantly and consistent with previous studies, education is an important factor. Clearly, it is the more educated people who migrate, though this must be judged against the overall low quality of education among most of the rural population in Thailand.
- (ii) Employment quality and relative improvement in migrants’ conditions are affected by both characteristics of the migrant and of the native household. Once again, education of the migrant along with economic conditions of the rural household is decisive. The two models set up to explain migration success rather consistently show that it is in the better rural households with

the relatively better educated migrants where migrants' chances of obtaining better quality employment are higher.

- (iii) In general, migration is positive for the well-being of the rural household. The income of rural households with migrants grows faster than that of households without migrants. We find significant average treatment effects of migration on the growth of per capita income of the rural household ranging from 17% to 22%. Disaggregating the results by province reveals that for the poorest province, the effect of migration is insignificant.
- (iv) Migrant success also means stronger positive welfare effects for natal rural households. The impact on income growth between 2008 and 2010 was 40% higher if the migrant had been above average in terms of an index that includes eight indicators of employment quality and living circumstances in the urban environment.
- (v) The information obtained from the migrant survey also provides some evidence that there is a need to review social protection policies for urban migrants. As most migrants do not have written employment contracts, legal protection is low. Also, since only a small proportion of the migrants have insurance contracts, health service is still an issue as it is not always clear to what the extent they are covered by the government schemes given that they are often registered in their natal village.

The study prompts some conclusions that might be useful for policy design and implementation. Most but not all rural households in Northeast Thailand do have migrant members. There is a certain profile that one can attribute to migrant households. They tend to be the ones who rely on remittances and therefore, are not likely to see much future in developing agricultural sources of livelihood. They tend to send the more educated household members away, though this must be seen against the background of generally poor quality education in the rural areas. Among households with migrants, the better ones tend to have more successful migrants, such that migration ultimately has a tendency to increase inequality. In fact, this may provide some explanation for why the decline of poverty in some rural areas is unequal within the rural areas and overall much slower in rural than in urban areas (Warr 2001). In other words, migration seems to do little to narrow the urban–rural divide. The fact that the impact among the three provinces differs, with the poorest province not significantly gaining, underlines this fact. Additional geographic or administrative differentiation might further sharpen this picture.

In terms of policy recommendations, two aspects seem to emerge from these results. First, the Thai government should pay more attention to education

quality in the rural areas. Based on anecdotal evidence, the current scheme of adult education, which is popular among the poor since eventually everyone can get a high school degree (M-6 level), raises some doubts regarding its quality. The second recommendation runs along the same lines as the first one. On paper, the Thai government may have introduced health insurance, pension schemes, allowances, etc., but the question is to what extent these are really implemented. For example, if a person is not formally employed (e.g., in a household or a small or medium-sized enterprise) and not backed by a legally binding written contract, then social protection schemes may not be as effective as intended.

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ADB FORUM ON THE USE OF CAPITAL CONTROLS

Managing Capital Flows: What Tools to Use?

JONATHAN D. OSTRY

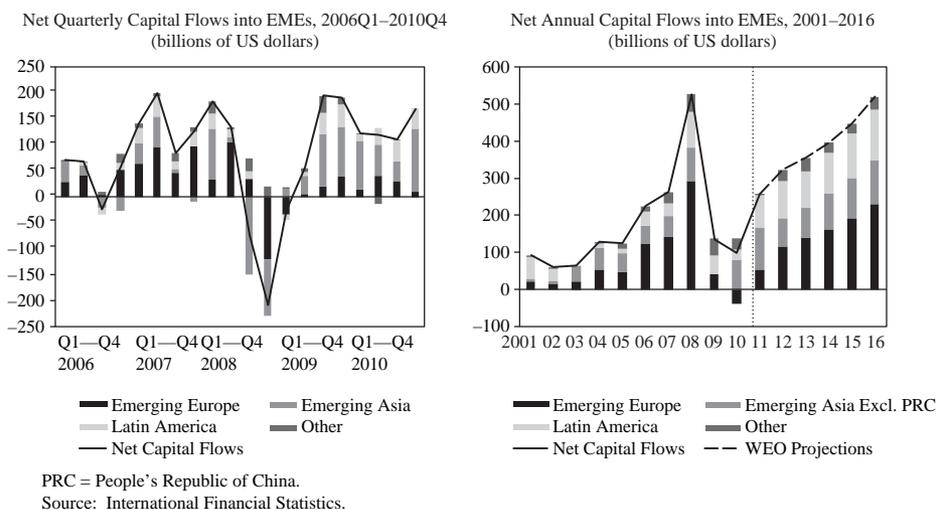
The use of capital controls is an old issue. It arose in the 1930s and is steeped with ideological overtones. It sparked controversy even at the inception of the International Monetary Fund (IMF). Two of the IMF's founders issued the following statements as regards the subject of capital flow restrictions:

“The advocacy of a control of capital movements must not be taken to mean that the era of international investment should be brought to an end. On the contrary, the system contemplated should greatly facilitate the restoration of international loans and credits for legitimate purposes.” – John Maynard Keynes

“The task before us is not to prohibit instruments of control but to develop those measures of control, those policies of administering such control, as will be the most effective in obtaining the objectives of world-wide sustained prosperity” – Harry Dexter White

The subject of capital controls also presents technically complicated considerations that require further research so as to develop a sound framework for their use. The option of employing capital controls came in the aftermath of the 1997 Asian financial crisis which highlighted the role played by sudden stops and reversals of capital flows. Escalating magnitude and volatility of capital flows were likewise observed in the run-up to the 2008 global financial crisis when reversals occurred once again as capital took safe haven in the US given global macroeconomic risk. With the resurgence of capital flows after the 2008 crisis, the focus is once again shifting to the use of capital controls as a measure to mitigate risks arising from financial vulnerability. The following charts illustrate the extent of magnitude and volatility of capital flows to Latin America, Emerging Europe, and Emerging Asia:

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These flows were substantial enough to cause exchange market pressure which together with accommodative monetary policies in the US led to allegations of “currency wars” in 2010. At the center of the debate had been the employment of capital controls by some emerging economies to allegedly prevent currency appreciation.

Buoyant economies combined with increased liquidity brought about the capital flows, which had macroeconomic impact on emerging economies as seen in the following table.

Inflation and Credit Growth: Selected Cases					
	Magnitude of Net Inflows ^a (% of GDP) (2009Q1–2011Q1)	Maximum Net Inflows ^b (% of GDP) (2009Q1–2011Q1)	Composition of Gross Inflows ^c Black = Portfolio Light grey = Other Dark grey = FDI	Inflation ^d (%, y/y) (2009M1–2011M4)	Real Credit Growth ^e (%, y/y) (2009M1–2011M2)
Brazil	8.16	14.61	●	5.14	10.35
Indonesia	5.95	12.18	●	5.25	8.78
Korea, Rep. of	7.69	15.06	●	3.08	1.86
Peru	7.28	12.50	●	2.30	10.78
South Africa	6.02	13.02	●	5.46	-0.68
Thailand	9.06	19.00	●	1.53	4.84
Turkey	3.28	11.35	●	6.74	13.39

^a Average net financial flow to GDP (in percent). For Peru and Thailand, data end in 2010Q2 and 2010Q4, respectively.

^b Maximum net financial flow to GDP (in percent) in 2009Q1 and 2011Q1. For Peru and Thailand, data end in 2010Q2 and 2010Q4, respectively. Quarters in parentheses refer to the quarter in which net capital inflow was the largest.

^c Composition of gross inflows in 2010.

^d Average year-on-year inflation over 2009M1 to 2011M4.

^e Average year-on-year real credit growth over 2009M1 to 2011M2.

Source: IMFs, IFS, INS, and WEO databases.

The magnitude of the inflows and the increased bias toward portfolio investments are viewed as a source of risk to financial stability. Indeed, there are initial indications that asset price bubbles started to form in some emerging economies in 2011.

The increasing acceptability of capital controls as a tool for managing macroeconomic and prudential concerns needs a reexamination of old issues in order to develop “intelligent” controls. Ostry et al. (2010)¹ identified a set of circumstances in which capital controls may be used to contain macroeconomic risk. They note that capital controls are appropriate when a currency is appreciating and is not undervalued, reserves are more than adequate, inflation is increasing such that policy rates cannot be lowered and fiscal policy is consistent with internal balance requirements and there is a sustainable level of long-term public debt. However, capital controls could also be used for mitigating financial stability risks in cases where the prudential framework is insufficient. The following table shows that a number of countries implemented capital controls in conjunction with other measures to mitigate the resurgence of capital inflows after the 2008 global financial crisis.

	Currency Appreciation^a (%) (2009Q1–2011Q1)	Reserve Increase^b (percentage points) (2008Q4–2010Q4)	Policy Rate^c	Fiscal Tightening^d (Structural Balance)	Prudential Policies/Capital Controls
Brazil	29.91	2.10	Raised	No	Yes
Indonesia	16.41	3.58	Raised	Yes	Yes
Korea, Rep. of	15.84	7.90	Raised	Yes	Yes
Peru	4.06	4.40	Raised	No	Yes
South Africa	30.30	-0.05	Lowered	Yes	No*
Thailand	3.06	12.44	Raised	No	Yes
Turkey	-2.32	1.64	Lowered	No	Yes

^a Cumulative percentage change in NEER from 2009Q1 to 2011Q1.

^b Change in reserves- to-GDP ratio from end-2008 to end 2010.

^c Monetary policy is the change in policy rates from 2009Q3 to 2011Q1.

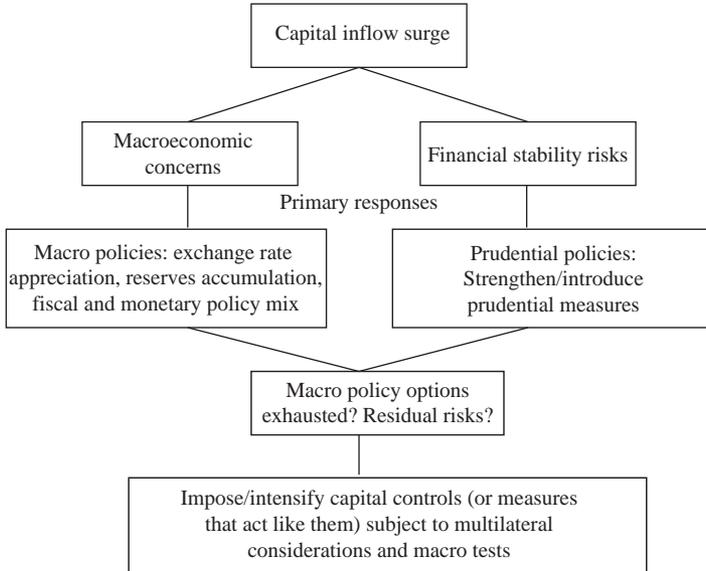
^d Fiscal policy is the change in cyclically adjusted fiscal stance between 2009 and 2010.

*South Africa has liberalized capital controls on outflows in response to the surge in capital inflow.

Source: IMFs, INS, and WEO databases, and national sources.

The use of capital controls also depends on the nature of the underlying risks. Macroeconomic risks include overvalued currencies, undesirable reserve accumulation, rising inflation and persistent inflationary pressure, and a limited scope for fiscal tightening. Prudential risks will have to be mitigated by macroprudential policies. The role of capital controls is summarized in the following flow chart:

¹ Jonathan D. Ostry, Atish R. Ghosh, Karl Habermeier, Marcos Chamon, Mahvash S. Qureshi, and Dennis B.S. Reinhardt. 2010. Capital Inflows: The Role of Capital Controls. IMF Staff Position Note 10/04, IMF, Washington, DC.



When both macroeconomic and prudential considerations suggest that capital controls are appropriate, then there is no conflict on the use of capital controls. When macroprudential concerns dictate the use of capital controls while prudential controls do not, there is still no conflict in principle albeit some design conflicts may arise. In this case, capital controls may possibly be used as transitional measures if there are lags in the effects of macro policy tools. A conflict occurs when macroeconomic conditions dictate that capital controls should not be used, but prudential considerations require it. An example of such a case is when a country has large current account surpluses, an undervalued currency, and nevertheless has substantial inflows of capital. A prescription in such a case is to allow the exchange rate to rise to its multilaterally-consistent level before contemplating the use of capital controls. Such a move will help to abate the excessive inflows, and mitigate both macroeconomic and prudential risks.

The Policy Toolbox

Ostry et al. (2011) categorize the available tools for implementing macroprudential policies into the following: FX-related prudential measures, other prudential measures, and capital controls. FX-related measures discriminate capital flows according to currency and not residency. These are applied to regulated financial institutions, primarily banks. Examples of such measures are limits on banks’ open FX positions and limits on FX lending by banks. Other prudential measures include loan-to-value ratios, limits on credit growth and sector lending, dynamic loan loss provisions, and countercyclical capital

requirements. These measures tend to reduce systemic risk without discriminating against currency or residency. Lastly, capital controls discriminate flows based on residency and can either be economy-wide or sector specific. They can also be designed to cover all flows, be they sector specific or industry specific. Examples of capital controls include withholding taxes on capital flows, unremunerated reserve requirements, and outright limits or bans.

