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Fiscal Stimulus, Agricultural Growth and Poverty in Asia

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1. INTRODUCTION

THE seeds of the recent global recession in 2008–09 were sown in the underpricing of risk and the resulting excessive leverage. Defaults on subprime mortgages led to repricing of risk in USA. As a result, there were sharp falls in the prices of mortgage-backed securities, share prices and home values. Destruction of wealth in turn caused cuts in consumer spending, in business investment and in commercial real estate values.

Declines in the values of mortgaged-based securities and of the derivatives based on them fed fears of further mortgage defaults, which resulted in the subprime mortgage crisis. Erosion of capital of financial institutions weakened their willingness to make loans. Thus, a dysfunctional credit market emerged that no longer gave loans or responded to changes in the interest rates (Feldstein, 2009; Krugman, 2009a).

Total capitalisation of world stock markets almost halved in 2008 (i.e. nearly $30 trillion of wealth disappeared) (Lin, 2009),[1] and losses of this magnitude had significant wealth effects on consumption and saving.

Although governments in USA and Europe acted promptly and decisively, they failed to prevent the financial crisis from spreading to the real sector.

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[1] Roxburgh et al. (2011) reported steady recovery of the world stock markets in 2009–10 despite a great deal of diversity across different countries. Over the summer of 2011, however, stock prices have declined again owing to the European financial crisis.

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Globally, industrial production declined by 28 per cent in the first quarter of 2009 before easing to a pace of contraction of 19 per cent in April (on a rolling quarterly basis). During the first quarter of 2009, exports in East Asia (e.g. China and Japan) declined by 50 per cent or more, and in Korea by 43 per cent, presaging the largest trade contraction since 1929 (Lin, 2009). Other transmission channels through which the contagion spread include sharp reductions in investment and remittances.[2]

The GDP growth rate in developing countries in 2009 was 2.8 per cent, a precipitous decline from 8.1 per cent in 2007 and 5.9 per cent in 2008.[3] World Bank (2009) showed that the sharp deceleration of growth would trap 53 million more in poverty (living on less than $1.25 a day) and 65 million on the higher cut-off of $2 per day. While the gravity of the concerns raised still persists, this study makes a strong case for the strategic role of agriculture in promoting economic growth of developing countries, and in mitigating poverty and other associated hardships, given the uncertainty about how the European financial crisis and recent surges in oil and food prices are likely to play out. While it is now claimed by the World Bank that financial crisis for developing countries is over and relatively high growth rate (6.3 per cent) is expected in 2011–13 (World Bank, 2011b), our analysis of the effects of fiscal stimulus on growth and poverty is still relevant, as the recovery is likely to be uneven among different countries and the recent estimate of hunger continues to be high – the total number of undernourished people in the world is estimated to have reached 1,023 million in 2009 (FAO, 2010).

2. WHY FISCAL STIMULUS?

Experience has shown that in general, monetary policy is ineffective in stimulating investment and consumption in excess capacity situations. Fiscal stimulus, on the other hand, has the potential of working by releasing bottlenecks to growth in developing countries.[4] It must, however, be bold, global and generate an immediate and sustained increase in global demand and productivity.

There are two major limitations of current fiscal stimulus programmes. First, most developing countries are constrained by either fiscal space or/and

[2] Total ~~FD~~FDI and private capital flows to developing countries are estimated to decline from $1.2 trillion in 2007 to $363 billion in 2009. Remittances are likely to fall from $328 billion to $305 billion (Lin, 2009). Private capital flows picked up significantly in 2011(IIF, 2011), but FDI inflows to developing countries continued to decline in the same year (UNCTAD, 2011).

[3] The figures are based on World Bank (2011a). The growth rate recovered to 7.6 per cent in 2010 (*ibid.* 2011a).

[4] For an emphatic endorsement, see Krugman (2009b). He in fact argues that fiscal expansion does not crowd out private investment – on the contrary, there's crowding in, because a stronger economy leads to more investment. So, fiscal expansion increases future potential, rather than reducing it.

foreign exchange reserves, and thus over a period of time will not be able to pursue counter-cyclical policies. Fiscal position was in large measure undermined by the fuel and food crises, resulting in expansion of subsidies. Moreover, an estimated one-third of developing countries have large current account deficits of 10 per cent of their GDP. Second, contrary to Keynesian theory, the so-called Ricardian equivalence theorem points to the possibility that households adjust their behaviour for consumption or saving on the basis of expectations about the future. Any fiscal stimulus package – spending or tax cuts – is then perceived as a liability, which will need to be repaid in the future. In such a situation, the multiplier could be <1, with the GDP seen as given so that an increase in government spending does not lead to an equal rise in other parts of GDP. A case in point is Japan's experience during the 'lost decade'. The government was aggressive in implementing its fiscal stimulus. In 1991, public debt was 60 per cent of the country's GDP. By 2002, it had risen to 140 per cent, implying a large stimulus of 7 per cent of GDP per year. Yet, Japan did not get out of the crisis. This is because people chose to increase saving, which mitigated the effects of government spending. So the lesson is clear: even if governments around the world agree to implement coordinated fiscal stimulus packages, there is still the issue of whether these fiscal programmes will increase aggregate demand enough to offset the excess capacity that has been built up during the 2002–07 bubble (Lin, 2008, 2009).

If public spending delivers higher levels of investment and rational economic agents believe that their income will not be taxed for repayment in future, the Ricardian equivalence effect will be weak, if any. If policymakers can design a system that allows projects/programmes to generate enough returns to repay themselves, the chance of success is high. So, if governments use fiscal stimulus to release bottlenecks to growth, economic growth will be accelerated and marginal returns to private investment will also be higher.

China's economic stimulus of 1998–2002 illustrates this view. In the midst of the Asian financial crisis, when sharp economic slumps in Indonesia, Korea, Malaysia, Philippines and Thailand prompted all the neighbours to depreciate their currencies, China issued an estimated RMB 660 billion in bonds specifically to finance infrastructure, inducing four times more of bank loans, private and local government investment. As a result, China went through deflation but recorded an average growth rate of 7.8 per cent. An important feature of the stimulus was that it was targeted to the release of bottlenecks to growth. Examples include the highway system, port facilities, telecommunications and education. The Chinese economy got out of deflation in 2003, and growth of GDP accelerated to 10.8 per cent in 2003–08. This then resulted in an increase in revenue, which brought about a reduction in public debt from 30 per cent of the GDP in the 1990s to 20 per cent in 2007 (Lin, 2009).

High-return opportunities may be limited in developed countries where a high level of investment and consumption has already been realised under the market system. By contrast, such projects tend to abound in developing countries – especially in the rural areas. Clearly, some fraction of fiscal resources must be injected in developed countries that are the epicentre of the crisis, but the main objective must be to create demand quickly and efficiently. So channelling of investment to where it can be most effectively utilised – especially in the developing countries – is a high priority. Infrastructural investment – both domestically and regionally – can generate strong backward and forward linkages with other sectors and facilitate growth and further investment in traditionally poorer areas.

However, there was one important distinguishing feature of the recent global crisis. In the past crises, some countries could depreciate their currencies and increase exports to get out of the recession. But in the recent global slowdown, currency depreciation and greater exports were not an option. This of course does not rule out greater trade *within* a region – for example, *within* Asia and/or *between* developing regions and/or *between* emerging economies. China's rapid expansion of trade with Japan is a case in point. But this is more a question of exploitation of intraregion or interregion trade potential and not one of using 'beggar thy neighbour policies'. While erosion of trade of East Asian countries (e.g. China) with USA and Europe during the last two quarters may not be fully compensated, there are substantial possibilities of trade expansion within Asia and with other developing countries (Petri, 2006).