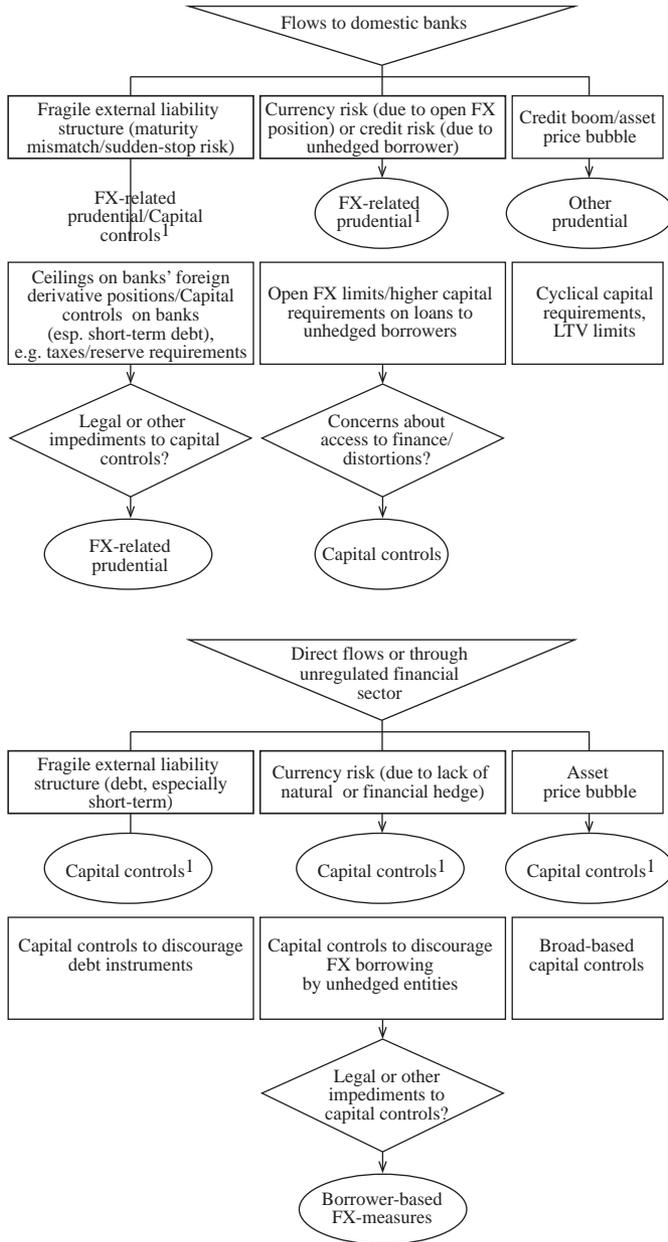
It is important to match the different risk categories to the appropriate tools. A key consideration is whether capital flows are being intermediated in the regulated financial system or not. For example, relying solely on prudential policies and not using capital controls may be argued for the case where all flows are fully intermediated through the regulated bank sector so that regulators should simply “lean” on the banks. The need for thorough investigation is however highlighted in this case since there is evidence that small and medium enterprises are predominantly dependent on banks for financing, and merely leaning on banks could lead to a substantial reduction in financial access of smaller firms. A different case is when capital flows do not pass through the regulated finance sector, in which case the use of capital controls may indeed be appropriate, and needed given the absence of other effective tools.

Considerations on the Design of Capital Controls

The design of capital controls must be governed by principles of effectiveness and efficiency. Effectiveness means that the intended aim is achieved and the control measure is not easily circumvented. Efficiency requires that measures be designed in such a way that it minimizes distortions and that the scope for lack transparency or arbitrary enforcement is negligible.

Under the above, other factors also have to be considered. The persistence of flows would have an impact on the choice of tools. When concerns on the effects of capital flows are on macroeconomic risk mitigation, then capital controls should only be imposed on temporary and not permanent capital flows. On the other hand, if the focus is on financial stability risks, then capital controls could likewise be imposed on persistent flows.

Another design consideration is on the scope of control. Broad-based controls are typically more appropriate for macroeconomic concerns, whereas targeted controls are more appropriate for prudential considerations. Note, however, that avenues for circumvention must be taken into consideration in the design of targeted measures.



¹Once macro policy space exhausted, and taking due account of multilateral considerations.

The basis of control dictates whether a price-based or quantity-based measure is appropriate. Price based measures are favored as these are easier to adjust cyclically and easier to administer. These are also typically more appropriate for macroeconomic risk mitigation. For prudential concerns, quantity-based measures may be more appropriate in the presence of information asymmetries as regards the private sector's response to the imposition of capital controls.

Lastly, administrative and institutional capacity is important and should be considered in the choice of capital control measures.

Recommendations on the Use of Capital Controls

So-called orthodox policy tools—macroeconomic and macroprudential policies—remain an integral part of the policy toolkit to cope with volatile capital flows. Capital controls and prudential measures should address specific risks. Capital controls are more appropriate in cases where cross-border flows are not intermediated through the regulated bank sector and are beyond the coverage of prudential regulation. The design of capital control measures and the decision to employ them should also be guided by administrative and institutional capacity.

Comments on:
Managing Capital Flows: What Tools to Use?
by Jonathan D. Ostry

Capital Controls: A Pragmatic Proposal
MARIA SOCORRO GOCHOCO-BAUTISTA AND CHANGYONG RHEE

Openness to cross-border capital flows has enabled many developing countries to prosper, join the ranks of Emerging Markets, and even become suppliers of capital to the rest of the world. In 2010, for example, net total outflows from all Emerging Market Economies amounted to USD 1,411B, with USD 859.8B or more than half, coming from Emerging Asia.¹

The strong rebound of capital inflows, mostly portfolio investments, into emerging economies in the recovery process of the 2008 global financial crisis brought the issue of capital controls to the forefront once again. The presence of large and persistent current account imbalances added complexity to the controversy as surplus countries could use capital controls to maintain undervalued currencies. On the other hand, weak economic recovery in advanced economies, particularly in the US, led to monetary easing which widened interest rate differentials further and encouraged an acceleration of capital inflows into robustly expanding emerging markets.

While openness to cross-border mobility of capital affords countries opportunities for gains, it nevertheless also gives rise to both macroeconomic stability concerns and an increased risk of financial crisis. Thus, countries have, in general, remained reluctant to completely do away with the option of using capital controls to deal with capital inflow surges despite a decades-long avowed shift toward greater economic liberalization.

Are capital controls effective in decelerating or stopping the cross-border flow of capital? Academically rigorous empirical tests on the effectiveness of capital controls in the 1990s show mixed results. Some studies show that the effects on the volume of flows are largely temporary. There is some evidence that they have a persistent effect on the composition flows, and that there is a tendency for controls to create bias towards capital flows with longer maturities. There is also evidence that capital controls significantly reduce external debt but do not

¹ Institute of International Finance. 2011. "Capital Flows to Emerging Market Economies." 1 June. pp. 2,17.

affect other volatile capital flows. Other studies also note that control measures were not effective in reducing net private capital flows. In the early 2000s, some Asian countries employed capital controls as inflows surged together with the strong rebound from the 1997 Asian financial crisis. There are some indications that these controls seem effective, but these were implemented together with other tools such as sterilization, liberalization of capital outflows, and prudential regulations. However, there are countries that show similar macroeconomic performance even though these did not use capital controls. The overall record of effectiveness of capital controls is mixed and results of various studies are not conclusive.

The IMF's Perspective on Capital Controls

The IMF recognizes the potential value of capital controls in mitigating risks associated with financial vulnerability but argues that there is a need to establish rules on the use of capital controls. The creation of a framework and a set of rules is important in order to mitigate against potential negative externalities arising from unilateral and unbridled use by countries. This is especially true if capital controls are used for reasons other than prudence. In line with this, the preliminary prescription of the IMF calls for the following preconditions prior to the institution of capital controls: (i) the absence of persistent currency undervaluation from a multilateral perspective, (ii) sufficient international reserves, and (iii) consistency of the country's monetary and fiscal policies with prudential norms, internal balance, and sustainable public debt. Given these preconditions, all macroeconomic and financial stabilization options must be exhausted prior to the imposition of capital controls. Capital controls must only be used as a last recourse even though it is part of the toolkit.

A Pragmatic Proposal

The IMF proposal, while sound in some aspects, may be perceived as an infringement of countries' sovereign right to use whatever tools are at their disposal to manage their respective economies. The current framework as defined is not simple and it may be difficult to obtain a political consensus for a multilateral commitment to adhere to the rules on the use of capital controls. There is some degree of ambiguity as to what constitutes an "exhaustive" use of macroeconomic policy space, and the provision for flexibility in accordance with in-country peculiarities leaves room for justifying potential abuse in the use of capital controls. There is a need to operationalize the IMF framework, with specific guidelines on the use of capital controls forwarded and agreed to by most, if not all, countries.

The problem of persistently large current account imbalances should likewise be brought to the fore, as currency overvaluation and undervaluation could be sustained through the use of capital controls. As an alternative, we argue that the absence of persistent current account imbalances be made a precondition on the use of capital controls. There is a need to quantify what an allowable current account deficit or surplus relative to the size of a country's economy is, and a multilateral agreement on what constitutes an "excessive" imbalance arrived at. There are initial agreements and activity within the G20 as regards indicative guidelines in measuring excessive imbalances which could be built upon for purposes of framing the use of capital controls.

The proposal is anchored on the principle of respect for a country's sovereign right to implement policies that they deem best for national welfare, but must do so only if there are no negative externalities on other countries. The proposal allows for the use of capital controls only for financial stability and not for macroeconomic objectives that tend to result in persistent current account imbalances.

The framework and guidelines on the use of capital controls must be developed and ratified by the vast majority of countries and especially the larger economies. There is a need to juxtapose the allowable use of capital controls and the requisite actions to alleviate the shortcomings of the current international monetary system which tends to lead to an ambiguous and asymmetric adjustment mechanism when current imbalances occur.

The following table summarizes some possible cases on the configuration of current account and trade balances, gross capital inflows and reserves accumulation, and the implications on the appropriateness of capital controls.

Table. **Balances, Gross Capital Inflows, and Reserve Accumulation:
Implications on the Use of Capital Controls**

CA Balance	Trade Balance	Gross K Inflows	Accumulation of Reserves	Use of K Control Measures
>>0	>>0	>0	>>0	Need macro adjustment, not capital controls.
>>0	>>0	<<0	=0	Like most developed countries that run surpluses and invest abroad. No need for capital controls, but may need financial supervision for safe investment.
>>0	>>0	=0	>>0	Need macro adjustment, not capital controls.
<<0	<<0	>>0	=0	May or may not need capital controls. Situation like in the time of the Asian financial crisis when countries were running trade deficits but had large inflows. Might need controls to select "good" inflows. Choice depends on whether there is a consumption or investment boom.
<<0	<<0	>0 or <0	<<0	Crisis situation. Need capital inflows or need to prevent outflows. May need capital controls.
=0	=0	>>0	>>0	Capital controls for financial stability reasons.
=0	=0	<<0	<<0	Capital controls for financial stability reasons.

Source: Authors' calculation.

The first row in the table presents the case where a country has a large current account and trade balance surplus, enjoys gross inflows in capital, and continues to accumulate copious amounts of reserves. To correct the imbalance, the country needs some macroeconomic adjustment and capital controls are not prescribed. The second row is akin to the situation in most developed countries that run current and trade account surpluses and hold investments in overseas markets. As in the first case, this country does not need capital controls but may require prudential regulations aimed at minimizing excessive risk taking. The third row presents a case similar to the first one, except that there are no gross capital inflows. This country requires some macroeconomic adjustment to address the current and trade account imbalance and does not need to institute capital controls.

The fourth case is typical of developing countries which run external deficits financed through gross capital inflows. These countries may or may not need to use capital controls depending on how volatile the inflows are and whether deficits are results of an unsustainable consumption boom or are being driven by investments that would eventually provide better macroeconomic fundamentals. The fifth row presents the case of a country already in crisis and suffering from substantial current account and trade deficits that are barely covered by capital inflows or are exacerbated by gross capital outflows. Such an

economy is drawing down substantial amounts of reserves and may need to employ capital controls on outflows for stabilization.

The sixth case can be likened to that of some emerging economies that have balanced current and trade accounts and are likely to have correctly valued currencies. Capital inflows, however, would tend to cause the currency to drift towards overvaluation leading to loss of trade competitiveness. Continuous sterilization and accumulation could keep currency values at competitive levels but could increase the fiscal burden over the long run. The use of capital controls may be warranted for financial stability reasons. The last case is simply the mirror image of the previous one from the standpoint of cross-border capital flows, and would, ipso facto, likely warrant the use of capital controls as well.