Not only has this opportunity been glossed over or sidetracked in recent debates, but there has also been an overemphatic endorsement of the 'savings' glut hypothesis and consequently higher consumption in China, in particular, and India and other high saving emerging countries, in general, to prevent the global slowdown from turning into a deep recession.[5] In line with the pronouncements of US Treasury and a galaxy of development economists, various researchers from the Asian Development Bank (ADB) (notably Park and Shin, 2009; Jha et al., 2009) have drawn attention to rebalancing of growth in emerging Asian countries – a euphemism for raising consumption. While recognising that both underinvestment and oversaving contribute to the current account surplus, Park and Shin (2009) assert that the contribution is predominantly from oversaving rather than underinvestment.[6] While as an empirical observation, this is not false, it is not sufficient to shift the policy emphasis from raising investment to cutting down oversaving.[7] From a medium-term perspective, the

[5] See, for example, Prasad (2009). For a re-examination of the 'savings glut' hypothesis, see Gaiha et al. (2010).
[6] This is buttressed by decompositions of growth in Jha et al. (2009).
[7] In fact, the Park-Shin analysis (2009) is deeply problematic both methodologically and interpretationally. For details, see Gaiha et al. (2010).

impediments to agricultural growth are many and persistent. These include limited access to markets, weak financial intermediation, fragile extension systems and high vulnerability to diverse market and nonmarket risks. As market failures are rampant, public expenditure has a vital role. Moreover, public investment multipliers – including not just infrastructure but also education and health – are generally found to be larger than public expenditure ones (net of investment). Indeed, as pointed out by Sachs (2009), the present crisis is an opportunity to *rebalance* the public and private sectors and to link the short-term macro stimulus with the long-term sustainability agenda.

Further doubts arise about the rebalancing argument if account is taken of recent estimates of consumption growth in emerging Asia. An article in The Economist (25 June 2009) draws attention to Asia's emerging economies bouncing back. Their GDP grew by an annualised 7 per cent in the second quarter of 2009.

Consumers' appetite to spend varies hugely across this region. In China, India and Indonesia, spending has increased by annual rates of more than 5 per cent during the global downturn. In China, real spending has grown at an impressive rate of 9 per cent. Elsewhere in the region, however, spending has stumbled, squeezed by higher unemployment and lower wages.

During the past five years, consumer spending in emerging Asia has grown by an annual average of 6.5 per cent, much faster than in any other part of the world. Consumption as a proportion of GDP has fallen but that is because investment and exports have grown even faster and not because spending has been weak. Relative to American consumer spending, Asian consumption has soared, as shown in Figure 1.

Nonetheless, China has done much to boost consumption – rural residents are given subsidies for buying vehicles, televisions and refrigerators – as there is huge potential for higher consumption in the rural areas when incomes rise. The government has also introduced social safety net measures – spending more on health care, pensions and payments to low-income households. These could lead low-income households to save less and spend more. But a bigger test of Asian governments' resolve to shift the balance of growth from exports towards domestic spending is, as argued in different issues of *The Economist* and elsewhere, whether they will allow their exchange rate to appreciate.[8]

[8] In an admirably clear and cogent exposition, Corden (2009) cautions against a simplistic view of exchange rate adjustments – especially appreciation of the *renminbi* – as key to correcting global current account imbalances. He makes two important points: (i) the current account balance has not been planned by the central authorities but instead has been an unplanned by-product of a variety of development and policies – including rapid productivity growth. Exchange rate policy has been just one key element in this story. (ii) While exchange rate policy can and does affect the surplus, it was targeted on a different objective – to maintain employment in export industries and to curb speculative attacks.

FIGURE 1
Consumption Growth in Asia

Source: *The Economist* (25 June 2009).

A revaluation would lift consumers' real purchasing power and allow firms to shift production towards domestic demand. That this is not just oversimple but also a short-sighted and potentially misleading view is elaborated below. Specifically, fiscal stimulus directed to investments in rural and other areas has considerable potential for expanding output and incomes in a sustainable way, through domestic and external demand, without drastic exchange rate adjustments.[9]

3. MACRO POLICY OPTIONS

Recent assessments (ADB, 2009; Feldstein, 2009; The Economist, 2009; Krugman, 2009a,b) of fiscal stimulus reflected a consensus on the need for it to stabilise the recovery process. While there is cautious endorsement of sustainability of fiscal expansion in emerging and other developing countries, depending on the fiscal space and debt burden, there is also awareness of the painful lessons learnt from an early withdrawal of fiscal stimulus during the Great Depression of the 1930s and the more recent experience of the recession in Japan in the 1990s. In fact, there are some – notably Krugman

[9] On this, see Rodrik (2007, 2009).

(2009b) – who are emphatic in their endorsement of a second round of fiscal stimulus. A general consensus is that all *major* actors need to respond quickly and in a more coordinated manner. These actors include developing countries that are now responsible for a large share of the global economy and trade flows.

In general, developing countries have been in some respects better poised to deal with the shocks that have rippled through the global economy, relative to the earlier crises, and most of them did manage to cope with the crisis at the macro level. Their macroeconomic policies – including their fiscal and external positions – were designed to make them less vulnerable to such shocks. Sovereign debt was better managed than at the time of the East Asian financial crisis while flexible exchange rates allowed external shocks to be absorbed less disruptively. Looking at the long-term trend of poverty, the number of extremely poor has also declined appreciably – by more than 300 million since the East Asian Financial Crisis (Chen and Ravallion, 2008). Diminished inflationary expectations together with reduction in commodity prices (for net importers) have further eased macroeconomic strains for some developing countries.

There are two main policy tools – monetary and fiscal policies – that developing countries must combine in a contextually appropriate manner. It may be imperative for some to tighten monetary policy by raising interest rates to avoid excessive currency depreciation or capital outflows while others may have room to lower interest rates to stimulate investment in sectors in which they have comparative advantage.

There is a variety of fiscal options. Injection of domestic demand could help offset the loss of foreign demand. Public investment – especially in infrastructure – is a key option. Of particular importance is rural infrastructure, given the disparity between rural and urban areas.[10] Another area of investment is social protection and human development. Examples include *conditional* cash transfers to keep disadvantaged children in school, public works employment (a case in point is National Rural Employment Guarantee Scheme in India) and subsidies on inferior food. Such fiscal stimulus is likely to work in countries with healthy reserves, current account surplus or small deficits, and fiscal balance. However, the policy dilemma that confronts governments in developing countries is whether they can respond in a countercyclical manner by increasing domestic demand without risking their fundamentals-fiscal position, debt level, domestic inflation and the banking sector. Few countries have scope to do this, while others are constrained fiscally (India more than China, for example) or experiencing capital flight out to safer havens.

[10] See, for example, the evidence on easier market access benefiting smallholders more than proportionately in an Indian state (Shilpi and Umali-Deininger, 2007).

4. EVIDENCE ON ASIA

Given the focus of our study on Asia, a review of this region's experience is given below. Here, we draw upon Jongwanich et al. (2009). Overall, the fiscal stimulus has been too small to achieve potential output, as shown in Table 1. Even the relatively strong package in China covers only half the output gap. Most stimulus efforts cover much less. In South Asia, the problem has been lack of fiscal space. In others, failure to manage the stimulus (e.g. absorptive and institutional capacity) has been a constraint.

The results given in Table 2 show the effects of fiscal stimulus of four countries/regions.[11] A brief summary of the results is given below. First, the impacts of the stimulus packages add between 0.2 per cent and 6 per cent to GDP growth in 2009, and between 0.9 per cent and 5.5 per cent in 2010. Second, even though the stimulus packages are large, and the impacts on growth positive, the stimulus packages will not reverse the impacts of the crisis in 2009. China is an exception as it benefits from its own large stimulus package. Third, all countries and regions, except Other Developing Asia, will experience positive growth at the end of 2010 *despite* the financial crisis. Fourth, most countries/regions are projected to experience a significant boost in their exports, especially for manufactured products. Services and agricultural exports are also projected to increase. Somewhat surprisingly, China is projected to see a significant rise in agriculture and processed food exports but a reduction in services exports. Fifth, in general, protectionism has a negative impact on the countries/regions that follow that route. India and Southeast Asia stand out as they could impact other regions in case they raise their tariffs to binding levels. China, on the other hand, lacks protectionist potential from raising applied tariff rates to binding rates in the Asia region. Finally, although few countries/regions experience a rise in exports, resulting from trade diversion created by accentuating tariff preferences for regional trade partners, the overwhelming effect is to reduce trade. Southeast Asia's exports decrease the most, followed by East Asia.

5. EXIT OPTIONS AND INFLATION IN ASIA

Our analysis will demonstrate significant growth acceleration through fiscal stimulus in a sample of Asian countries. As fiscal policy acts over a period – especially infrastructure spending – an inflationary impact in the short run is not unlikely. However, the balance of evidence continues to point to the imperative

[11] The results for Japan, China, North America OECD and European OECD are omitted. For details, see ADB (2009).

TABLE 1
Fiscal Stimulus Plans of Selected Developing Asian Countries

Fiscal Stimulus	*Countries*
More than 5% of GDP	China, Kazakhstan, Papua New Guinea, Vietnam
Between 2% and 5% of GDP	India, Philippines, Vietnam
Between 0.5% and 2% of GDP	Bangladesh, Cambodia, Indonesia, Pakistan
Less than 0.5% of GDP	Sri Lanka

Source: Asian Development Bank (ADB) (2009).

TABLE 2
Impacts of Stimulus Packages on Asian GDP Growth, 2009 and 2010 (Per cent of Real GDP)

Country/Region	*Projected GDP Impacts from Slowdown in OECD*		*Projected Fiscal Stimulus Impacts*[a]		*Gap*[b]		
	2009	*2010*	*2009*	*2010*	*2009*	*2010*	*Cumulative Gap in GDP (%)*[c]
China	−3.9	1.4	6.0	5.5	2.1	6.9	9.1
Other Developing Asia	−2.8	0.9	0.2	1.5	−2.6	2.4	−0.3
East Asia	−3.8	1.4	3.5	3.0	−0.3	4.4	4.1
India	−4.1	1.3	3.2	2.4	−0.9	3.7	2.8
South Asia	−3.6	1.2	2.3	2.2	−2.0	3.3	1.2
South East Asia	−3.4	1.2	1.6	2.1	−1.2	3.4	2.2

Notes:
[a] Projected GDP is the static impact on the Asian countries of fiscal stimulus packages where actual growth may be greater or smaller depending on the policies of individual countries, such as fiscal stimulus or protectionism.
[b] The potential gap is the difference between the impacts from the economic slowdown and the impacts from the projected fiscal stimulus packages.
[c] Cumulative numbers are not the simple addition of the two years but are compound growth rates.

Source: Jongwanich et al. (2009).

of further fiscal stimulus. A related issue is whether it is also necessary to tighten monetary policy to further undermine inflationary tendencies. However, any change of policy stance must be informed by a clear understanding of source of inflation in Asia. An important recent contribution (Jongwanich and Park, 2008) throws valuable light. In particular, the focus is on the relative importance of demand-pull and cost-push factors. A notable feature is that the analysis is based on a sample of Asian countries over the period 1996Q1–2009Q1.[12]

[12] The sample of countries includes China, India, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand and Vietnam.

Briefly, the main cost-push factors are international oil and food prices, while the main demand-pull factors are excess aggregate demand, proxied by the output gap, and inflationary expectations (defined as a function of lagged domestic inflation). The implications of decomposition of inflation into these factors have policy significance. In the case of cost-push inflation – driven by the rising input costs of goods and services – a marked slowdown and rising unemployment are likely to accompany higher inflation. A tight monetary policy would come with the high cost of slower growth and higher unemployment. Nor would loosening monetary policy in response to declining global oil and food prices help in pushing up growth and employment. In contrast, tightening monetary policy would contain inflation if inflation was of the demand-pull type. In that case, a tight monetary policy would dampen aggregate demand.

Inflationary expectations reinforce the case for monetary policy, regardless of the source of inflation. There is often a risk that inflationary expectations get entrenched and cause a cost-price spiral. A case in point is the stagflation experience of industrialised countries in the 1970s, triggered by the 1973–74 oil price shock. In other words, even if there is cost-push inflation, inflationary expectations may be formed, requiring monetary policy intervention.

The upshot is that monetary policy will continue to have a role in curbing inflation. Combining it with the expansionary effect of fiscal stimulus, a larger output gap is not unlikely. If, however, as our analysis suggests, the fiscal stimulus is contingent on better infrastructural support, and agricultural expansion, the trend output growth without inflation may also accelerate and thus offset the enlargement of the output gap. A subtle balancing of a gradually tightening monetary stance and more effective but continuing fiscal stimulus would allay inflationary apprehensions. From this perspective, this analysis of inflation offers some new insights into why an early exit is not warranted.

6. ECONOMETRIC ANALYSIS

a. Objectives

The objective of our analysis is to focus on the potential of public expenditure for growth and poverty reduction in a sample of developing countries. Our points of departure from the extant literature are the following: first, an attempt is made to analyse the effects of public expenditure and its two components: infrastructure and net of infrastructure, on agricultural and overall growth in several different specifications. In other variants, we examine the separate effects of agriculture and different components of public expenditure – including a reclassification of public expenditure on infrastructure and health and education – on overall growth. Second, combining these results with a range of

poverty-growth elasticities computed under different assumptions in Imai et al. (2010), we offer an assessment of the impact of fiscal stimulus and its components – through overall and agricultural growth – on poverty in Asia and the Pacific Region. A limitation of our analysis, however, is that it is confined to the contemporaneous impact of fiscal stimulus.[13]

b. Specification

The objective of the econometric analysis is to assess the impacts of government expenditure on the growth rates of per capita GDP and agricultural value added, after controlling for the effects of other variables. Total public expenditure as an aggregate and its disaggregation into infrastructure and non-infrastructure spending are considered separately. This analysis is supplemented by counterfactual simulations, focusing on their poverty impacts.

To focus on GDP per capita growth, we estimate the following model:

$$\begin{aligned}\Delta(GP_{i,t}) = {} & \beta_0 + \beta_1\Delta(INF_{i,t}) + \beta_2\Delta(NetINF_{i,t}) + \beta_3\Delta(AGP_{i,t}) + \beta_4 initialGP_i \\ & + \beta_5 Trade + \beta_6 Crisis * Asia + Year\ dummy \\ & + Country\ dummy + u_{i,t}, \end{aligned} \tag{1}$$

where $\Delta(GP_{i,t}) = GP_{i,t} - GDP_{i,t-1}$; $\Delta(INF_{i,t}) = INF_{i,t} - INF_{i,t-1}$; $\Delta(NetINF_{i,t}) = NetINF_{i,t} - NetINF_{i,t-1}$ *and* $\Delta(AGP_{i,t}) = AGP_{i,t} - AGP_{i,t-1}$

Note that β_1, β_2 *and* β_3 are central to our purpose. As the variables are in log, the coefficient estimates of β_1, β_2 *and* β_3 represent the elasticity of per capita GDP growth with respect to (i) growth of government infrastructure expenditure, (ii) growth of government expenditure net of infrastructure or growth of non-infrastructure spending and (iii) agricultural growth per capita. We also test whether high debt/GDP ratio has an adverse effect on growth. The fiscal multipliers in the long run may also be lower as fiscal expansion is not sustainable when the debt/GDP ratio is high. Besides, whether per capita agricultural growth affects per capita GDP growth is examined.

Similarly, we estimate the determinants of per capital agricultural growth as specified below:

$$\begin{aligned}\Delta(AGP_{i,t}) = {} & \alpha_0 + \alpha_1\Delta(INF_{i,t}) + \alpha_2\Delta(NetINF_{i,t}) + \alpha_3 initialAGP_i + \alpha_4 Trade \\ & + \alpha_5 Landpc_{i,t} + \alpha_6 Crisis * Asia + Year\ dummy \\ & + Country\ dummy + \varepsilon_{i,t}. \end{aligned} \tag{2}$$

Three-stage least square (3SLS) estimator is applied here to estimate equations (1) and (2) to circumvent possible reverse causality between, say, GDP

[13] Data constraints precluded a broader focus.

per capita growth and agricultural value added growth per capita, among others. Total public expenditure, infrastructure spending and government expenditure net of infrastructure were instrumented by their lagged values, and country and time effects in separate equations, respectively, while they are used as right side variables in overall growth equations. In addition, using 3SLS, we also allow for contemporaneous correlation between $u_{i,t}$ and $\varepsilon_{i,t}$.

c. Data

The data for the present study are taken from IMF's Government Financial Statistics, ADB's key indicators and World Development Indicators. The total sample consists of 23 countries of Asia, Latin America and Africa.[14] The period covered is from 1993 to 2006. Because of missing observations in government expenditure data, it was difficult to construct annual time series for most of the countries or to cover more recent years. While realising it is not an ideal solution, we have divided the entire period into seven subperiods by taking two year average for all variables (i.e., 1993–94, 1995–96 and so on up to 2005–06).