The above does not provide an exhaustive list of cases but merely provides an illustration of a possible framework on the use of capital controls in relation to persistent current account imbalances. The table illustrates that macroeconomic adjustment, rather than capital controls, is called for in the case where a country has a persistently large surplus. On the other hand, if a country has large gross capital flows in the absence of a large current account imbalance, then capital controls may be prescribed. It is noted that the existence of persistently large current account imbalances, rather than the currency overvaluation and undervaluation, can be a better precondition for the use of capital controls. Since there are initial agreements and activity within the G20 concerning indicative guidelines in the measurement of excessive imbalances, these can be pragmatically utilized in operationalizing the IMF framework on the use of capital controls

Empirical Evidence on the Efficacy of Capital Controls: A Summary Evaluation

MICHAEL M. HUTCHISON

The sharp rise in financial integration over the past several decades has gone hand in hand with a dramatic increase in overall liberalization of international financial flows. However, almost no economy has completely eliminated capital controls, and in many cases they remain substantial, with officials frequently increasing the intensity of controls during episodes of financial disruption. Moreover, since the 2008–2009 global financial crisis, emerging markets such as Brazil have increasingly imposed capital controls in an attempt to limit surging capital inflows (Pasricha 2011). Capital controls have traditionally been discouraged by such institutions as the IMF but are now gaining wider acceptance as part of the macroeconomic policy and prudential “toolkit” for emerging market policymakers (IMF 2011).

Despite the frequent use of capital controls as a policy tool, there is no general consensus on critical questions regarding the efficacy of capital controls. Data limitations are an important reason for the mixed results on this topic. Most studies have employed aggregate binary indicators of de jure restrictions that are too coarse to distinguish between more subtle variations in capital account regimes. Recent work, with more refined measures, is partly overcoming this limitation (Schindler 2010).

In order to evaluate the efficacy of capital controls, one must first ask about the objectives associated with their use. Capital controls are imposed for a number of reasons, but all are based on the desire to insulate the domestic economy from some form of international capital flow (Dooley 1996). Three main reasons are usually put forward. The first is concern over the impact of large exchange rate movements—either bouts of substantial appreciation or depreciation of the currency—on the real and financial economy, and the hope that various forms of capital controls can help offset these exchange rate pressures. The second is concern over potentially disruptive effects of large and volatile short-term, speculative capital flows (“hot money”). The third concern is over the potential loss of monetary control that may be associated with large capital flows.

To this end, I briefly evaluate these three categories in a very selective review of the literature. This review is admittedly biased towards areas where I have researched.

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Have Capital Controls Limited Large Exchange Rate Movements?

Empirical evidence on the role of capital controls, or conversely capital openness, in protecting countries from currency crises and very large and undesired exchange rate movements is mixed. This is particularly important since recent work on the 2008–2009 financial crisis suggests that emerging markets with greater total external liabilities relative to the size of the economy—one measure of financial openness—experienced greater exchange rate depreciations and loss of reserves (Aizenman and Hutchison 2011).

Several empirical papers have investigated the experiences with capital controls of selected developing countries. Edison and Reinhart (2001a) focus on the recent experiences of Malaysia and Thailand, while Edwards (1999) and Gregorio et al. (2000) examine Chile. In general, these studies have found little effect of capital controls in averting currency crises, at least not without other supporting economic policies. For example, using various econometric tests and a detailed case study of Chilean controls imposed in the 1980s, Edwards (1999) finds that “...the relative absence of contagion effect on Chile (during the currency crises of the 1990s) is due to its sturdy banking regulation and not to its capital controls policy.” This finding is supported by Edwards’ (1989) analysis of the role of capital controls in 39 devaluation episodes for 24 developing countries over the period 1961–1982. He finds that countries typically intensified their control programs in the year before devaluation and concludes that “(a)t most one can argue that these heightened impediments to trade managed to slow down the unavoidable balance of payments crisis” (Edwards 1989, 189–190).

Glick and Hutchison (2005) systematically investigate the link between capital controls (or international payments restrictions generally) and currency stability for a broad sample of developing economies. They also investigate other empirical factors explaining both currency crises and capital account restrictions, and causal linkages between the two phenomena. Their results find a statistically significant positive link between capital controls (measured *de jure* dichotomously as to whether controls are in place or not in place) and exchange rate instability. This result is robust to a variety of specifications and estimation methods that take into account simultaneity issues.

Glick, Guo, and Hutchison (2006) are concerned that earlier results may be biased by self-selection issues—countries facing exchange rate instability are more likely to impose capital controls, hence a positive link between the two phenomena. They introduce a propensity-score matching methods methodology to address the self-selection problem. This method allows a better measurement of the counterfactual (what would have occurred in the absence of capital controls) in estimating the impact of capital controls on exchange rate instability. Surprisingly, their earlier results hold up and support Bartolini and Drazen

(1997a)—countries with capital controls are more likely to experience currency crises.

Have Capital Controls Influenced the Magnitude and Composition of Capital Flows? Have they Limited “Hot Money” Inflows and Sudden Stops of Capital?

A number of individual country studies have studied the effects of capital controls on the volume of capital flows, but relatively few multi-country studies have focused on this issue. Magud and Reinhart (2007) review more than 30 studies, only five of which are multi-country studies. The few multi-country studies that have considered the effects of controls have focused on capital inflows rather than outflows (or both). Magud and Reinhart (2007) conclude their survey by stating that studies in this area “...are not very informative regarding the effectiveness of controls in reducing the volume of capital flows and reducing real exchange rate pressures.”

Many *individual country* case studies have considered the effect of controls on capital flow volumes. Overall, most individual studies find that controls do not successfully alter the volume of capital inflows and outflows but do affect, to a limited degree, the composition of capital inflows. To the extent that controls affect net capital flows, these effects are short-lived. A number of studies examine the effects of a specific type of capital control—unremunerated reserve requirements (URR)—on various measures of capital flows. Cardenas and Barrera (1997) address this question for the case of Colombia, and De Gregorio et al. (2000) study the Chilean case during 1991–1998, where URR were aimed at reducing the volume of capital inflows to increase monetary autonomy and to limit the appreciation of the real exchange rate. Both the Colombia and the Chile study find that their measure of capital controls does not affect the level of capital inflows, but that the URR appear to have been effective in tilting foreign liabilities toward long-term maturities. Cardenas and Barrera (1997) argue that the effect of capital controls on the composition of flows has made Colombia less vulnerable to sudden reversals in capital.

Several *multi-country studies* have also investigated the link between capital controls/financial market liberalization and capital flow contractions-reversals-sudden stops using multi-country panel data sets. Eichengreen et al. (2006) find a weak negative association between capital account liberalization and sudden stops in capital controls, but the link is generally not statistically significant. Edwards (2005) also finds some evidence of a negative association between capital account liberalization and sudden stops. In later work, Edwards (2007) finds evidence that capital controls lower the likelihood of capital flow contractions. He uses three alternative measures of capital controls and investigates both “capital flow contractions” (small and medium-sized

contractions in net capital inflows) and sudden stops (major reversals in net capital inflows).

Ariyoshi et al. (2000) review the experience of 14 emerging market countries that used capital controls in the 1990s to address whether capital controls played any role in determining the movement of capital flows. They provide a case-by-case descriptive analysis focusing on the effectiveness of capital controls and the costs associated with them. They do not undertake any formal econometric analysis, but their qualitative case studies suggest that controls on capital inflows were partially effective (in Malaysia and Thailand) in reducing the volume and altering the maturity of flows. Controls on outflows, by contrast, at best only appeared to have a very short-lived effect.

Montiel and Reinhart (1999) focus on the effects of capital controls on both the volume and the distribution of capital inflows, based on an aggregate measure of the intensity of controls. (Their aggregate measure ranges from 0 to 2, with 0 indicating no restrictions and 2 indicating substantial restrictions). Using a panel data set of 15 emerging market economies during 1990–1996 and employing both least squares dummy variable (LSDV) regression and LSDV with instrumental variables, they break down capital inflows into three categories of capital inflows: portfolio inflows, short-term inflows, and foreign direct investment (FDI) inflows. While they do not find any evidence that capital controls impact the volume of capital inflows, capital controls appear to influence the composition of inflows by reducing the share of portfolio and short-term flows in total capital inflows. They do not consider capital outflows nor do they have nuanced measures of capital controls for specific asset classifications.

Lane and Milesi-Ferretti (2003) focus on the determinants of the increase in financial integration, defined as the sum of gross foreign assets and gross foreign liabilities as a percentage of GDP, during the preceding two decades. In a panel data set for 18 OECD countries over 1978–2001 (data averaged over six 4-year periods) and employing LSDV, they regress changes in financial integration on a set of regressors that include a measure of capital controls (capital account liberalization index). Their capital control variable is an aggregate capital controls index ranging from 0 to 4 (with 0 representing stringent controls), based on de jure restrictions reported in the *IMF Annual Report on Exchange Arrangement and Exchange Restrictions* (AREAER) and averaged over each 4-year period. Their measure of capital controls does not distinguish between inflows and outflows or between different types of capital flows, and it does not have independent explanatory power when included in multivariate regressions.

Grilli and Milesi-Ferretti (1995), investigating the effects of restrictions on capital flows in a panel of industrial and developing economies, find that capital controls have a significant negative effect on foreign borrowing. They also find that capital controls are associated with lower domestic interest rates, consistent with the view that they limit international arbitrage in asset markets. Interestingly,

in terms of relaxation of capital controls, Bartolini and Drazen (1997a) survey a number of episodes of capital account liberalization and find that the easing of restrictions on capital outflows often represented early ingredients of a broad set of reforms (including the lifting of various elements of financial repression) and frequently led to large capital inflows. More recently Binici et al. (2009) find that controls in emerging markets may significantly reduce equity capital inflows but have limited effect on debt inflows or capital outflows. They employ a new data set, attributable to Schindler (2009), which allows a detailed decomposition of controls on assets and liabilities of different forms (debt, equity, FDI, bank flows/derivatives) applied to capital inflows and outflows.

Finally, the IMF (2008) takes an intermediate position by considering the effects of policy responses during episodes of large capital (net) inflows on GDP growth and on exchange rate pressures. They find that capital controls do not seem to be effective in reducing vulnerability to inflow reversals. However, because their sample begins in the late 1980s, they cannot meaningfully distinguish between inflow and outflow controls.¹

Have Capital Controls Increased Monetary Autonomy?

Despite narrow success in limiting currency instability or aggregate capital flows, the empirical evidence is quite supportive of capital controls decoupling, at least temporarily, domestic interest rates from foreign interest rates and providing some measure of monetary autonomy. This work usually takes the form of measuring short-term interest differentials that are indicative of differing domestic and foreign monetary policies.

There is a long empirical literature in this area. Studies that have estimated deviations from covered interest parity (CIP) as an indication of international financial market integration in various contexts include Frenkel and Levich (1975), Grilli and Milesi-Ferretti (1995), Peel and Taylor (2002), and Obstfeld and Taylor (2004). For example, Grilli and Milesi-Ferretti (1995) find that capital controls are associated with lower domestic interest rates, consistent with the view that they limit international arbitrage in asset markets and contribute to monetary autonomy.

Recent work by Ma and McCauley (2008) argues that capital controls adopted by the People's Republic of China (PRC) remain substantially binding, allowing the Chinese authorities to retain some degree of short-term monetary autonomy, despite the fixed exchange rate, up to July 2005. Although capital controls of the PRC have been circumvented to some extent, they find sustained and significant gaps between onshore and offshore renminbi interest rates and persistent dollar/renminbi interest rate differentials during the period of a de facto

¹The IMF's AREAER started to systematically differentiate between inflow and outflow controls only in 1995.

dollar peg. While some cross-border flows do respond to market expectations and relative yields, they have not been large enough to equalize onshore and offshore renminbi yields.

Using a similar approach, Hutchison, Pashrica, and Singh (2011) consider yield differentials in India and the PRC. They analyze the extent to which the effectiveness of international capital controls in India have changed over time by analyzing daily return differentials in the non-deliverable forward (NDF) markets using a methodology that allows for arbitrage to work outside of certain thresholds (due to transaction costs and capital controls). Inside the bands, small deviations from CIP follow a random walk process. Outside the bands, profitable arbitrage opportunities exist and they estimate an adjustment process back towards the boundaries. They identify several distinct periods reflecting changes in capital control application and intensity for India and estimate the model over each subsample in order to capture the de facto effect of changes in capital controls on return differentials over time. They find that (i) capital controls are asymmetric over inflows and outflows, (ii) controls have changed over time from primarily restricting outflows to effectively restricting inflows, and (iii) arbitrage activity closes deviations from CIP when the threshold boundaries are exceeded in all subsamples. It is noteworthy that the no arbitrage bounds have collapsed in the last couple of years, indicating that international financial liberalization—in part the relaxation of capital controls—has made the linkage between Indian financial markets and those abroad much tighter. As a robustness test of the methodology, Hutchison, Pasricha, and Singh (2011) apply it to the Chinese RMB NDF market and also find that capital controls vary over time and are effective. Capital controls in the PRC remain effective in allowing a high degree of domestic monetary autonomy.