We have modified the IMF and ADB data on government expenditure classified by its functional outlay into two components of expenditure categories:[15] (i) expenditure on infrastructure and (ii) total expenditure minus infrastructure expenditure. Expenditure on infrastructure is the sum of expenditures on electricity, gas and fuel, and transport and communication.

The variables used in the present study are listed below.

GP: Log of GDP per capita (constant US$ in 2000).
AGP: Log of per capita agricultural value added (constant US$ in 2000).
TE: Log of total government expenditure in value (constant US$ in 2000).
INF: Log of government expenditure on infrastructure (constant US$ in 2000).
NetINF: Log of total government expenditure minus infrastructure expenditure (constant US$ in 2000).
Trade: Log of share of trade in GDP.
Debt ratio: Log of share of central government debt to GDP.

[14] The countries are Bangladesh, Cambodia, India, Indonesia, Nepal, Philippines, Sri Lanka, Brunei, Malaysia, Maldives, Thailand and Mongolia for Asia; Costa Rica, Guatemala, Mexico and Panama for Latin American Countries; Burundi, Cameroon, Egypt, Ethiopia, Kenya, Tunisia and Zambia for Sub-Saharan African countries. These countries are selected only based on the availability of relatively complete data of government expenditure. We run the regressions for total sample countries and only for Asian countries.

[15] Public expenditure refers to central government expenditure only for all countries except India. We have used state-level government expenditure for India as a large share of expenditure on agriculture, and rural areas is undertaken by state governments (Fan et al., 1999).

Working population ratio: Log of share of population aged 16–64 to total population.
Land per capita.: Log of arable land (hectare) per person.
Initial *GP*: Log of initial value of per capita GDP (constant US$ in 2000).
Initial *AGP*: Log of initial value of per capita agricultural value added (constant US$ in 2000).
Crisis*Asia: A dummy variable for whether a country belongs to Asia region and the period is 1997–8.
Crisis*Sea: A dummy variable for whether a country belongs to Southeast Asia region and the period is 1997–8.

Given the importance of public expenditure on health and education – especially from a medium-term perspective – a subsection is devoted to the re-estimation of growth and poverty reduction owing to a broadening of public expenditure to include physical infrastructure and health and education.

7. ECONOMETRIC RESULTS

a. Public Expenditure Impact

Table 3 provides the econometric results to estimate the impact on public expenditure on growth for selected cases. 3SLS is applied for a set of endogenous variables as dependent variables for three different cases – Case A: growth GDP per capita [*D*(*GP*)], growth of Agricultural Value Added per capita [*D*(*AGP*)] and growth of Total Public Expenditure [*D*(*TE*)] for total sample; Case B: *D(AGP)* and *D(TE)* only for Asia and Case C: *D(GP)*, *D(AGP)* and *D(TE)* for Asia. Case A, based on the total sample, shows a significant positive contribution of government expenditure to overall economic growth: the elasticity of per capita GDP growth with respect to the growth of total expenditure is 0.669, which is statistically significant at the 1 per cent level. The negative coefficient of the interaction term of Asian Financial Crisis and Asian countries (Crisis*Asia) confirms that Asian countries were more affected from the crisis in 1997/98 than the rest of the sample.

Turning to agricultural growth in the second column of Case A, government expenditure has a positive role. The growth elasticity of per capita agriculture value added with respect to government total expenditure growth is 0.655. This is also statistically significant at the 1 per cent level. The positive coefficient of initial agriculture GDP per capita (0.216) implies divergence (i.e. the difference in per capita agricultural value added between sample countries is expected to widen).

TABLE 3
Three-Stage Least Square Estimation on Public Expenditure Impact

	Case A			*Case B*		*Case C*		
	Change of Log GDP Per Capita [D(GP)] and Log Agriculture VA Per Capita [D(AGP)]			*Change of Log Agriculture VA per Capita [D(AGP)]*		*Change of Log GDP Per Capita [D(GP)] and Log Agriculture VA Per Capita [D(AGP)] – Asia Region*		
	Total Sample			*Asia Region*		*Asia Region*		
	D(GP)	*D(AGP)*	*D(TE)*	*D(AGP)*	*D(TE)*	*D(GP)*	*D(AGP)*	*D(TE)*
D(TE)	**0.669** (**3.01**)***	**0.655** (**3.00**)***	–	**1.254** (**2.19**)**	–	**1.288** (**2.47**)**	**0.716** (**3.90**)***	–
D(AGP)	−**0.32** (**1.72**)*	–	–	–	–	−**1.27** (**2.84**)***	–	–
Initial GP	0.026 (0.31)	–	–	–	–	0.161 (0.77)	–	–
Initial AGP	–	**0.216** (**2.32**)**	–	−0.023 (0.14)	–	–	−**0.165** (**1.82**)*	–
Trade share	−0.055 (1.63)	−**0.073** (**1.73**)*	–	−0.141 (0.96)	–	−0.156 (1.48)	−0.097 (1.60)	–
Land p.c.	–	−0.116 (1.17)	–	−0.04 (0.29)	–	–	0.027 (0.34)	–
Working ratio	–	−0.158 (0.32)	–	0.313 (0.39)	–	–	0.491 (0.91)	–
Working ratio*Land p.c.	–	−0.152 (0.88)	–	−0.046 (0.18)	–	–	0.024 (0.16)	–
Crisis*Asia	−**0.041** (**2.74**)***	0.001 (0.07)	–	−0.01 (0.3)	–	−**0.078** (**2.16**)**	−0.008 (0.34)	–
Lag *D(TE)*	–	–	−**0.11** (**2.11**)**	–	−0.107 (1.02)	–	–	−**0.195** (**2.45**)**
Constant	−0.11 (0.18)	−1.134 (1.43)	0.293 (2.36)	0.451 (0.35)	0.293 (2.54)	−0.857 (0.52)	1.621 (2.2)	0.302 (2.62)
Observations	117	117	117	64	64	64	64	64

Note:
Absolute value of *z* statistics in parentheses. *Significant at the 10%, **significant at the 5%, and ***significant at the 1% level. Year and country dummies are included in the regression but not shown in the Table.

The important findings from the subsample of Asian countries (Cases B and C) are the following. The significant role of public expenditure on overall growth is also evident in the subsample of Asian countries, and it is in fact larger and significant at the 5 per cent level. A 1 per cent higher expenditure growth increases the growth of GDP per capita by approximately 1.29 per cent, as shown in the first column of Case C. Public expenditure growth shows a strong association with agricultural growth as well – the elasticity being 1.25 (Case B) or 0.72 (Case C). In large measure, the differences in the results are because of the use of different samples (aggregate and the Asian subsample).

b. Impacts of Infrastructure and Non-Infrastructure Expenditure

Table 4 examines the impact of public expenditure on infrastructure and non-infrastructure on growth for total sample countries. 3SLS estimation has been used for three different specifications, that is, Case A: With growth of GDP per capita – *D(GP)*, *D(INF)* (growth of government expenditure on infrastructure) and *D(NetINF)* (growth of government expenditure on non-infrastructure), Case B: With agricultural growth – *D(AGP)*, *D(INF)* and *D(NetINF)*, and Case C: With both growth of GDP and agricultural per capita – *D(GP)*, *D(AGP)*, *D(INF)* and *D(NetINF)*.

The result in Case A further confirms that per capita GDP growth is positively and significantly influenced by *both* public infrastructure spending and non-infrastructure spending in the aggregate sample: a 1 per cent increase in the growth of non-infrastructure expenditure increases GDP per capita growth by 0.31 per cent (which is statistically significant at the 10 per cent level), whilst a 1 per cent change in infrastructure expenditure is associated with 0.047 per cent change in GDP growth (significant at the 1 per cent level). While this may seem intriguing in view of the evidence cited earlier, it is not so since infrastructure is defined somewhat narrowly (education and health, for example, are excluded). As expected, agricultural growth has a significant positive effect on overall growth even after allowing for the effects of infrastructure and non-infrastructure spending. Specifically, the elasticity of per capita GDP growth with respect to per capita agricultural growth is 0.134. The debt/GDP ratio is negatively associated with economic growth, implying the constraining influence of debt repayment on public investment. The negative coefficient estimate of the interaction term of *Crisis* and *Asia* (i.e. Crisis*Asia) implies that per capita GDP growth rates of Asian countries were more negatively affected by the Asian Financial Crisis.

In both Cases B and C, there is a strong influence of non-infrastructure expenditure on per capita agricultural growth: a 1 per cent increase in spending increases per capita agricultural value added growth by 1.11 per cent, statistically significant at the 1 per cent level in both cases. The growth elasticity of agricultural value added with respect to infrastructure expenditure is also positive but relatively small (e.g. 0.08 per cent in Case B and 0.064 per cent in Case C, both significant at the 10 per cent level). There are at least two reasons why this effect is small. One is the narrow focus of infrastructure spending. Another is the failure to distinguish between rural and urban infrastructure spending. This is a data constraint that we are unable to overcome. Nevertheless these results further confirm the important role of increased government spending in promoting agricultural growth.

In Table 5, the same specifications are applied only to the subsample of Asian countries. In Case A of Table 5, we find that both components of government expenditure are positively associated with per capita GDP growth: the elasticity

TABLE 4
Three-Stage Least Square Estimation of Impacts of Infrastructure and Non-Infrastructure Expenditure (Total Sample)

	Case A			*Case B*			*Case C*			
	Change of Log GDP Per Capita [D(GP)]			*Change of Log Agriculture VA Per Capita [D(AGP)]*			*Change of Log GDP Per Capita [D(GP)] and Log Agriculture VA Per Capita [D(AGP)]*			
	D(GP)	*D(INF)*	*D(NetINF)*	*D(AGP)*	*D(INF)*	*D(NetINF)*	*D(GP)*	*D(AGP)*	*D(INF)*	*D(NetINF)*
D(INF)	**0.047** (**2.99**)***	–	–	**0.081** (**1.65**)*	–	–	0.031 (1.42)	**0.064** (**1.65**)*	–	–
D(NetINF)	**0.31** (**1.87**)*	–	–	**1.107** (**2.56**)**	–	–	0.033 (0.18)	**1.066** (**2.90**)***	–	–
D(AGP)	**0.134** (**1.68**)*	–	–		–	–	0.146 (0.76)	–	–	–
Initial GP	0.034 (0.32)	–	–		–	–	0.057 (0.99)	–	–	–
Initial AGP				**0.219** (**1.98**)**	–	–	–	**0.222** (**2.09**)**	–	–
Trade share	0.024 (0.63)	–	–	−0.049 (0.57)	–	–	−0.01 (0.25)	−0.059 (0.78)	–	–
Debt	−**0.04** (**2.02**)**	–	–	–	–	–	–	–	–	–
Land p.c.		–	–	−0.117 (0.93)	–	–	–	−0.098 (0.83)	–	–
Working ratio		–	–	−0.195 (0.31)	–	–	–	−0.151 (0.25)	–	–
Working ratio*Land p.c.		–	–	−0.065 (0.32)	–	–	–	−0.048 (0.24)	–	–
Crisis*Asia	–	–	–	0.005 (0.21)	–	–	−**0.042** (**3.22**)***	0.005 (0.22)	–	–

TABLE 4 *Continued*

	Case A			*Case B*			*Case C*			
	Change of Log GDP Per Capita [D(GP)]			*Change of Log Agriculture VA Per Capita [D(AGP)]*			*Change of Log GDP Per Capita [D(GP)] and Log Agriculture VA Per Capita [D(AGP)]*			
	D(GP)	*D(INF)*	*D(NetINF)*	*D(AGP)*	*D(INF)*	*D(NetINF)*	*D(GP)*	*D(AGP)*	*D(INF)*	*D(NetINF)*
Lag *D(INF)*	–	**−0.346** (**3.06**)***	–	–	**−0.253** (**2.93**)***	–	–	–	**−0.267** (**3.17**)***	–
Lag *D(NetINF)*	–	–	−0.131 (1.11)	–	–	−0.098 (1.44)	–	–	–	−0.101 (1.49)
Constant	−0.381 (0.47)	−0.899 (1.88)	0.655 (4.67)	−1.816 (1.93)	−0.96 (2.24)	0.632 (5.2)	−0.402 (0.94)	−1.756 (1.94)	−0.972 (2.27)	0.633 (5.21)
Observations	106	106	106	106	106	106	106	106	106	106

Note:
Absolute value of *z* statistics in parentheses. *Significant at the 10%, **significant at the 5% and ***significant at the 1% level. Year and country dummies are included in the regression but not shown in the Table.

TABLE 5
Three-Stage Least Square Estimation of Impacts of Infrastructure and Non-Infrastructure Expenditure (Asia Region)

	Case A			*Case B*			*Case C*			
	Change of Log GDP Per Capita [D(GP)]			*Change of Log Agriculture VA Per Capita [D(AGP)]*			*Change of Log GDP Per Capita [D(GP)] and Log Agriculture VA Per Capita [D(AGP)] – Total Sample*			
	D(GP)	*D(INF)*	*D(NetINF)*	*D(AGP)*	*D(INF)*	*D(NetINF)*	*D(GP)*	*D(AGP)*	*D(INF)*	*D(NetINF)*
D(INF)	**0.087** (**1.87**)*	–	–	0.058 (0.93)	–	–	**0.074** (**1.98**)**	0.074 (1.38)	–	–
D(NetINF)	**0.465** (**2.75**)***	–	–	**0.846** (**4.87**)***	–	–	**0.511** (**3.39**)***	**0.627** (**4.86**)***	–	–
D(AGP)	−0.003 (0.02)	–	–	–	–	–	−0.427 (1.57)	–	–	–
Initial GP	0.095 (1.06)	–	–	–	–	–	**0.147** (**1.84**)*	–	–	–
Initial AGP		–	–	−0.049 (0.35)	–	–	–	−0.18 (1.52)	–	–
Trade share	−0.014 (0.30)	–	–	−**0.14** (**2.02**)**	–	–	−0.058 (1.19)	−**0.097** (**1.69**)*	–	–
Land p.c.	–	–	–	0.052 (0.43)	–	–	–	0.028 (0.27)	–	–
Working ratio	–	–	–	1.001 (1.41)	–	–	–	0.737 (1.17)	–	–
Working ratio*Land p.c.	–	–	–	0.12 (0.58)	–	–	–	0.042 (0.23)	–	–
Crisis*Sea	−0.048 (1.55)	–	–	0.011 (0.29)	–	–	−**0.054** (**2.10**)**	−0.003 (0.10)	–	–

TABLE 5 *Continued*

	Case A			*Case B*			*Case C*			
	Change of Log GDP Per Capita [D(GP)]			*Change of Log Agriculture VA Per Capita [D(AGP)]*			*Change of Log GDP Per Capita [D(GP)] and Log Agriculture VA Per Capita [D(AGP)] – Total Sample*			
	D(GP)	*D(INF)*	*D(NetINF)*	*D(AGP)*	*D(INF)*	*D(NetINF)*	*D(GP)*	*D(AGP)*	*D(INF)*	*D(NetINF)*
Lag *D(INF)*	–	**−0.237** (**2.16**)**	–	–	**−0.237** (**2.16**)**	–	–	–	**−0.262** (**2.41**)**	–
Lag *D(NetINF)*	–	–	−0.129 (1.57)	–	–	−0.129 (1.57)	–	–	–	**−0.193** (**2.49**)**
Constant	−0.819 (1.21)	−0.807 (2.49)	0.556 (4.9)	0.908 (0.77)	−0.896 (2.78)	0.612 (5.48)	−1.082 (1.80)	1.703 (1.71)	−0.918 (2.85)	0.624 (5.59)
Observations	61	61	61	61	61	61	61	61	61	61

Note:
Absolute value of *z* statistics in parentheses. *Significant at the 10%, **significant at the 5% and ***significant at the 1% level. Year and country dummies are included in the regression but not shown in the Table.

of per capita GDP growth with respect to infrastructure expenditure growth and to net expenditure growth are 0.087 and 0.465 (and statistically significant at the 10 per cent and 1 per cent levels), respectively. The positive and statistically significant influence of non-infrastructure expenditure is also observed in the agricultural value added per capita growth equation in Case B of Table 5: a 1 per cent increase in this expenditure is associated with 0.85 per cent increase in growth of agricultural value added per capita. The effect of infrastructure spending on agriculture growth is positive but statistically not significant (or not significantly different from 0). For the reasons stated earlier, this is not so surprising.

c. Extensions

We have carried out a few extensions using three-year averages instead of two-year averages mainly as a robustness check.[16] Here, a few changes have been made to the previous specifications. First, government infrastructure expenditure is broadened to include government expenditure on education and health services. Hence, infrastructure expenditure now refers to both physical and social government spending. Second, we have included money supply or M2 to examine the effects of monetary policy on economic growth. In other words, this is a step towards a closer integration of the real and monetary markets.