Concluding Remarks

Overall, evidence on the effectiveness of capital controls in warding off currency crises and sudden stops is quite mixed. The evidence is more supportive of slowing aggregate flows of capital in the desired direction but most importantly in the area of shifting the composition of capital flows towards longer maturity flows. The strongest evidence, however, is that capital controls appear to give domestic monetary authorities some autonomy, based on widening interest rate differentials under capital control regimes. This provides support to the idea that capital controls may be used to some effect in helping maintain monetary control in the face of strong outflows or inflows of financial capital. Most of the evidence points to temporary effects of controls, so presumably controls would be most effective as a short-term policy tool designed to complement other measures.

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Panel Presentations

A BRIEF REVIEW OF LITERATURE ON THE EFFECTIVENESS OF INTERNATIONAL CAPITAL CONTROLS

Michael M. Hutchison

Methodologically, it is difficult to get actual “de jure” control index instruments. This implies that there could be significant measurement errors in the indices being used. It is also difficult to implement structural VAR analysis given data constraints and the number of parameters that need to be estimated. It may be worthwhile to consider conducting event studies in addition to VAR modeling for purposes of robustness and parsimony.

There are essentially three goals for which capital controls can be used:

- (i) to limit exchange market pressures and large currency fluctuations,
- (ii) to control volatile financial flows, and
- (iii) to restore monetary independence.

With regard to the effectiveness of capital controls in limiting exchange market pressure, the empirical literature in general points to ineffectiveness when controls are employed in the midst of a crisis. This may be due to the negative signaling effects of controls where perceptions of instability are reinforced (Bartolini and Drazen 1997) and because controlling outflows also leads to a decline in inflows. Dooley (1996) notes that capital controls induce yield differentials but cannot really prevent speculative attacks. As such, capital controls seem ineffective in controlling exchange rate fluctuations.

A survey of literature covering empirical tests of capital control effectiveness in controlling excessive capital flows points to the transitory impact on volumes. The permanent effects of capital controls lie more in the composition of the flows. In general, however, results of empirical analyses are not robust.

As regards the impact of capital controls on monetary independence, price data seem to support the proposition that they are effective in maintaining some degree of monetary independence. The gap between onshore local currency yields and the implied yields of non-deliverable forwards (NDFs) tend to widen with capital flow restrictions. Quantity data, however, do not seem to support the notion that capital controls are effective. Hutchison notes that data limitations are a caveat that must be considered when assessing the effectiveness of capital controls using econometric methods.

In summary, the empirical evidence on the effectiveness of capital controls in warding off sudden stops and currency crises is mixed. There is proof, however, that capital controls can alter the composition of cross-border flows toward longer maturity assets. The most robust evidence on effectiveness of capital controls is on its impact on monetary autonomy as reflected in the difference between onshore yields on local currency assets and the implied yields of NDFs.

Comments on Hutchison's Review

Bautista affirms that there are indeed differences in the results arising from various empirical studies on the effectiveness of capital controls based on a parallel review of literature conducted by ADB staff and consultants. This reinforces the argument that the evidence from various econometric studies on the effectiveness of capital controls is mixed.

Two recent studies by Bautista, Jongwanich, and Lee (2010)¹ and by Bautista and Francisco (2011)² show that effectiveness of restrictions on cross-border flows are also affected by a country's domestic finance sector development and regional grouping.

¹Gochoco-Bautista, M. S., J. Jongwanich, and J. W. Lee. 2010. How Effective are Capital Controls in Asia? ADB Economics Working Paper Series No. 224, Economics and Research Department, Asian Development Bank, Manila

²Gochoco-Bautista, M. S., and R. Francisco. 2011. Effectiveness of Capital Restrictions: Do Regional and Income Differences Matter? ADB Economics Working Paper Series No. 261, Economics and Research Department, Asian Development Bank, Manila.

THE THAI EXPERIENCE ON THE USE OF CAPITAL CONTROLS

Chalongphob Sussangkarn, TDRI

During my time as Thailand's Minister of Finance, between March 2007 to February 2008, the management of rapid capital inflows that Thailand was experiencing during that period was one of the most challenging policy issue. There were many discussions about the appropriate policy directions with no clear answer. First of all, when we have rapid inflows, how much exchange rate intervention is appropriate. The Bank of Thailand at the time felt that they had intervened a lot, but it was insufficient to keep the baht from a strengthening trend. This strengthening trend led to a one way bet for speculators, so even more inflows came in. Because of this, in December 2006, Thailand imposed capital controls in the form of a 30% Unremunerated Reserve Requirement (URR) and requiring inflows to stay in the country for at least one year. This led to a stock market crash and inflows into the stock market had to be exempted the next day. So, the capital controls could not prevent capital inflows from continuing.

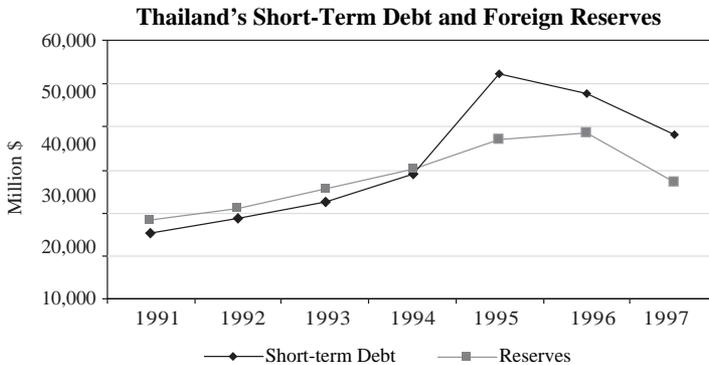
The intervention and the exchange rate appreciation led to large fiscal costs. There was a cost in sterilizing the exchange rate intervention and the appreciation of the baht also led to a valuation loss on the foreign reserves. After the 1997 crisis, the country incurred large costs in cleaning up the financial system. Bonds amounting to about \$40 billion were issued for this purpose. There was an agreement that the Bank of Thailand would take responsibility for the capital cost and the Ministry of Finance would fiscalize the interest payment. However, because the Bank of Thailand incurred large losses from exchange rate intervention under continued large capital inflows, the capital cost of the bonds could not be reduced, and interest cost on the bonds of about \$2 billion–\$3 billion had to be budgeted each year.

The situation was very frustrating because on the one hand you wanted to get rid of the capital controls, as they led to a lot of capital market distortions, but on the other hand you have to be concerned that if the baht suddenly appreciates by another 10%, then the situation will be very untenable. When I attended the Asian Development Bank's (ADB) Annual Meeting in Kyoto in May 2007, I complained in my governor's speech that organizations like the International Monetary Fund (IMF) did not do enough research on capital controls to provide guidance to countries on the appropriate capital control measures to use, and I thought that it would be very useful for the ADB to do such a study. ADB President Haruhiko Kuroda kindly took up this request and assigned the Asian Development Bank Institute to do it. The book on this study, *Managing Capital Flows: The Search for a Framework*, and such studies should be further encouraged.

My position on exchange rates is that they should be governed by fundamentals in the real economy. So, given recent large current account surpluses in East Asia, I believe that we should have let our currencies appreciate much more than what has happened. Of course, it is difficult for a single country like People's Republic of China or Thailand, to adjust our own exchange rate based on our own surplus alone. Countries in this region are competing with each other in third countries' markets, so appreciating your currency unilaterally, risks losing out to other East Asian countries. So you need a cooperative arrangement to deal with this issue, and this should be developed in East Asia.

I turn now to short term capital flows: These create short term foreign exchange liabilities in the sense that the flows may quickly reverse and they include short term foreign bank borrowing and also include foreign investment in stocks and bonds. These flows do have some benefits. For example, portfolio investment inflows increase investment and liquidity in the stock and bond markets. Also, for countries with saving deficits (current account deficits), foreign borrowing can help finance the deficits.

However, short term capital flows also create a great deal of risk. Certainly, Thailand learned the hard way from the 1997 crisis that if you do not have enough foreign reserves to back up the short term foreign liabilities, the country can easily become insolvent with very painful consequences. Prior to the 1997 crisis, foreign reserves were increasing rapidly for a number of years even though Thailand was experiencing large current account deficits. This was because of very large short-term foreign borrowing that more than filled the gap indicated by the current account deficits. By 1995–1996, short-term foreign debt became larger than total reserves. Speculators were betting on a baht depreciation and attacked the currency many times. The Bank of Thailand compounded the problem by using almost all of the reserves to defend the value of the baht. Thailand became essentially insolvent in not having enough useable foreign reserves to meet her foreign currency liabilities. The baht was floated on 2 July 1997 and Thailand had to seek IMF assistance.



Source: Thailand Development Research Institute.

The lesson for me is that you need to have sufficient coverage for your short term foreign currency liabilities. How do you have that coverage? When short term flows come in, the way to have that coverage is to buy up foreign currency inflows. The central bank needs to buy up the inflows, and this will prevent your currency from appreciating as well. This is easy to say, but in fact it is not easy to implement.

In a country like Thailand, we also have large current account surpluses, so the foreign inflows are not just from short term inflows, but also from the current account surplus as well as from foreign direct investment inflows. We can also have speculative inflows if there is a one way appreciation trend of the exchange rate. Foreigners bring in money to invest in the stock market, pushing up stock prices, and the currency also appreciates, so they gain double, and this leads to even more inflows. Thai people also join in the speculation and the situation becomes even worse.

So while in principle a country should make sure that it has enough reserves to back up its short term foreign currency liabilities, it is not that easy in implementation. The cost of sterilization can also be very high as was already mentioned. So I think that capital control measures should be part of the toolkit to manage capital flows, and they should be targeted at the short term flows. The IMF also agrees with this now, but it is still suggesting that capital controls should only be used as a last resort. I disagree with this. Sometimes you want to use capital controls to prevent your currency from appreciating to such an extent that you real sectors lose competitiveness. However, to do it properly I think there needs to be a common approach internationally, whether globally or regionally, say in East Asia or even in ASEAN. This is why if the IMF comes up with some concrete recommendations on appropriate capital control measures, it would be very useful.

For Thailand in 2006, the 30% URR was not the problem. The big problem was the requirement that the inflows must be kept in the country for at least one

year otherwise you lose 10% of your capital. Nowadays, money moves around quickly. To require that the money remains in the country for at least one year imposes very high costs. If one gets rid of this requirement and have some kind of URR, then this can be a capital control instrument where you can adjust the URR from 0% to a higher level as necessary (like a tax). However, before you can use that, you need to have the institutional infrastructure, such as special accounts for various kinds of inflows so the URR can easily be imposed and/or adjusted as needed. So if this is agreed to be an appropriate capital control instrument at the regional or global level, then even though the rate of URR is normally zero, countries can set up these accounts in case one day a non zero rate of URR is needed. Then the government or the central bank can easily announce and implement a non-zero URR rate at any time.

Other aspects of international cooperation are also very important. First, current provisioning requirement of the Basel Capital Accord, with less provision for short term loans compared to long term loans, encourages short term lending to emerging markets. It is true that for the lending bank short term lending has less risk. However, if every bank lend short, then the risk for the whole system is very high and this was a fundamental cause of the Asian financial crisis. This should be carefully re-examined.

Another issue is that unexpected capital flow reversal can lead to foreign exchange liquidity problems even though a country may have sufficient reserves to cover the short term foreign liabilities. This was the case for the Republic of Korea, for example, during the global financial crisis. It may be difficult to quickly liquidate your reserve holding, and may disrupt the US Treasury and other bond markets. This is why the Chiang Mai Initiative Multilateralization (CMIM) is so important. It should be able to provide short-term (say six months) liquidity support for temporary foreign exchange liquidity problems. Of course, the IMF can also provide this, but it still has a stigma problem in many East Asian countries from bad experiences during the Asian financial crisis. This also means that the linkage between CMIM and the IMF is still a major constraint for the effectiveness of CMIM.

Finally, cooperation on exchange rates is critical to rebalance the global economy. What has been the problem in the past is that there is no appropriate forum to talk about this. In Ministers of Finance meetings, focusing on exchange rate issues risks being accused interfering in the central bank as exchange rate policy is the responsibility of the central bank in many countries. However, in some countries, the central bank does not determine exchange rate, so central bank meetings cannot deal adequately with exchange rate issues either. However, from 2012, ASEAN plus 3 Finance Ministers Meeting will be joined by the ASEAN plus 3 Central Bank Governors. This should be the appropriate forum for the region to discuss exchange rate issues.

MANAGING THE RISK FROM CAPITAL FLOWS

Eli Remolona, BIS

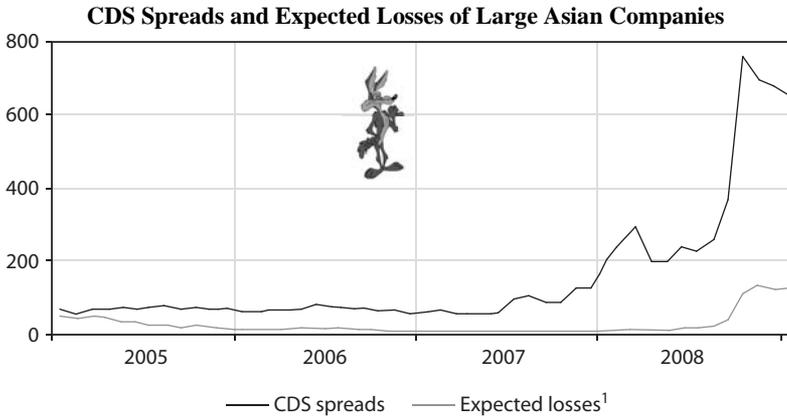
The risks emanating from the unfettered cross-border flow of capital has long been raised by well-known economists. To quote Jagdish Bhagwati, “Dollars are not widgets; free trade is not the same as free capital markets”. The existence of several puzzles like the Lucas paradox, the Feldstein-Horioka puzzle, and the home bias puzzle are indications that there are violations to propositions of neoclassical theory espousing full capital account liberalization.

The Lucas paradox essentially reveals that contrary to theory, capital does not move from rich to poor countries. The Feldstein-Horioka puzzle states that investment show relatively high correlations with savings in OECD economies despite the relatively free mobility of capital among them. The home bias puzzle shows that there is an empirical preference for local investments in the face of opportunities for risk diversification.

While the Lucas paradox may be resolved by enhancements in governance and through institutional development, there is no apparent way of resolving the Feldstein-Horioka and home bias puzzles. As such, consumption smoothing and global risk diversification are not likely to be delivered by free capital flows.

Capital flows are beset by sudden stops, capital flow reversals, and asset bubbles. The empirical evidence on the benefits of full capital mobility is mixed, whereas the tail risks associated with full capital mobility are real. The incidence of crises is correlated with the increasing liberalization of cross-border flows which began in the 1980 and accelerated in the 1990s. These risks are theoretically rooted on deviations from the behavioral axioms of neoclassical theory. Kahneman and Tversky (1979) show that standard expected utility theory does not hold survive experimental evidence. More precisely, the maximization of expected utility from consumption is not the relevant objective function of agents, and what matters for risk aversion are the gains and losses in income. This implies procyclicality of risk aversion and economic fundamentals, where agents take significant amounts of risk during booms and become extremely risk-averse during busts. Such behavior may be likened to that of the “Wily Coyote”, forever chasing the elusive “Roadrunner” until he eventually falls off a cliff. This pattern could be exemplified by the movement of CDS spreads in the run-up to and during the 2008 global financial crisis.

The cliff is the coyote’s Minsky moment, an information event that bursts the bubble and radically shifts agents’ behavior from low to extremely high risk aversion. The dynamics of the “Wily Coyote” effect, however, is not well understood.



¹Average EDF multiplied by 0.5, which is the historical loss given default
Sources: Markit; Moody's Investors' Services, author's calculations.

In principle, the risks associated with capital flows need to be mitigated. In doing so, the following may be considered:

- (i) Types of flows and contributions to risk or volatility;
- (ii) Alternative approaches to managing capital flows, e.g.,
 - “leaning” on banks (conduct preemptive action, and progressive or proactive intervention),
 - “clean” approach (allow the adjustment to occur and respond afterwards, take a passive approach);
- (iii) Nature of intervention (rules-based versus discretionary); and
- (iv) Frequency of intervention, e.g.,
 - “chicken feed” moves (small but frequent adjustments), or
 - discrete moves (large but infrequent moves).

It is argued that in most cases, a “lean” rather than “clean” approach to risk management as regards surges in capital flows is better, especially with the more volatile components. Some scope for discretion should also be allowed, in contrast to a strictly rules-based approach, given imperfect indicators of risk.

To minimize the risk of sudden stops from the liabilities side of the balance sheet, the following instruments may be used:

- (i) minimum holding period requirements,
- (ii) withholding taxes on nonresident flows, and
- (iii) macroprudential stability taxes.

On the asset side, the prevailing insurance instrument is reserve accumulation. It is, however, not clear how much reserves are needed, although the Guidotti-Greenspan rule states that the amount of reserves should be equivalent to the volume of short-term debt. It is likely that this is the rule being followed by the Chinese on their portfolio flows, which may actually be too much. Not being sure about the optimal size of reserves to hold as insurance against capital flow reversals is bad enough, but there are also costs to sterilization of inflows, and holding reserves as insurance against reversals could be costly due to the carrying costs of associated government bond issuance.

To manage the risk of asset price bubbles, the following are often adopted:

- (i) Basel III countercyclical buffers,
- (ii) aggressive use of loan-to-value ratios, and
- (iii) property cooling measures.

In cases where the impetus is strong, the above may not be sufficient. Surges in capital inflows result in excess liquidity, and this in turn fosters the emergence of price bubbles. There is evidently a role for monetary policy (through policy rate adjustments) under floating exchange rate regimes and increasing banks' reserve requirements in managed exchange rate regimes.

CAPITAL INFLOWS AND REGIONAL POLICY COOPERATION

Masahiro Kawai, ADBI

Lessons from the Asian and Global Financial Crisis

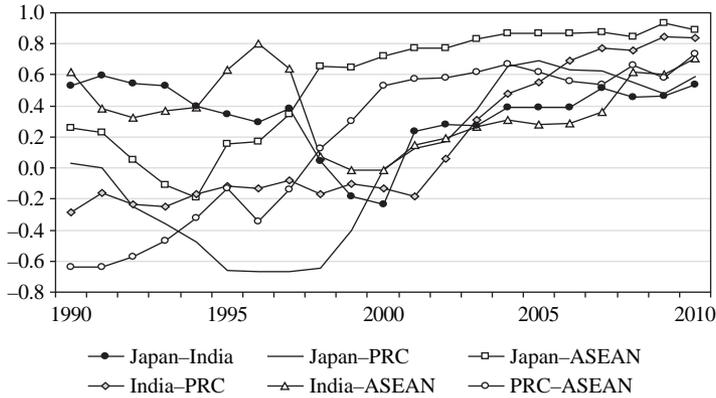
One important lesson from the 1997–1998 Asian financial crisis and the 2008–2009 global financial crisis is that policymakers in the region would benefit from closer policy coordination in managing macroeconomic-financial risk and crisis contagion from other economies. The reason is that we observe:

- (i) the high frequency of disruptive shocks from the global financial market, affecting all economies in the region;
- (ii) loose monetary policy in the US and Europe, affecting many economies in the region; and
- (iii) growing regional macroeconomic interdependence and the resulting spillover effects of macroeconomic and financial shocks and policies from other economies in the region.

Shocks from global financial markets have affected Asian economies in different ways. However, a coordinated approach to managing such shocks will be more effective than a unilateral approach and produce better results. For example, accommodative monetary policy—such as quantitative easing—in the US and Europe has similar effects on most economies in the region and therefore requires a coordinated response.

Growing regional trade and financial interdependence is magnifying the spillover effects of macroeconomic and financial shocks and policy actions. The increasing interdependence of economies in Asia is reflected in the rising correlation of the GDP growth rates of Japan, the People's Republic of China (PRC), India, and the ASEAN members.

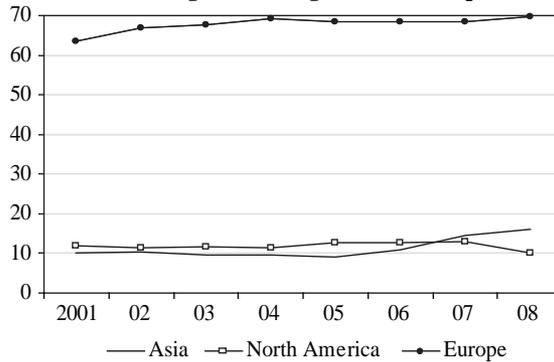
**Rising Correlation of the GDP Growth Rates of Japan, India, the PRC, and ASEAN
(10-year moving windows)**



PRC = People's Republic of China.
Source: Author's calculations.

The level of financial market integration in Asia is increasing, but is still in a long way behind Europe, as can be seen in the chart below. Nonetheless, the crisis contagion at the time of the Asian financial crisis signified the extent and speed with which one country's financial crisis can spread to others in the region. As Asia's financial systems develop and become more open, they will increasingly integrate with one another.

**Intraregional Portfolio Investment (%):
Asia Rising but still lags behind Europe**



Source: International Monetary Fund, Coordinated Portfolio Survey.

Capital Flow Management and Regional Policy Coordination

The volume of international capital inflows to Asia seems bound to increase as the growth prospects of the region's economies remain robust while the US and European economies remain weak. Asian policymakers have several policy options available to them to address the consequent risks of large and volatile capital inflows, including structural, macroeconomic, and macroprudential policy measures.

Structural policy measures include the development and deepening of domestic financial markets so they become resilient to volatile capital inflows and outflows, as well as the liberalization of goods and services imports and capital outflows to ease currency appreciation pressure. Macroeconomic policy responses of individual economies to large capital inflows include allowing currency appreciation, preventing currency appreciation through sterilized interventions and accumulation of foreign exchange reserves, tightening fiscal policy, and lowering policy interest rates. Macroprudential measures encompass tighter regulation and supervision of domestic banks to prevent a buildup of financial vulnerabilities such as asset price bubbles as well as to control the inflow of short-term capital.

Of the macroeconomic policy measures, there is a risk that currency appreciation will damage international price competitiveness and exports if carried out unilaterally. However, maintaining currency undervaluation through market interventions may have negative spillover effects on other economies. There are also limits to tighter fiscal policy and interest rate adjustment as the former takes time to implement and the latter requires low prevailing and expected inflation rates.

In managing capital flows, the typical prescription of policymakers and economists from advanced economies is to choose one of the three corner solutions of the "impossible trinity": liberalize cross-border capital flows, adopt a fully flexible exchange rate regime, and ensure monetary policy independence. This approach, while suitable for advanced economies, may not be desirable for all emerging economies, given their relatively underdeveloped financial—particularly banking—systems, shallow currency markets, and inadequate industrial diversification. These are important binding constraints that prevent emerging economies from benefiting fully from opening up their capital accounts and adopting fully flexible exchange rate regimes. For many of these economies, capital controls are still needed to mitigate the risks associated with large and volatile capital inflows and outflows.

The value of regional policy coordination in managing capital inflows is often ignored in such prescriptions. Capital flow management clearly has international implications, especially in the conduct of monetary and exchange rate policies and of macroprudential policies limiting short-term capital inflows.

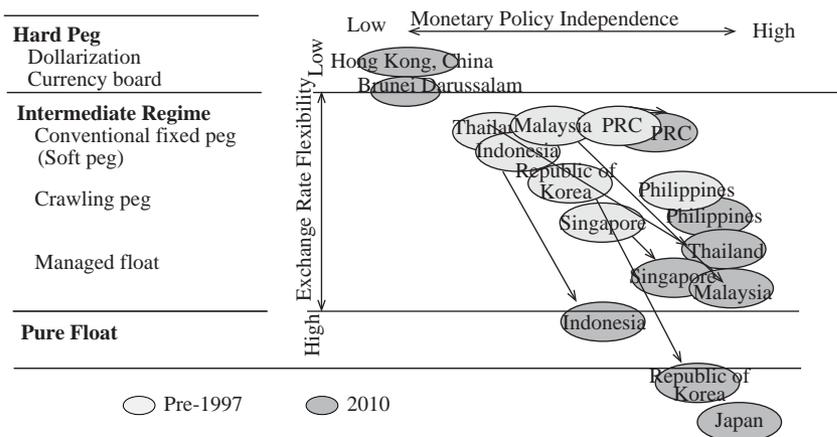
First, one country’s intervention in the foreign exchange market to prevent its currency from appreciating can affect the competitiveness of other countries. It may discourage them from allowing currency appreciation, for fear of loss of price competitiveness, even when they face the risks of inflation and asset price bubbles. Second, prudential and regulatory measures to limit short-term capital inflows can divert such flows to neighboring countries, which may not wish to receive them. Thus, coordinated responses would help to maintain macroeconomic and financial stability at the national and regional level.

Significant policy coordination will require intensive policy dialogue. Without it policymakers in individual economies may disregard the implications for neighboring economies of such policies as competitive currency depreciation or an asymmetric exchange rate policy that restrains appreciation pressures more than it does depreciation pressures. Intensive policy dialogue and coordination could prevent such beggar-thy-neighbor impacts and improve macroeconomic and financial sector performance.

Exchange Rate Policy Coordination

Asia has a diverse range of exchange rate arrangements. Japan has a free-floating exchange rate regime, while the PRC maintains a very tightly managed exchange rate regime by intervening regularly and heavily in the market. All other economies have intermediate exchange rate regimes, including managed floats. With the notable exception of the PRC, most economies are gradually moving toward monetary policy independence and exchange rate flexibility.

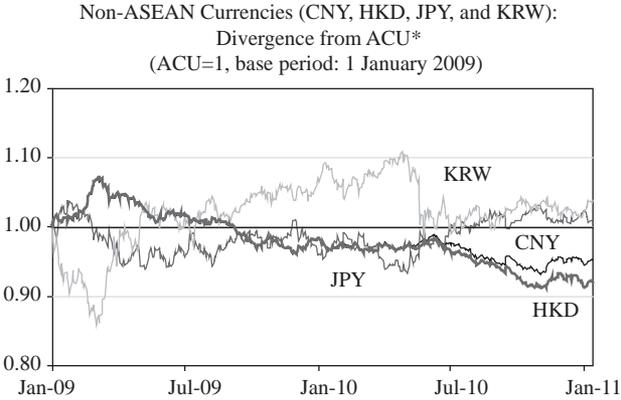
Diversity of Exchange Rate Regimes in East Asia (pre-1997 and 2010)



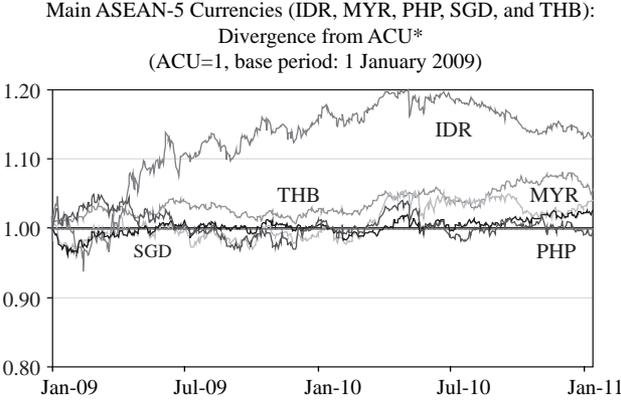
PRC = People’s Republic of China.
 Source: Author’s diagram.

Asia’s nominal exchange rate movements reveal several interesting developments. Major ASEAN currencies, including the Malaysian ringgit, the Singapore dollar, the Thai baht and, to some extent, the Philippine peso, have tracked each other closely in recent years. The Indonesian rupiah has moved in a more volatile way, although over the past 2 years the rupiah has been moving in the same direction as other ASEAN currencies. In contrast, the Japanese yen and the Korean won have moved in a very volatile way, which could be problematic given the high and rising economic interdependence between the two countries.

ACU Divergence Indicators



* An increase is an appreciation.



* An increase is an appreciation.

Source: Asian Development Bank Institute.

Given the rising economic interdependence in Asia, intraregional exchange rate stability and extraregional rate flexibility are desirable. Ideally, Asian policymakers would adopt similar exchange rate arrangements that are

sufficiently flexible against external currencies and would also try to avoid significant intraregional exchange rate volatility. But the reality is that it is not easy to agree on exchange rate policy commitments in Asia, because of the region's structural diversity and preference for maintaining policy sovereignty.

Informal "soft" coordination may be sufficient to achieve intraregional rate stability (and extraregional rate flexibility) at this point. Market forces have driven some major ASEAN currencies to move in a similar direction, which should enable the authorities in these economies to maintain mutually relatively stable, not necessarily fixed, exchange rates. So if the PRC joins these ASEAN countries by allowing the renminbi to be more flexible and let its exchange rate behave like the major ASEAN currencies, emerging Asia should be able to achieve relatively stable intraregional exchange rates. The Japanese and Korean authorities also need to strengthen policy dialogue so they can prevent excessive fluctuations between the yen and the won. A conscious and long-term framework grounded on the principle of pragmatism in the ASEAN+3 countries (the ten ASEAN countries plus the PRC, Japan, and the Republic of Korea) would be a constructive way to move forward.

Regional Financial Cooperation

Current regional financial cooperation initiatives involve monitoring and carrying out policy dialogue on capital flows, financial market conditions, and exchange market developments, among others. Cooperation also extends to the development and integration of ASEAN financial markets as well as to the development and deepening of local-currency bond markets through the Asian Bond Markets Initiative (ABMI) under the ASEAN+3 framework and the Asian Bond Fund projects under the Executives' Meeting of East Asia Pacific Central Banks (EMEAP). Lastly, the Chiang Mai Initiative Multilateralization (CMIM) provides a financial safety net to economies in the region should they encounter financial distress.

The next phase of efforts in fostering greater Asian financial cooperation shall focus on (i) strengthening the surveillance capability by providing sufficient resources to the ASEAN+3 Macroeconomic Research Office (AMRO), (ii) facilitating economic reviews and policy dialogue among the ASEAN+3 finance ministers and central bank governors, and (iii) further strengthening the CMIM process. The CMIM has been expanded to US\$240 billion in its fund size and has introduced precautionary instruments, similar to the IMF's precautionary and liquidity lines, in addition to its crisis-lending facility. Its IMF de-link portion has been raised to 30% and will need to be further raised over time to 100% by strengthening the surveillance process. The Asian bond market development programs need to continue by increasing the size of the Credit Guarantee Insurance Facility (CGIF) and by embarking on a third stage of the Asian Bond

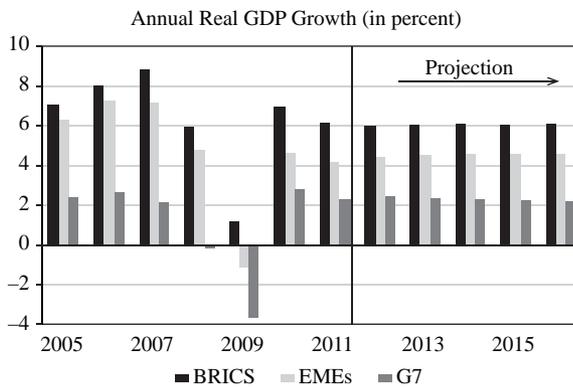
Fund (ABF3). An Asian Financial Stability Dialogue (AFSD) should be set up as a forum for coordinating regional efforts aimed at regional financial stability.

An increasingly integrated Asia needs more stable intraregional exchange rates. To maintain macroeconomic and financial stability, Asian economies need more flexible exchange rates vis-à-vis the US dollar. This will in turn require convergence of exchange rate regimes within Asia. In the case of major ASEAN currencies, market forces are leading to a trend toward such convergence. An intensive exchange rate policy dialogue is essential to start even informal and soft exchange rate policy coordination. Convincing the PRC to adopt a managed float akin to those that govern the ASEAN currencies would improve the alignment of exchange rate regimes in Asia.

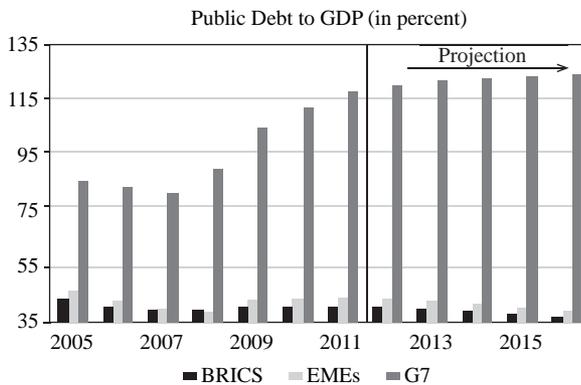
MANAGING CAPITAL FLOWS: SOME RECENT EVIDENCE

Jonathan D. Ostry, IMF

The recent surge in capital flows to emerging markets is largely attributable to strong macroeconomic fundamentals, relatively high interest rate differentials, and attractive risk-return profiles on emerging market investments. Note below, for instance, the relatively buoyant growth projections for BRIC (Brazil, Russian Federation, India, and the PRC) and other emerging market economies, as well as projections of relatively low government debt ratios for these countries.

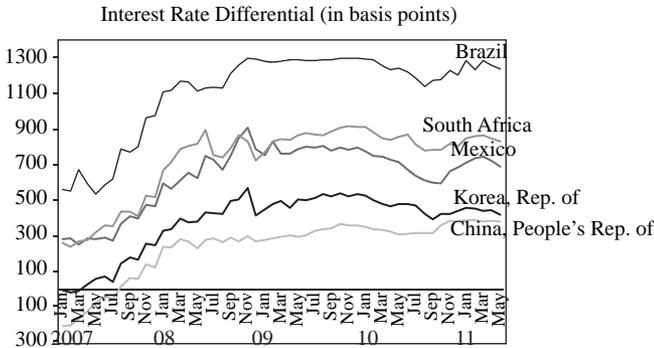


Note: Average year-on-year growth (in percent).
Source: IMF's WEO database.

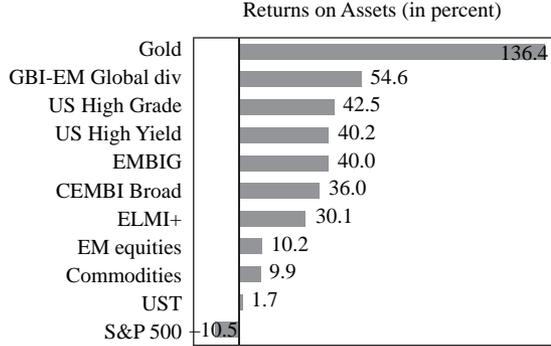


Note: Average gross general government debt to GDP ratio (in percent).
Source: IMF's WEO database.

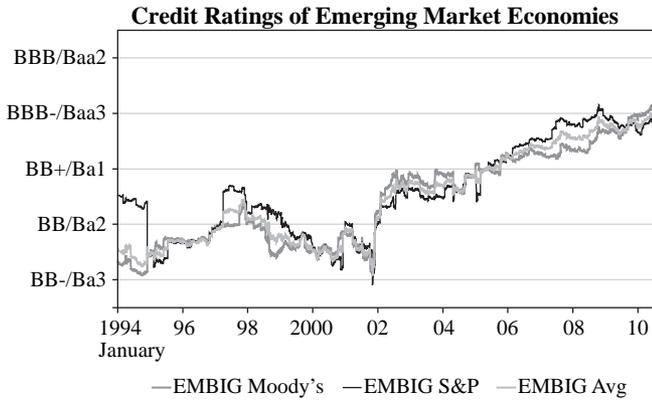
The relatively high interest rate differentials and favorable returns on emerging market investments, as well as improving credit ratings, likewise provide incentives for cross-border capital to flow to these countries.



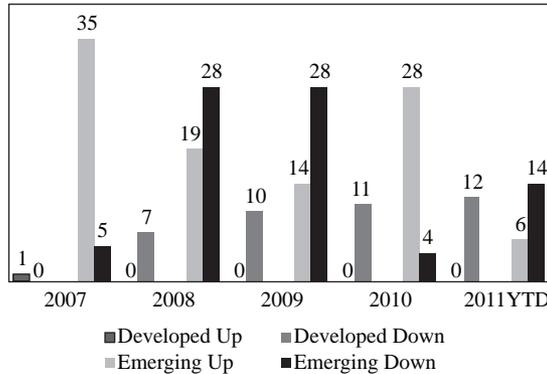
Note: 10-year government bond yield minus 3-month US T-bill rate in basis points.
 Source: Bloomberg.



Note: Returns as of June 29, 2007 to May 31, 2011 (in percent).
 Source: J.P. Morgan.



Note: EM fixed income indices are now investment grade. (> BBB-).
 Source: Chang (2011).



Note: The total number of upgrades and downgrades includes both S&P and Moody's actions.
 Last developed market sovereign rating upgrade occurred in 2007.
 Source: Chang (2011).

Capital controls, foreign currency regulations, and domestic prudential regulations are all possible tools for managing financial-stability risks associated with a surge in capital flows. There is a large volume of literature on the use and effectiveness of capital controls, but little systematic treatment of the interplay of the three categories of instruments. To address this, an analysis of the joint effect of regulatory measures on the structure of external liabilities, foreign currency denominated lending, domestic credit booms, and resilience to crises was conducted.

Two capital control de jure indices were used in the study based on the IMF *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER): an economy-wide capital inflow controls index based on Schindler (2008), and a financial sector specific controls index, which is an average of binary variables with one reflecting restrictions on the financial sector's foreign

borrowing, differential treatment of non-residents accounts, and restrictions on foreign accounts. An index of foreign currency regulations based on the AREAER was created by taking the average of binary variables indicating limits on domestic lending in foreign currency, limits on purchases of locally-issued securities denominated in foreign currency, differential treatment of deposit accounts denominated in foreign currency, and limits on open foreign currency positions. IMF Desk Survey data was used to create an index of domestic prudential regulations, computed by taking the average of binary variables indicating the presence of loan-to-value ratios, the level of bank reserve requirements, and limits on sectoral credit concentration.

A cross-sectional analysis of 38 countries using 2007 data and pre-crisis regulatory measures suggests that economy-wide capital controls on inflows are significantly associated with lower debt while controlling for external vulnerability and institutional quality. The analysis also shows that foreign currency restrictions are significantly associated with lower debt, although the statistical significance disappears when economy-wide capital controls are included in the regression. Using the same data and replacing external debt with the ratio of foreign currency lending to total domestic credit, we find that economy-wide controls lead to a reduction in the proportion of foreign currency lending. Foreign currency restrictions had similar effects. The impact of capital controls and foreign currency credit restrictions jointly lower the proportion of foreign currency credit since the coefficients of the two classes of restrictions continue to remain significant.

Using a slightly smaller data set for 28 countries (because of data availability), a regression of the change in the credit ratio from 2003 to 2007 and pre-crisis regulatory measures was conducted to assess the incidence of credit booms in the presence of the aforementioned regulatory measures. Controlling for institutional quality, initial private credit to GDP, and credit bureaus, the analyses reveal that prudential regulations lead to smaller credit booms. The effect of prudential regulations also remains significant when capital controls and foreign exchange restrictions are added to the list of independent variables.

A panel data analysis of the same 38 countries was likewise done using data from 1995 to 2008. The results indicate that economy-wide and financial sector capital controls significantly reduce debt. The effect of economy-wide and capital controls and restrictions on domestic lending in foreign currency in the panel data analysis is similar to that obtained in the cross-section regressions, but, in addition, we also find a statistically significant effect of financial sector capital controls. Similarly, the results for the panel regressions of domestic credit booms and prudential regulations, capital controls, and foreign currency lending restrictions are consistent with the findings of the cross-section analysis.

If policy measures reduce vulnerability, then the downturn in the event of a crisis should be smaller. A cross-sectional analysis of the change in growth of 41

countries during the 2008 to 2009 global financial crisis and the average growth for 2003 to 2007 in relation to economy-wide and financial sector capital controls, domestic bank foreign currency lending restrictions, and prudential regulations, reveals that the use of regulatory measures tends to result in a smaller decline in economic growth. Specifically, both economy-wide capital controls and domestic prudential regulations retain statistical significance when included together as independent variables. Economy-wide capital controls, however, dominate when included with foreign currency lending restrictions. An analysis of past crisis resilience using 1995 to 2008 data shows that capital controls are associated with smaller declines in growth during incidence of crises.

The following were undertaken to ensure robust findings:

- (i) addition of regressors to capture political stability, financial market development, and type of political regime;
- (ii) use of alternative indices; and
- (iii) tests for endogeneity.

The key results of the analyses are either unaffected or strengthened after conducting the robustness tests. The findings of recent studies by the IMF suggest that capital control as well as prudential measures can reduce financial-stability risks, likely reflecting the impact in tilting external liability structures away from debt, especially short-term and FX-denominated debt. In addition, domestic prudential measures reduce risks from excessive domestic credit booms.

Panel Discussion

This section summarizes the proceedings of the Panel Discussion. The panelists' names and corresponding discourse are presented in sequence.

Maria Socorro Gochoco-Bautista

After the 1997 Asian financial crisis, there was greater openness to using capital controls for prudential reasons. The use of capital controls is sometimes warranted, especially in light of difficulties in managing a financial crisis, for financial stability. The difficulty of implementing policy especially during times of crisis was highlighted by Dr. Chalongphob Sussangkarn's account of Thailand's experience in the run-up to and during the 1997 Asian financial crisis. On the other hand, capital controls could also be used as tools for a competitive exchange policy stance when a country has a persistently high current account surplus.

Dean Kawai notes that capital controls may be used as prudential measures especially if financial markets are underdeveloped. This is supported by empirical studies showing that countries with underdeveloped financial markets that liberalized their capital account experienced greater volatility in output and consumption.

Dr. Chalongphob and Dr. Remolona also note that capital controls should not be used as a last resort, as this will send a signal that the toolbox is empty and that conditions are really bad. If the market knows that capital controls are the "last card" and it is laid down the table, it could send a signal that economic managers have run out of choices, and this could fuel panic.

On the role of the IMF, Dr. Chalongphob and Dean Kawai raised the need for regional cooperation and coordination as regards the use of capital controls. It is difficult for countries who want to use capital controls to gather and agree on a framework, such that the IMF is the logical body that could drive the effort given its emerging paradigm shift on the use of capital controls. The role of the IMF at this point is not yet clear, although it should have an institutional role in the use of capital controls. Furthermore, although it proposes a framework on the use of capital controls, it still lacks guidelines for implementation.

Changyong Rhee

I agree that capital controls may be used by countries with a small current account surplus experiencing a surge in capital inflows. However, persistently large surplus countries need to have exchange rate adjustments. This consideration is part of the G20's indicative guidelines.

It is important to make a distinction between countries with small and large current account imbalances as regards the use of capital controls. It is difficult to convince trade partners that capital controls are warranted if a country has large current account surpluses.

Masahiro Kawai

A distinction must also be made between countries that have liberalized their capital accounts and those that have not. There is a need to distinguish these differences in initial conditions. There are countries that maintain capital controls and never liberalized, countries that used to employ capital controls and are liberalizing their capital accounts, and countries with liberal accounts but which choose to re-impose capital controls. The direction of policy implementation also matters.

Changyong Rhee

I agree that initial conditions should be a consideration and that the perspective of discussion with regard to capital controls should be on the status quo. Countries with persistent current account surpluses and existing capital controls should not, at the very least, introduce new measures.

Maria Socorro Gochoco-Bautista

This is line with the issue of Dr. Chalongphob Sussangkarn's comment on sequencing because there are countries that liberalized their capital accounts in the 1990s, like the Republic of Korea, but are currently reintroducing capital controls due to the volatility of cross-border capital flows. The PRC, on the other hand, is relatively closed and has not yet liberalized its capital account.

There must also be a clearer distinction between capital controls and prudential measures. The Republic of Korea may not be considered as liberalized if tighter definitions of capital controls are imposed.

Jonathan Ostry

On the issue of using capital controls as a last resort—this really depends on whether a country's currency is undervalued or not. This is why the first node in our proposed flow chart looks at the existence of current imbalances. Whether capital controls are used as a last resort or not, there must be a test of macroeconomic fundamentals at the early stages even if there are risks to financial stability. It is important for macroeconomic policy to be geared toward an adjustment if necessary. This is the context by which the process flow is

structured. While capital controls are part of the toolkit, they should not be used as a substitute to macroeconomic adjustment if such is warranted.

Assuming that the current account imbalance is within bounds, capital controls may be used, not necessarily as a last resort but as part of a broader toolkit to manage risks arising out of excessive capital flows. However, capital controls should not be used as a “first resort” even if there are financial stability risks. Capital controls could also be used in conjunction with other measures to maximize effectiveness, especially for tools that have significant implementation lags like fiscal policy.

On multilateral issues concerning the “currency wars” debate, the externalities across countries could lead to an adverse equilibrium outcome where most countries introduce and maintain capital controls to stop flows which could otherwise be beneficial. While the multilateral aspects of capital controls need to be investigated, the knee-jerk reaction of imposing capital controls in response to the actions of other countries must not be encouraged.

Masahiro Kawai

It is very difficult to arrive at an agreement on whether a country’s currency is overvalued or undervalued. If capital inflows are large enough, exchange market pressure will build up and eventually induce currency appreciation. If capital controls are imposed, a country could still be accused of intervening to prevent currency appreciation.

In the PRC’s case, the problem is the persistence of current account surpluses. If the international monetary system were still under Bretton Woods, then the PRC’s case would be classified as a fundamental disequilibrium situation. It could be argued that capital inflows into the PRC are already too much, and a macroeconomic response of allowing the yuan to appreciate faster may be a better approach to dealing with the surge of inflows.

Changyong Rhee

Even the Chinese government is not talking about capital controls. They focus instead on macroeconomic management. Our pragmatic proposal is consistent with the call to conduct macroeconomic adjustment first if there are large imbalances. Furthermore, the indicative guidelines already agreed on by the G20 could be used to gauge the necessary action since it is difficult to arrive at an agreement on currency overvaluation or undervaluation.

Michael Hutchison

If every country bans cross-border flows of short-term capital, a gap between the private sector's requirements for short-term capital and supply could ensue, and domestic entities would benefit from arbitrage. Banning short-term capital flows is not the first-best solution, and that scenario will not occur for as long as proper management is done.

Capital controls are certainly not the right tools for correcting current account imbalances, if capital flows constitute a small portion of the country's current account position. Capital controls do not fundamentally affect saving and investment, and international capital typically constitutes a relatively small part of investment capital.

Eli Remolona

I agree with the position that the use of capital controls should be discouraged when there are large current account surpluses.

Thailand's situation in the run-up to the 1997 Asian financial crisis, however, was just the opposite. It was running large current account deficits that were being financed through large amounts of short-term debt inflows. The flow reversals in 1997 had devastating effects on the Thai economy. In the Republic of Korea's case, the capital flow reversals could have been managed through a drawdown of reserves. The country's economic managers, however, did not do this, probably due to uncertainty with respect to the magnitude of reserves needed to compensate for the cash outflows. It is enough to say that if a country has a current account surplus, it should not resist currency appreciation.

The issue of currency valuation is indeed difficult to tackle and achieve agreement on. It is simpler to talk about current account balances as an indicator, but the volume and flow of short-term debt should likewise be tackled.

Chalongphob Sussangkarn

Exchange rates should adjust when there are current account imbalances, but that is not happening in this region. If a country allows its currency to appreciate, it should not do it alone since there are spillover effects on other countries. The country allowing currency appreciation in the presence of large capital inflows could lose competitive edge on its exports. It is probably better for all countries in the region to allow for currency adjustments in a coordinated manner, and that is the trajectory today.

Masahiro Kawai

When the PRC was pressured to revalue the renminbi or adopt greater flexibility so that it would appreciate, some policymakers and economists were worried that some countries would not follow suit. There is a clear scope for policy dialogue and formal coordination.

In addition to external short-term debt flows, portfolio equity flows should also be monitored as these could be volatile as well.

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KEY INDICATORS FOR ASIA AND THE PACIFIC 2011

\$75.00 plus courier charges / ISSN: 0116-3000 / 978-92-9092-154-7

The *Key Indicators for Asia and the Pacific 2011 (Key Indicators 2011)*, the 42nd edition of this series, is a statistical data book presenting economic, financial, social, and environmental indicators for the 48 regional members of the Asian Development Bank (ADB). This issue of the *Key Indicators* presents in Part I a special chapter—Toward Higher Quality Employment in Asia—followed by statistical tables in Parts II and III with short, nontechnical commentaries on economic, financial, social, and environmental developments. Part II comprises the first set of statistical tables and commentaries, which look at the MDGs and progress in the region toward achieving key targets. The second set of tables, which are in Part III, is grouped into seven themes providing a broader picture of economic, financial, social, and environmental developments. The aim of the publication is to provide the latest key statistics on development issues concerning Asian and Pacific economies to a wide audience including policy makers, development practitioners, government officials, researchers, students, and the general public. This year, the ADB also presents the *Framework of Inclusive Growth Indicators*, a special supplement to the *Key Indicators*.

The *Key Indicators 2011* is divided into the following parts:

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FLAGSHIP PUBLICATIONS

ASIAN DEVELOPMENT OUTLOOK 2012: CONFRONTING RISING INEQUALITY IN ASIA
\$75.00 plus courier charges / ISBN: 978-92-9092-606-1 (print);
978-92-9092-607-8 (web)

The annual *Asian Development Outlook* (ADO) provides a comprehensive analysis of economic performance for the past year and offers forecasts for the next 2 years for the 45 economies in Asia and the Pacific that make up developing Asia.

Despite weak global demand, Asian Development Outlook 2012 expects that developing Asia will largely maintain its growth momentum in the next couple of years, in an environment of easing inflation for most regional economies, although policy makers must be alert to further oil-price spikes arising from threats of oil supply disruptions.

The report sees that the greatest risk to the outlook is the uncertainty surrounding the resolution of sovereign debt problems in the eurozone. Still, in the absence of any sudden shocks, developing Asia can manage the effects on its trade flows and financial markets.

The theme chapter looks at widening inequality: in spite of developing Asia's great success in raising living standards and reducing poverty, swelling income disparities threaten to undermine the pace of progress. Regional policy makers need to ensure that the benefits of growth are widely shared.

ASIAN DEVELOPMENT OUTLOOK 2011 UPDATE: PREPARING FOR DEMOGRAPHIC TRANSITION

\$75.00 plus courier charges / ISSN:1655-4809 (print) / ISBN: 978-92-9092-390-9 (print), 978-92-9092-392-3 (web)

The annual *Asian Development Outlook*, generally launched in April, presents an analysis of developing Asia's recent economic performance plus its prospects for the next two years. This Update shows whether these forecasts were met, explaining divergence between forecasts and the actual outturn, and firms the forecasts for the next 18 months or so.

The Update expects developing Asia to sustain its robust growth over the next 2 years, despite the tepid outlook for the United States, the eurozone, and Japan. The region will be buttressed by healthy domestic demand and buoyant intraregional trade. Managing inflation has to be a key focus for policy makers, to allow for inclusive growth.

Such growth includes the elderly, who are all too often left behind as Asia's traditional family networks weaken. As the elderly will form an ever-larger share of the region's population over the next few decades, states will have to ensure their economic security—and meet the wider economic implications for society.

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ECONOMICS TITLES FROM ADB

FOOD SECURITY AND POVERTY IN ASIA AND THE PACIFIC:

KEY CHALLENGES AND POLICY ISSUES

(APRIL 2012)

\$25.00 (paperback) / ISBN 978-92-9092-666-5 (print),

ISBN 978-92-9092-667-2 (web)

Ensuring a secure supply of food is essential, given the world's (and especially Asia's) growing population, high and volatile food prices, increasingly scarce resources, and changing environment. This paper discusses the drivers behind food insecurity in Asia and points to ways to mitigate it.

The world's population has now reached 7 billion, and is projected to increase by more than 2 billion between now and 2050. Asia will account for majority of the increase. And Asia's growing affluence is shifting food demand away from cereal grains toward meat, vegetables, and fruits, which require more water, land, and other inputs than do cereals.

Asia, which is home to most of the world's poor and undernourished populations, is finding increasing difficulty feeding its people as demand for food expands rapidly just as water and land resources decline. Because of these pressures, food prices have been rising since the 2000s. High and volatile food prices are eroding the purchasing power of households—especially of poor ones, which spend up to 70% of their budgets on food—and are thus undermining recent gains in poverty reduction. The impact of higher food prices is severe—an additional 112 million people could have escaped poverty in Asia during the late 2000s if food prices had not increased during the period. Thus, long- and short-term strategies are needed to ensure food security and bolster efforts at poverty reduction. Policies to enhance food security that are discussed in this paper include safety net and social protection programs, and policies that promote agricultural productivity, rural development, agricultural research, and human capital investment.

ECONOMICS TITLES FROM ADB

DIAGNOSING THE INDONESIAN ECONOMY: TOWARD INCLUSIVE AND GREEN GROWTH (FEBRUARY 2012)

£60.00 / \$99.00 (paperback) / ISBN 978-0-85728-447-1

Diagnosing the Indonesian Economy: Toward Inclusive and Green Growth, edited by H. Hill, M. E. Khan, and J. Zhuang, commences with a broad overview of Indonesia's development since the 1960s. The analytical frameworks for the study, which were developed at Harvard University and ADB, are then used in an attempt to identify the constraints that most severely bind the country's development, and therefore the priorities for policy implementation and/or reform. The country's macroeconomic management and monetary policy since the Asian financial crisis is reviewed. The challenges of Indonesia's slow industrial transformation and small industry sector are described, as are their implications for poverty reduction efforts. The challenges Indonesia faces in developing its infrastructure are set out, e.g., the country's diverse topography, archipelagic nature, and monopolies. Human capital, an essential element in both growth and poverty reduction, is analyzed for the country, including the improvements in enrolments and gender balance, and the limitations the poor face to accessing education. Indonesia's record on poverty reduction is traced, as are the efforts to improve it. The links between employment creation and poverty reduction are presented, with a focus on the pressing issue of youth employment. The impact and status of the decentralization effort and efforts to fine-tune it are discussed. Lastly, the rather dismal status of the country's environment and natural resources management and the emerging impacts of climate change are summed up.

Indonesia's national development plan for 2005–2025 sets a vision of a country that is self-reliant, has a highly educated population with capable human resources, has no discrimination, and is prosperous enough to fulfill its population's needs. This will require high levels of economic growth that is both socially inclusive and environmentally sustainable. The volume identifies that in order to overcome the binding constraints to this growth, Indonesia needs to improve its infrastructure, enhance the education system to provide a more capable workforce, revive its manufacturing sector to open up employment, and facilitate these efforts through substantially improved governance and institutions. Furthermore, this growth must be accomplished in a manner that is harmonious and not destructive to the environment and natural resource base.

ECONOMICS TITLES FROM ADB

COSTS AND BENEFITS OF ECONOMIC INTEGRATION IN ASIA (2011)

ISBN: 9780199753987

To recover from recession, the global economy must rely on the strong performance of developing Asian economies, and it has become clear not only in Asia that regional cooperation and integration is key to regional economic development. Heavily reliant on external demand as an impetus to growth and closely linked to global financial markets, Asian economies are becoming closely integrated through trade, investment, and financial transactions. But how closely integrated are they, and what are the real benefits of integration?

In line with its goal to foster economic growth and cooperation in the region, the Asian Development Bank, with Robert J. Barro and Jong-Wha Lee, have collected a formidable group of scholars to tackle the issues related to these questions. *Costs and Benefits of Economic Integration in Asia* offers quantifiable results from the field's top economists on cooperation and integration in the areas of trade, investment, and finance in Asia. Appealing to scholars, policymakers, and interested general readers, the book is an authoritative diagnosis of initiatives seeking to promote regional economic integration. It examines two broad divisions of cooperation and integration: monetary and financial, and trade and investment. Specific enquiries include such topics as comparisons to other regions such as Eastern Europe and Latin America, the effects of regional free trade agreements on overall trade and welfare, the distribution of benefits of unevenly distributed resource wealth among the region's economies, the possibility and desirability of an East Asian currency union, business cycle synchronization and its relationship with inflation targeting regime and trade, pre-World War I Asian monetary systems, the computation of the extent of foreign and domestic content in a country's exports, and many more.

After financial disaster, the world's economy is changing drastically, and Asia will play a pivotal role in how these changes occur. *Costs and Benefits of Economic Integration in Asia* is an essential reference on the controversy and consensus on economic integration, and how it will influence individual Asian countries, the region as a whole, and the world, for decades to come.

PENSION SYSTEMS AND OLD-AGE INCOME SUPPORT IN EAST AND SOUTHEAST ASIA OVERVIEW AND REFORM DIRECTIONS (2011)

£105.00 (hardback) / ISBN: 978-0-415-69270-0

Old age income support will be one of the biggest social and economic challenges facing Asia in the 21st century. The growing spotlight on old age income support is largely due to exceptionally rapid population aging which is fundamentally reshaping Asia's demographic profile. A young continent reaping the demographic dividend of a large youthful workforce is giving way to a greying continent where the ratio of retirees to workers is on the rise.

ECONOMICS TITLES FROM ADB

In contrast to industrialized countries, most Asian countries do not yet have mature, well-functioning pension systems. As a result, they are ill prepared to provide economic security for the large number of retirees who loom on the region's horizon. This book takes a close look at the pension systems of eight countries in East and Southeast Asia—namely, the People's Republic of China, Indonesia, the Republic of Korea, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam—which encompass a wide range of income and development levels. The book provides a comprehensive overview of pension systems in the eight countries, including an in-depth diagnosis to identify their major weaknesses and shortcomings.

On the basis of the diagnosis, the book sets forth concrete and specific policy options for reforming Asia's pension systems. Many policy options for reform are country-specific. For example, a top priority in the People's Republic of China is to extend the pension system to rural areas. At the same time, a number of reforms—such as the need to extend coverage—resonate across the entire region. Appropriate reform will enable the region's pension systems to deliver affordable, adequate and sustainable old-age economic security.

THE INFORMAL SECTOR AND INFORMAL EMPLOYMENT IN ARMENIA (JANUARY 2011)
\$38.00 plus courier charges / ISBN: 978-92-9092-213-1 (print);
978-92-9092-238-4 (web)

This country report is one of the outputs of Asian Development Bank's (ADB) regional technical assistance (RETA) 6430: Measuring the Informal Sector. The National Statistical Service of the Republic of Armenia, one of the three partner statistical agencies of RETA 6430, worked closely with ADB in adapting the mixed survey approach for collecting informal sector and informal employment data, in analyzing the survey results, and in writing this country report.

The country report presents an in-depth analysis of informal employment, which comprises about 52.1% of all jobs in Armenia. The method for estimating the contribution of the informal sector to the gross domestic product, the resulting estimates, labor productivity, and the characteristics of informal sector production units are also discussed in this report.

THE INFORMAL SECTOR AND INFORMAL EMPLOYMENT IN INDONESIA (2010)
\$30.00 plus courier charges / ISBN: 978-92-9092-214-8 (print);
978-92-9092-243-8 (web)

This country report is one of the outputs of Asian Development Bank's (ADB) regional technical assistance (RETA) 6430: Measuring the Informal Sector. The BPS-Statistics Indonesia, one of the three partner statistical agencies of RETA 6430, worked closely with ADB in adapting the mixed survey approach for collecting informal sector and informal employment data, in analyzing the survey results, and in writing this country report.

ECONOMICS TITLES FROM ADB

The country report presents an in-depth analysis for the provinces of Yogyakarta and Banten. Of the total employment in Yogyakarta and Banten in 2009, 89.14% and 75.90% were informal, respectively. The method for estimating the contribution of the informal sector to the gross domestic product, the resulting estimates, labor productivity, and the characteristics of informal sector production units are also discussed in this report.

INDONESIA: CRITICAL DEVELOPMENT CONSTRAINTS (2010)

ISBN: 978-92-9092-076-2

Indonesia, despite steady economic growth in recent years, faces formidable challenges going forward. Economic growth has not returned to the level that prevailed before the 1997 Asian financial crisis. Progress toward reducing poverty and inequalities too has been slow during the recent years. Moreover, economic growth in the last decade has not been accompanied by significant employment generation. The country diagnostic study *Indonesia: Critical Development Constraints* presents a diagnosis of the critical development constraints the country faces. The report proposes policy options to help overcome constraints and to set the country on a path of high and sustained inclusive economic growth in the medium term.

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VOLUMES I AND II

ISBN: 978-92-9092-205-6

This study reveals the core drivers of state-owned enterprises (SOEs) performance, illustrates how rapid progress can be made in placing SOEs on sound commercial footing, and demonstrates the importance of political will for successful SOE reform.

RURAL AND MICROFINANCE IN THE LOWER MEKONG REGION: POLICIES, INSTITUTIONS, AND MARKET OUTCOMES (2011)

\$32.00 plus courier charges / ISBN: 978-92-9092-227-8 (print);

978-92-9092-228-5 (web)

This study examines progress in rural and microfinance in Cambodia, the Lao People's Democratic Republic, and Viet Nam over the past decade, in comparison with industry standards set by international best practices. The study focuses on the policy environment, including regulatory norms and their implementation, as well as support provided to financial infrastructure, and the impact of this environment on the development and performance of institutions providing rural and microfinance services. This examination helps guide government and international development agencies as to which types of interventions can be most supportive of efficient and sustainable institutions that provide financial products and services to the poor, especially those in rural areas.

THE DYNAMICS OF ASIAN FINANCIAL INTEGRATION: FACTS AND ANALYTICS (2011)

Edited by Michael Devereux, Philip Lane, Cyn-Young Park, Shang-Jin Wei

ISBN: 978-0-415-59551-3

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The book attempts to achieve two goals by assessing the degree of regional and global financial integration and unveiling the drivers of such integration. First, it lays out analytical frameworks that are foundations for measuring the degree of integration in the financial asset market and direct investment flows, business cycle synchronization and financial contagion, and consumption and output risk-sharing. Second, by applying the rigorous frameworks, the book provides an up-to-date assessment of the extent of regional and global financial integration in Asia, documenting the complexity in the different patterns of the integration and quantifying their consequences. Its chapters look into three broad aspects of regional and global financial market integration: (i) measurement of regional and global financial integration, (ii) understanding dynamics of regional financial integration versus global financial integration, and (iii) welfare implications from regional financial market integration amid financial globalization.

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The global financial crisis presents a timely opportunity for Asian policy makers to rethink their strategies for financial deregulation and liberalization, and carefully reconsider a next step for further integration among regional financial markets and beyond. An ultimate question is whether and to what extent financial integration is beneficial for economic growth. By assessing the progress of regional financial integration in East Asia in relation to the trend of financial globalization, this book will help address some of these challenges facing the region's policy makers.

ENHANCING SOCIAL PROTECTION IN ASIA AND THE PACIFIC (2011)

\$48.00 plus courier charges / ISBN: 978-92-9092-224-7 (print);

978-92-9092-245-2 (web)

On 21–22 April 2010, the Asian Development Bank (ADB) organized a social protection conference in Manila. Interest in social protection has been growing since the global financial crisis heightened awareness of the many millions of people in Asia and the Pacific who live in poverty or vulnerable situations. Thus, policy makers are now keen to develop social protection systems that can assist people to both leave and stay out of poverty. The conference brought together people from ADB, its developing member countries, partner agencies, research institutes, and civil society organizations to exchange valuable experience and information and discuss ideas on how to develop social protection and expand it for the well-being of people in Asia and the Pacific.

This book features selected papers from the conference that respond to the need for integrated and inclusive social protection to improve the quality of peoples' lives and livelihoods. Specific areas emphasized are health insurance, pensions, the informal sector, measures targeting children, and measuring and monitoring social protection.

METHODOLOGY FOR IMPACT ASSESSMENT OF FREE TRADE AGREEMENTS (2011)

ISBN: 978-92-9092-197-4

This publication displays the menu for choice of available methods to evaluate the impact of Free Trade Agreements (FTAs). It caters mainly to policy makers from developing countries and aims to equip them with some economic knowledge and techniques that will enable them to conduct their own economic evaluation studies on existing or future FTAs, or to critically re-examine the results of impact assessment studies conducted by others, at the very least.

Asian Development Review

The *Asian Development Review* is a professional journal for disseminating the results of economic and development research carried out by staff and resource persons of the Asian Development Bank (ADB). It seeks high-quality papers with relevance to policy issues and operational matters done in an empirically rigorous way. Articles are intended for readership among economists and social scientists in government, private sector, academia, and international organizations.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.8 billion people who live on less than \$2 a day, with 903 million struggling on less than \$1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

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