With the aggregate sample, a positive and significant coefficient estimate of government expenditure on physical infrastructure and health and education is obtained. If a government raises this component of public expenditure by one per cent, 0.282 per cent higher overall economic growth is likely.

After controlling for the effects of money supply, we obtained a positive effect of infrastructure on economic growth. The effect of money supply on per capita GDP growth is positive. With or without a control for money supply, agricultural growth has a substantially greater effect on overall growth (the elasticity ranges from 0.38 per cent to 0.41 per cent).

In sum, the main findings are summarised as follows. First, agricultural growth has a substantial effect on overall growth. Second, public expenditure growth has a positive effect on overall growth, as also growth of the components of the former (infrastructure and non-infrastructure spending). Third, the effect of growth of non-infrastructure spending is often considerably larger than that of infrastructure spending. This is not surprising for two reasons: narrow definition of infrastructure spending and failure to account for its longer-term impact. Finally, agricultural growth is also highly sensitive to growth of public expenditure or non-infrastructure spending, and less so to infrastructure

[16] It would be ideal to use a longer time span (e.g. six-year averages) instead of three-year averages to test the longer-term effect, but the data do not allow this. The econometric results summarised in this subsection are not shown because of the space constraint, but will be provided on request.

spending. The latter is presumably a consequence of our failure to disaggregate infrastructure spending into rural and urban.

8. SIMULATIONS OF GROWTH AND POVERTY REDUCTION

A selection of our results is given in Tables 6 and 7, based on counterfactual simulations of increases in public expenditure, and its components, on agricultural and overall growth. We have carried out simple simulations for the Asian subgroup based on the estimates of elasticities of growth or poverty with respect to total and disaggregated expenditures. These elasticities are calculated by (i) the coefficient estimates corresponding to elasticities of GDP per capita and agricultural value added per capita with respect to total public expenditure or disaggregated public expenditure in Tables 3 and 5; (ii) the elasticity estimate of GDP per capita with respect to lagged agricultural value added per capita in Imai et al. (2010), which examined the prospects of developing countries of achieving Millennium Development Goal of halving extreme poverty; and (iii) the elasticity estimate of poverty headcount ratio (based on the international poverty line of US$1.25) with respect to GDP per capita in the same study.

Imai et al. (2010) have examined statistical robustness of the elasticity estimates of poverty by applying a number of different specifications and different periods. For example, they find that the elasticity of poverty headcount ratio with respect to GDP per capita ranged between −1.029 and −1.503 in case of the static

TABLE 6
Effect of Total Public Expenditure on Growth and Poverty

Asian Subsample	*D(TE)*		
	No Change	*10%*	*20%*
Overall growth			
Reference growth rate (for the first column)	Reference rate[a]	20.85%[b]	41.14%[b]
Per cent decline in poverty ratio	−6.79	−8.26	−9.70
Actual/predicted poverty ratio	31.95	31.45	30.96
Difference in the number of the poor (million) (base case – 'no change')		10.30	20.44
Agricultural growth			
Reference growth rate (for the first column)	Reference rate[a]	53.81%[b]	107.14%[b]
Per cent decline in poverty ratio	−1.10	−1.71	−2.31
Actual/predicted poverty ratio	33.90	33.69	33.49
Difference in the number of the poor (million) (base case – 'no change')		4.25	8.50

Note:
[a] The reference growth rate is computed by the coefficient estimates reported earlier and mean values of explanatory variables.
[b] Percentage increases in comparison with the reference growth rates.

TABLE 7
Effect of Disaggregated Public Expenditure on Growth and Poverty

Asian Subsample	*No Change*	*D(INF)*		*D(NetINF)*	
		10%	*20%*	*10%*	*20%*
Overall growth					
Growth rate	Reference rate	5.39	5.42	5.89	6.41
Per cent decline in poverty ratio	−6.72	−6.76	−6.79	−7.40	−8.08
Actual/predicted poverty ratio	31.98	31.96	31.95	31.74	31.51
Difference in the number of the poor (million) (base case – 'no change')		0.27	0.54	4.81	9.56
Agricultural growth					
Growth rate	Reference rate			3.18	4.05
Per cent decline in poverty ratio	−1.21			−1.68	−2.15
Actual/predicted poverty ratio	33.87			33.70	33.54
Difference in the number of the poor (million) (base case – 'no change')				3.31	6.61

panel regression (Table 3 of Imai et al., 2010, pp. 322–323). The elasticity of poverty with respect to agricultural value added per capita (lagged) ranged between −0.752 and −0.982. These are all statistically significant at the 1 per cent level.

As the dependent variable in Tables 3 and 4 was either the change of log GDP per capita or of log of agricultural value added per capita, we can obtain the predicted GDP per capita growth or agricultural value added growth using the coefficient estimates and mean values of explanatory variables. We call these reference growth rates (the first column of Tables 6 or 7) and simulate the impact of change (10 or 20 per cent) in total public expenditure or disaggregated public expenditure on overall growth, agricultural growth and poverty head count ratios. The elasticity estimates are based on the regression results in Tables 6 and 7 and the first case (covering all the countries/periods) of Table 3 in Imai et al. (2010) – the most representative and statistically robust case where poverty elasticity with respect to GDP per capita is −1.175 and that with respect to agricultural value added per capita is −0.823. Using the product of two sets of elasticities, we can derive the approximate change of poverty in response to change of public expenditure. It should be noted, however, that the results should be interpreted with caution because these are based on the product of two estimates of different regressions.

Through these simulations, the present study examines the efficacy of different routes of fiscal and agricultural expansion. The important role of fiscal stimulus in reviving the Asian economies and in maintaining the progress towards the MDG of halving of the headcount index of poverty is illustrated – in both *relative* and *absolute* terms.

As shown in Table 6, with a 10 per cent higher growth of public expenditure, the growth rate of GDP per capita will increase by 20.85 per cent

(in comparison with the reference case in the first column), and with a doubling of the growth of public expenditure, the GDP growth rate accelerates by 41.14 per cent. Although the reductions estimated in the poverty ratio – rising from 6.80 per cent in the reference case to 8.26 per cent and 9.70 per cent in the two counterfactual scenarios of higher growth of public expenditure – seem small, the reductions in the number of poor (on the $1.25 per day criterion) are large: 10.30 and 20.44 million, respectively.

In the lower panel of this table, we assess the impact through a higher growth rate of agricultural value added per capita. Note that the poverty elasticity with respect to agricultural value added is much smaller than that of GDP per capita (-0.823 as against -1.175).[17] So, while agricultural growth rate accelerates and there are small reductions in the poverty headcount ratios, the reductions in the number of poor are still substantial (4.25 and 8.50 million, respectively). It follows, therefore, that fiscal stimulus operating through agricultural growth continues to have considerable potential for poverty reduction.[18]

A disaggregated analysis of fiscal stimulus is given in Table 7. To avoid cluttering the text, a selection of results is given.

Given the narrow definition of infrastructure, as also the fact that our analysis is confined to the contemporaneous impacts, it is not surprising that a more rapid growth of infrastructure spending has small growth and poverty impacts, while those of non-infrastructure spending are substantially larger, operating through acceleration of GDP and agricultural growth. With a 20 per cent faster growth of non-infrastructure spending, for example, agricultural growth accelerates from 2.30 per cent in the reference case to 4.05 per cent, and the number of poor drops by just under 7 million.

To supplement these results, Table 8 illustrates the likely effects of combining government expenditure on health and education with that on infrastructure on growth and poverty. There is a substantial decline in the number of the poor when physical and social infrastructure spending rises. Relative to the reference case, with a 10 per cent (20 per cent) higher growth in physical and social spending, overall growth rate will increase by 3.37 per cent (6.73 per cent). The estimated reduction in the number of poor is 2.52 (5.04) million. This is in striking contrast to our earlier results implied by simulated increases in physical infrastructure expenditure. For instance, the simulation exercise suggests that with a 10 per cent (20 per cent) higher growth in physical infrastructure spending, barely 0.27 (0.64) million poor cease to be poor. The importance of social spending in reducing poverty is thus strongly corroborated

[17] For estimation details, see Imai et al. (2010). We have also computed counterfactual (per cent) decline in poverty ratio by changing the poverty elasticity values. For example, a 10 per cent decrease (increase) in each of these elasticity values would reduce (increase) the magnitude of poverty reduction by around 10 per cent, as our calculation is based on linear regressions.

[18] Note that these simulations exclude China.

TABLE 8
Effect of Physical and Social Expenditure on Growth and Poverty

Aggregate Sample – Overall Growth	*No Change*	*D(INF)*	
		10%	*20%*
Reference growth rate (for the first column)	Reference rate[a]	3.37%[b]	6.73%[b]
Per cent decline in poverty ratio	−10.19	−10.54	−10.90
Predicted poverty ratio	30.79	30.67	30.54
Difference in the number of the poor (base in no change)		2.52	5.04
Reference growth rate (for the first column)	Reference rate[a]	3.47%[b]	6.95%[b]
Per cent decline in poverty ratio	−8.35	−8.65	−8.95
Predicted poverty ratio	31.42	31.31	31.21
Difference in the number of the poor (base in no change)		2.11	4.23

Note:
[a] The reference growth rate is computed by the coefficient estimates reported earlier and mean values of explanatory variables. The difference in reference growth rates in the two cases is mainly because of the difference in coefficient estimates and in means of explanatory variables, averaged in two-year and three-year spans.
[b] Percentage increases in comparison with the reference growth rates.

by our simulations. Given the importance of social spending in the medium term, the effects on growth and poverty reduction are likely to be larger.

Juxtaposed against the trapping of 53 million in poverty in the developing world because of the recent global slowdown, as noted by Lin (2009), our simulation results are reassuring.[19] Whether a bold and coordinated fiscal stimulus directed to agriculture and rural areas in Asia and the Pacific region is feasible, time alone will confirm.

[19] Given this alarmist World Bank prediction (Lin, 2009), we investigated whether there were more recent estimates of increase in the number of poor as a result of the financial crisis. Unfortunately, there are no recent household surveys except the 66th round of the National Sample Survey for India, released in late July, 2011. A recent assessment of poverty in Asia and the Pacific by Wan and Sebastian (2011) is thus of some interest. Using headcount ratio elasticities with respect to GDP per capita obtained using a Box-Cox specification, and applying them to changes in GDP per capita, projections of headcount ratios and numbers of poor are obtained for 2009 and 2010. The results are somewhat surprising as Asia managed to reduce the number of poor during the global economic crisis. In 2009, for example, the number of people below the $1.25 per day poverty line is projected to be 705–48.6 million less than the 2008 total. An additional 46.8 million exited extreme poverty in 2010, resulting in the decline of the number of poor to 687 million or 18.7 per cent of the total population. However, what is also significant is that the rate of reduction in poverty slowed down. From 903 million poor in 2005, the number declined to about 753 million in 2008 – a reduction of 150 million – while over the shorter two-year period (2008–10), the reduction was 95 million. The slowing down is reflected more sharply in the headcount ratio, which reduced from about 27 per cent in 2005 to 21.87 per cent in 2008. But over the shorter period, the headcount ratio was over 20.24 per cent in 2009 and 18.70 per cent in 2010. Part of the difficulty lies in comparing poverty projections using different methodologies. What must also be emphasised is that the resilience of two emerging economies in Asia and the Pacific (notably China and India) to the economic crisis helped in avoiding a reversal of the progress in poverty reduction.

9. CONCLUSIONS

To put the analysis in perspective, we reject the savings glut hypothesis as sufficient to shift the emphasis from investment to cutting oversaving in emerging Asian countries as a way out of the global slowdown. Arguing that underinvestment must remain the focus of macro policies, a case is made for a bold and coordinated fiscal stimulus.

Drawing upon country panel data for developing countries and a subsample of Asian countries during the period 1991–2007, we have analysed the effects of government expenditure on GDP and agricultural value added growth, and their implications for poverty reduction. One of our main findings is that *despite* the decline in the share of agriculture in GDP, it has a major role in growth acceleration. But, more importantly, under the present scenario of uncertainty confronting developing countries, because of the deepening European financial crisis, the case for a bold fiscal stimulus is reinforced despite signs of a feeble recovery of those countries. Although impacts of public expenditure in the aggregate as well as of its components – especially infrastructure spending – vary depending on the model and sample used, their growth impacts are positive and, in some cases, *large* and *robust*. While the impact of infrastructure spending is small relative to that of non-infrastructure spending, this is not surprising given the narrow definition of infrastructure used.

We then broadened our measure of public expenditure on infrastructure by including health and education to allow for their potential for medium-term growth acceleration. Not only are the growth effects larger but also the poverty reduction is greater. If accepted at face value, and conditional on the feasibility of a bold and coordinated fiscal stimulus, the dire predictions of more than 50 million getting trapped in poverty because of the global slowdown appear exaggerated. Besides, if mechanisms are evolved to direct the fiscal stimulus to the rural areas where both physical and social infrastructure are far from adequate to sustain the growth impulse – as illustrated by the case studies of rural infrastructure in selected Asian countries – the payoff in terms of poverty reduction may surpass seemingly optimistic predictions.

In conclusion, the prospects of a strong recovery led by fiscal stimulus are real and achievable.

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USING e-ANNOTATION TOOLS FOR ELECTRONIC PROOF CORRECTION

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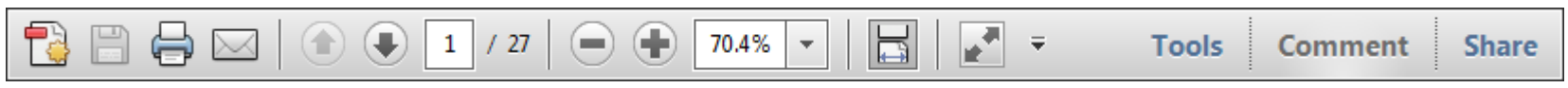
Once you have Acrobat Reader open on your computer, click on the Comment tab at the right of the toolbar:



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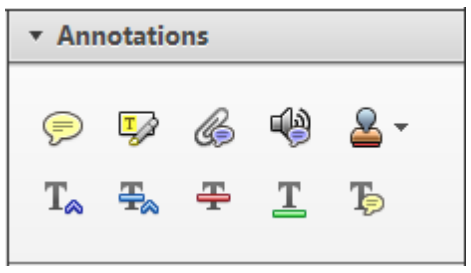
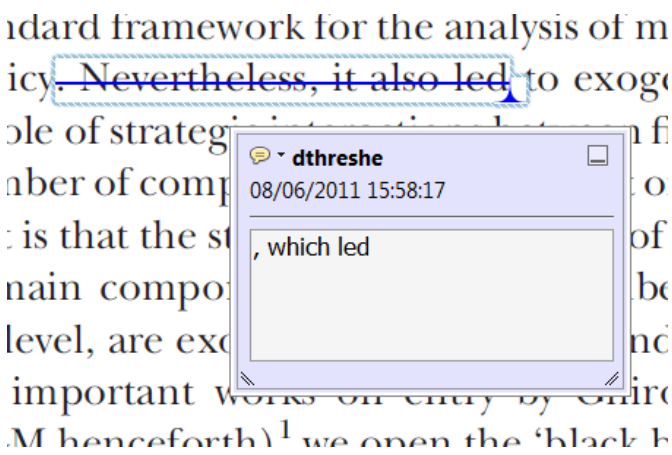


1. Replace (Ins) Tool – for replacing text.

Strikes a line through text and opens up a text box where replacement text can be entered.

How to use it

- Highlight a word or sentence.
- Click on the Replace (Ins) icon in the Annotations section.
- Type the replacement text into the blue box that appears.

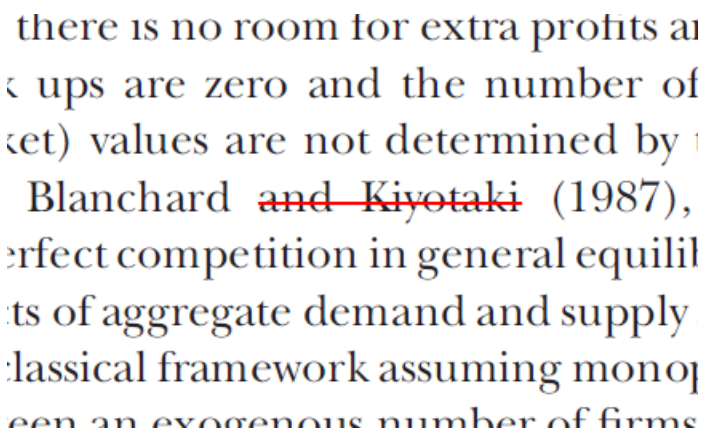


2. Strikethrough (Del) Tool – for deleting text.

Strikes a red line through text that is to be deleted.

How to use it

- Highlight a word or sentence.
- Click on the Strikethrough (Del) icon in the Annotations section.

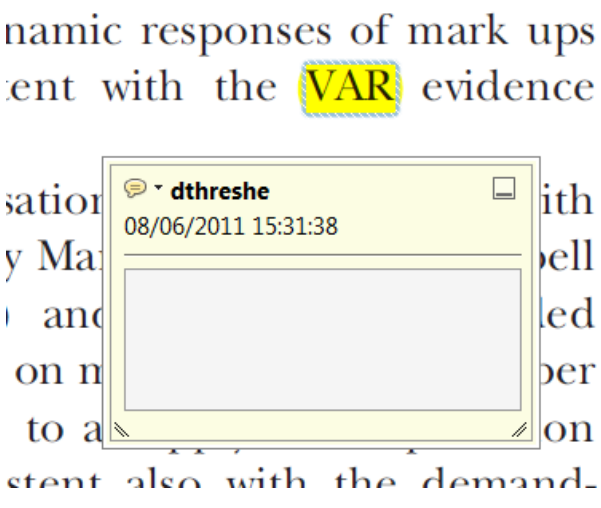


3. Add note to text Tool – for highlighting a section to be changed to bold or italic.

Highlights text in yellow and opens up a text box where comments can be entered.

How to use it

- Highlight the relevant section of text.
- Click on the Add note to text icon in the Annotations section.
- Type instruction on what should be changed regarding the text into the yellow box that appears.

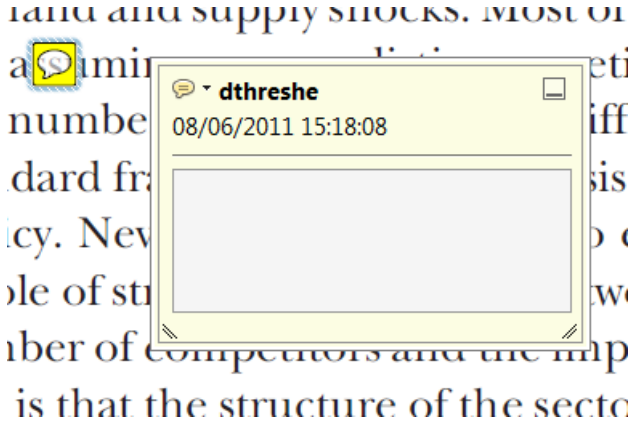


4. Add sticky note Tool – for making notes at specific points in the text.

Marks a point in the proof where a comment needs to be highlighted.

How to use it

- Click on the Add sticky note icon in the Annotations section.
- Click at the point in the proof where the comment should be inserted.
- Type the comment into the yellow box that appears.



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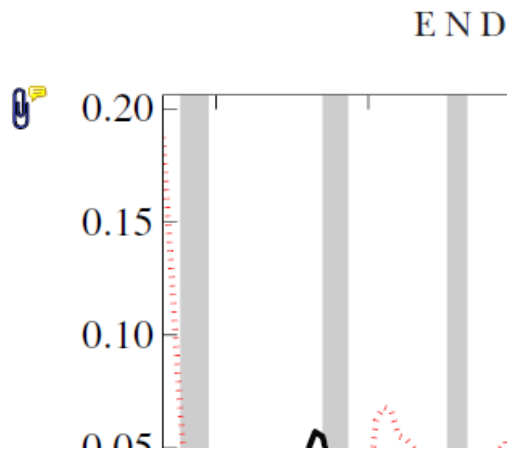
5. Attach File Tool – for inserting large amounts of text or replacement figures.

Inserts an icon linking to the attached file in the appropriate pace in the text.

How to use it

- Click on the Attach File icon in the Annotations section.
- Click on the proof to where you'd like the attached file to be linked.
- Select the file to be attached from your computer or network.
- Select the colour and type of icon that will appear in the proof. Click OK.



6. Add stamp Tool – for approving a proof if no corrections are required.

Inserts a selected stamp onto an appropriate place in the proof.

How to use it

- Click on the Add stamp icon in the Annotations section.
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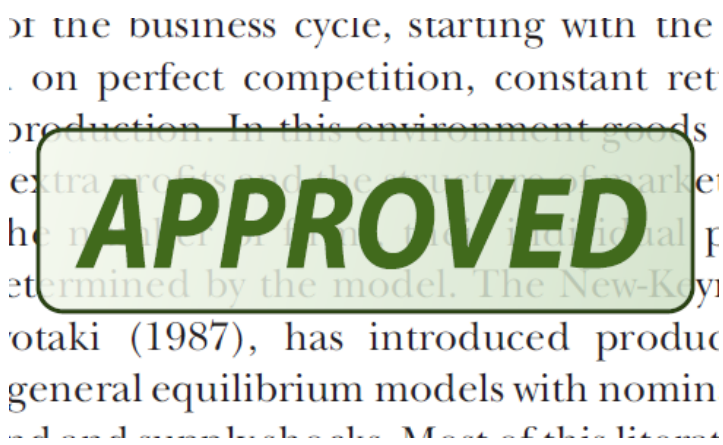
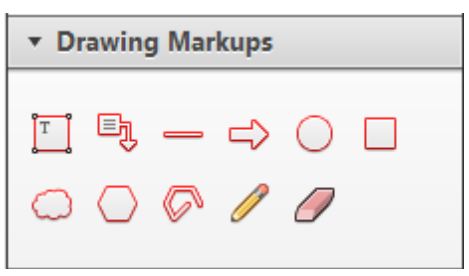
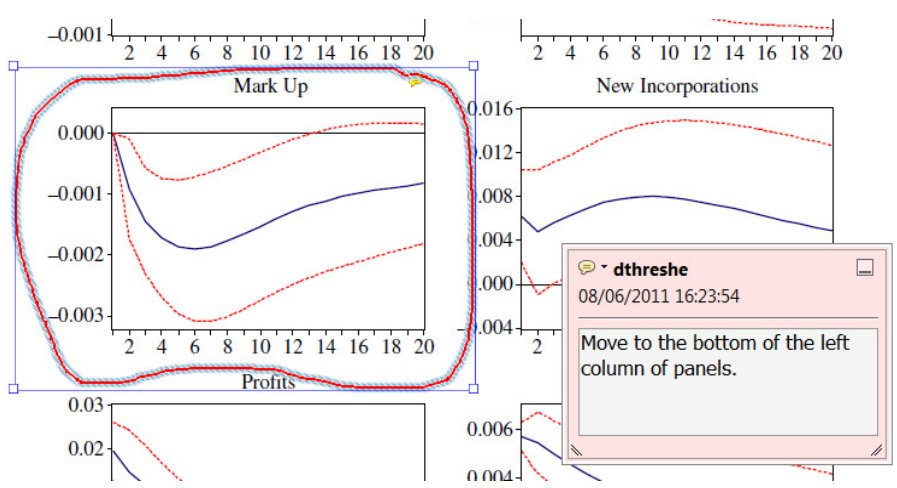




7. Drawing Markups Tools – for drawing shapes, lines and freeform annotations on proofs and commenting on these marks.

Allows shapes, lines and freeform annotations to be drawn on proofs and for comment to be made on these marks..



How to use it

- Click on one of the shapes in the Drawing Markups section.
- Click on the proof at the relevant point and draw the selected shape with the cursor.
- To add a comment to the drawn shape, move the cursor over the shape until an arrowhead appears.
- Double click on the shape and type any text in the red box that appears.

For further information on how to annotate proofs, click on the Help menu to reveal a list of further options: