Importance of Productivity in India*

Respected Professor Papola and friends,

It is an honour and privilege to address this august gathering. I am happy to visit Visakhapatnam, where, in 1965, I commenced my career in civil services in Andhra Pradesh as an Assistant Collector under training - learning initially from village *karnam* of Penduthri village (then a village) and Revenue Inspector of Gajuvoka, travelling by bicycle to the villages. I am particularly delighted that a friend for decades, an economist of eminence and a person of outstanding personal values is delivering the Presidential Address at this conference today.

At the instance of late Professor P.R. Brahmananda, I delivered the valedictory address at the Amrit Jubilee (*i.e.*, 80th year) conference of the Indian Economic Association in December 1997 and the subject was "Economists and Public Policy". The community of economists may be happy to know that the Reserve Bank of India has instituted a memorial lecture in his honour as a token of respect - the only economist to have been so honoured by the RBI. Incidentally, Lord Meghnad Desai delivered the first lecture which was presided over by late Dr. I.G. Patel. In my valedictory address, I had elaborated the Reserve Bank's close links with the fraternity of economists and hence, will not revisit the theme today. My address today focuses on the growing importance of productivity in the Indian economy, while also alluding to the Reserve Bank's own contribution to enhancing productivity in our economy.

It is well known that economic growth, as a means to enhancing the welfare of people, depends both on the use of factors of production such as capital and labour, and the efficiency in resource use, often referred to as productivity. Recent developments indicate the growing importance of productivity, particularly for our economy at its present stage of development.

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Trade integration amongst the countries, that is driven more by the technological developments than by the public policy, has the overall effect of rewarding those with high and increasing productivity. In fact, recent experience shows that, even in the industrialised economies, a public policy that attempts to protect less-than-competitive productive employment may not succeed and even when it does to an extent, it is temporary and expensive in the face of rapid technological change. Such cross-border trade-integration induced pressures on productivity have some undeniable positive effects. For example, the price and quality of goods available for consumers are substantially determined by the most efficient producers in the world. Productivity gains that get transmitted through trade-integration have positive effects on the standard of living as well as the quality of life.

The spread and the thrust of Information and Communication Technology (ICT) have provided unprecedented scope for productivity gains the world over in a very short span of time. It is interesting to note that the deployment of ICT in India may contribute to productivity gains in the USA but not necessarily to India if the public policy framework does not enable adoption of modern ICT *within* India. Further, the changes in demography and their implications need to be viewed in a global perspective rather than only in a national context. Thus, it is expected that India would contribute to the world a large young work force in the first half of this century, when the rest of the world may be getting crowded with an elderly population. A large young work force in India is often described as “demographic dividend” but, we must recognise that the so called demographic dividend may turn into a demographic nightmare if adequate level of productive employment to our youth, in an increasingly globalised environment, is not ensured by an enabling public policy framework. Finally, before India enters the latter part of 21st century, with a large share of the elderly like the rest of the world, we would have to reckon with the need to provide for the increasingly ageing population. In other words, the current generation of young persons should grow rich well before they grow old, both on social and economic grounds, since they may not have a younger generation to take care of them. I hope the case for focusing on the growing importance of productivity has not been overstated by me today.

The text books do provide simple definitions of productivity and techniques for measurement. Productivity may be defined as the ratio of the output of goods and services to the inputs - human as well as others - used in the production process. Labour productivity, the best known measure of factor productivity, reflects the influence of various factors (such as capital, quality of labour, technological change and organization of production) that affect productivity. Based on inputs to production, labour productivity can be decomposed into two components: (a) productivity due to capital deepening (i.e., improvements in physical capital available per labour unit) and (b) multi-factor productivity (MFP) or total factor productivity (TFP). TFP is the contribution other than that emanating from the increased use of inputs (capital and labour). TFP thus measures the increase in efficiency with which resources are being used through innovations and improved management techniques to increase the output from a given combination of capital and labour. Although, conceptually, it is relatively easier to define productivity, its actual measurement is beset with a number of statistical issues such as accounting for quality adjustment and non-marketed output such as public administration in addition to the underground economy. In spite of the difficulties, an accurate measurement of productivity is an imperative, albeit with full awareness of the limitations of such an exercise. This is area of fruitful research, which the Andhra Pradesh Economic Association may like to consider.

As already mentioned, the main reason for unprecedented productivity growth in the recent past has been the impressive technological progress. Robert Solow had emphasised the importance of technological change in long-term economic growth and productivity way back in the 1950s. But, the key issue - what determines technological progress – was left unanswered by assuming technological progress to be exogenous. Technological advance involves the creation of new ideas - partially non-rival and, therefore, having certain aspects of public goods – with increasing returns to scale. This, however, conflicts with perfect-competition assumption. These weaknesses of the neo-classical model assuming exogenous technological progress were overcome with the development of the concept of endogenous growth propounded by Romer and its subsequent refinements in the 1980s. In this

approach, the long-run growth is determined within the model, with technological advance benefiting from research and development activity, supported by some monopoly power and increasing returns to scale.

Following the research report of the Centre for the Study of Living Standards (CSLS) in 1998, one can identify the following seven determinants of productivity growth: the rate of technological progress, investment in physical capital such as machinery and equipment and structures, the quality of the workforce, size and quality of the natural resource base, industrial structure and inter-sectoral shifts, the macroeconomic environment or aggregate demand conditions, and the microeconomic policy environment. Similarly, Harris (1999), based on a review of the cross-country growth literature, has identified three proximate drivers (the Big Three) of productivity growth: investment in machinery and equipment; education, training and human capital; and openness to trade and investment. While the proximate drivers may not be exhaustive, they do point to the critical elements of an enabling public policy for enhancing productivity and employment.

What is the role of the ICT in enhancing productivity? The ICT can have a positive impact on growth not only through a surge in ICT investment, strong productivity effects from the ICT-producing industries and but also through a more productive use of the ICT in the rest of the economy. The ICT equipments enable new organisational models and other innovations in the production process as well as the production of new goods and services. Thus, even if the ICT investment goods are standard products, they enable firms to innovate and accumulate firm-specific capital with positive spillovers on production.

Ark and Inklaar (2005) posit that the ICT investments may have a U-shaped effect on productivity. After some initial benefits from the ICT investments (“hard savings”), the contribution may even become negative since for reaping full benefits of the ICT, complementary investments in human and knowledge capital as well as in organisational innovations become necessary. Such complementary investments involve gestation lags and do not immediately result in an acceleration of productivity growth. It is only over time that the combination of ICT investment coupled with intangible investments and innovations shows an effect on productivity (“soft savings”),

reflected in the U-shaped relationship. The realisation of "soft savings" involves more trial and error and thus, could benefit from an entrepreneurial environment and competitive labour and product markets.

There have been several empirical studies on the productivity trends with special reference to increased use of the ICT and the efficiency gains (For example, Oliver and Sichel, 2002; Nordhans 2005; Ark and Inklaar 2005; Gorden 2004). The major issues that are addressed relate to the acceleration of productivity since 1995 in the US but not in Europe; the role of the ICT in productivity acceleration with noticeable differences between the US and Europe seeking explanations for the lagged or indirect effects of the ICT; and the differences in impact of the ICT on productivity in the manufacturing vis-à-vis the services sector. It is not my intention to go into the details of research but only to highlight the importance of understanding the role of the ICT in securing productivity gains, particularly since Andhra Pradesh has been one of the leading States in the area of ICT. Hopefully, Andhra Pradesh Economic Association will consider exploring these issues relating to ICT.

It will be interesting to recall the empirical work done so far on the trends in productivity in India. Most of the empirical studies on productivity in India have focussed on the growth in the TFP in the manufacturing sector. These studies suggest a decline in the total factor productivity growth (TFPG) till 1970s, with a turnaround taking place in mid-1980s pursuant to the reoriented trade and industrial policies and improved infrastructure performance (Brahmananda, 1982; Ahluwalia, 1991; Balakrishnan and Pushpangadan, 1994; Majumdar, 1996; Rao, 1996; Pradhan and Barik, 1999; Trivedi, Prakash and Sinate, 2000). The proposition that the TFPG accelerated during the 1980s would be consistent with the recent contentious view associated with Rodrik and Subramanian (2004) who have argued that the transition to high-growth phase occurred around 1980 – a full decade before economic liberalisation - due to pro-business policies that started being adopted during the 1980s. Various incremental reforms in the industrial sector during the 1980s appear to have had a positive impact on the productivity during the 1980s. However, the pick-up in productivity during the 1980s remains a matter of contention. Balakrishnan and Pushpangadan (1994), for instance, argue that the turnaround in productivity during the 1980s is the

artefact of using the single-deflation method; there is no evidence of such a turnaround in case double-deflation approach is adopted: (Under single-deflation method, nominal value added is deflated by an index of the price of gross output. Under double-deflation method, gross output and material input are deflated separately by output price index and input price index, respectively, and the difference is treated as real value added).

Turning to the trends in productivity in the post-reform period, the evidence from empirical studies by researchers is ambiguous, though anecdotal evidence, especially of trends in recent years, shows significant increases in productivity. While studies by Unel (2003) and Tata Services Ltd. (2003) find an acceleration in the TFPG in the 1990s, Goldar (2004) and RBI (2004) find a deceleration in the TFPG. Notwithstanding the ambiguity regarding acceleration in TFPG, evidence suggests that trade liberalisation since 1991 has had a positive impact on the TFPG in India (Krishna and Mitra, 1998; Chand and Sen, 2002; Das, 2003; and, Topalova, 2004). At the sectoral level, there is evidence of improved TFPG for the exporting sectors *vis-à-vis* the non-exporting ones (Dholakia and Kapur, 2001; Unel, 2003). More recently, Kato (2005) finds that the smaller the market share of a firm, the higher is its productivity growth.

One limitation of most of the studies in the Indian context is their focus on productivity in only the manufacturing sector. The share of industrial sector in India's GDP is only 22 per cent whereas the services sector has emerged as the predominant contributor to GDP with a share of 58 per cent. Since 1993-94, the services-sector GDP has recorded an annual average growth of almost 8.0 per cent per annum, notably higher than 6.7 per cent recorded by the industry. Therefore, studies that focus on manufacturing sector alone may not represent a true picture of productivity of the economy as a whole. This is especially true in view of some evidence that the productivity acceleration in the US during the second half of the 1990s was led by the services sector. For India, recently Virmani (2004) has attempted to measure the TFPG for the Indian economy as a whole. His estimates suggest that the TFPG has followed a V-shaped pattern since independence, with near flattening from the late 1980s. Growth in the TFP decelerated since early 1950s, when it was about 2.5 per cent, till mid-1970s when it fell to less than 0.5 per cent.

Subsequently, the TFPG recovered and peaked at about 2.6 per cent in 1988-89 and has broadly remained around these levels since then.

A second relevant factor in these empirical studies in India is that their focus is predominantly on the TFPG. In addition to TFPG, it is important to examine trends in labour productivity since it is a more proximate measure of the standard of living, which is specially relevant for the countries with low living standards. Studies in this regard throw some evidence of an increase in the growth rate of labour productivity during the 1990s [RBI (2004); Balakrishnan and Babu (2003)]. Thus, even if it is held that there has been no clear evidence of growth in the TFP, labour productivity growth could have been higher in the post-reforms period, though the evidence is not conclusive.

A third factor to be kept in view is that many studies draw upon the data up to the year 2000 while, by all indications, significant gains in productivity have occurred in the more recent years, particularly in manufacturing. Anecdotal evidence, in addition to relevant supporting data on trends in prices, composition of our export basket and corporate balance sheets, indicates a significant acceleration in productivity gains in the economy. These are issues worth exploring for research on a priority basis, including the studies on capital productivity and the movement of the incremental capital-output ratio.

How does India fare in comparison with other countries? Cross-country evidence (Ark and Inklaar, 2005) shows that labour productivity growth in India in recent years is better than in Germany, the United Kingdom and the United States. Wage rates in India are much lower than in Thailand, Singapore, the Philippines, Malaysia and Korea. In terms of the unit labour cost, India has a competitive edge over Singapore, Korea and Malaysia. In the case of the iron and steel industry, India fares better than Hong Kong, Indonesia, and Malaysia, both in terms of lower input costs and higher operating surplus. India leads in skill-based manufacturing activity such as ability to re-engineer equipment at lower capital costs, innovative process re-engineering, availability of skilled technicians and quality mindset. On the other hand, the unit labour cost in India is higher in food products, electrical machinery and transport equipments as compared with some other emerging market economies. Overall, the Global Competitiveness Report 2004 (World

Economic Forum) has ranked India 55th among 104 economies in terms of the Growth Competitiveness Index and 30th in terms of Business Competitiveness Index. Although labour productivity growth in India is higher than in the advanced economies, it needs to be stressed that its level in India remains quite low in many sectors. Illustratively, productivity per worker in India is only nine per cent of the US productivity as compared with fourteen per cent for China (Ark, Bart van 2005).

An important issue for India is the relationship between productivity and employment. Does higher productivity lead to a reduction in employment? *Prima facie*, the evidence may appear to support such a proposition but it might require a deeper analysis. Illustratively, in the US productivity has rebounded in the last decade while manufacturing employment has declined sharply. Such a simple positive correlation might be deceptive as it ignores productivity trends in the competing economies. It could be the case that productivity in competitor countries might have exceeded that in the US. It is possible that the effects of rapid domestic productivity growth could have been more than offset by more rapid productivity growth and price declines arising from foreign competitors. Indeed, this appears to have been the case since, according to estimates by Nordhaus (2005), the relevant elasticities of employment with respect to productivity – about 0.25 to 0.5 - indicate that faster productivity growth leads to increased rather than decreased employment in manufacturing. In brief, the implications of productivity trends on employment in our country depend not merely on what happens within India but what happens in other countries contemporaneously, reaffirming the importance of tracking productivity both in India as well as in other countries, in view of trade integration. I would flag this as another priority area for research by the economists.

While a number of studies have examined the relationship between productivity and income on the one hand and between income and poverty on the other, the relationship between productivity and poverty is perhaps relatively less explored. A number of studies have found that productivity growth has a positive impact on income growth. Sustained and high growth, in turn, is found to reduce poverty levels in an economy. Thus, it is expected that productivity growth should also have a positive effect of reducing poverty in an

economy, although the very short-run effect may be ambiguous depending upon the effect of productivity growth on employment. While in the long-run, productivity growth is employment enhancing, the short-run effect could be employment-diminishing, if redeployment of labour is rendered difficult. Hence, a labour force supported by adequate human capital skills and robust governance institutions can help reaping the benefits of productivity growth on employment more rapidly. It must be noted that an inverse relationship between productivity growth and employment may, in fact, hold in the long-run at a sectoral level (say, agriculture), but at the economy-wide levels, a positive relationship is expected as employment opportunities arise in newer industries and the services sector.

On the whole, productivity growth can have positive impact on poverty reduction through two channels: First, increase in productivity raises wages and incomes and hence reduces poverty. Higher productivity-led wages and incomes can have a second-round impact on domestic demand and, in turn, on employment and further gains on poverty reduction. Second, productivity gains help to moderate the rate of increase in prices – as has been happening in a number of countries. Lower inflation is equivalent to an increase in the purchasing power of current incomes. This indirect effect, operating through lower inflation, can also have a mitigating effect on poverty levels.

A detailed analysis of the relationship between productivity and poverty has recently been made by the International Labour Organisation in its publication *World Employment Report, 2004-05* (WER). Cross-country empirical analysis contained in the Report shows that poverty reduction is often, but not always, the mirror image of productivity gains. Productivity growth can and must go hand in hand with employment creation and poverty reduction, at least in the long run. But, as the Report stresses, this does not occur automatically and in the same way for all regions. For the beneficial effects of productivity growth to be reaped, economies require a certain degree of productivity growth in order to improve labour market conditions. Major transitions or crises can have a negative impact on productivity growth and labour markets need time to recover. A recent study [CSLS (2003)] finds that productivity growth accounts for changes in poverty better than the more commonly used economic growth. According to the study, in countries with

the lowest GINI indices, a one per cent rise in labour productivity is associated with a 1.02 per cent decline in the incidence of poverty. In countries with the highest GINI indices, the impact is less than a half: a one per cent rise in labour productivity was associated with only a 0.45 per cent decline in the incidence of poverty. It appears that the effects of productivity growth on poverty depend inversely upon the income inequality levels: the higher is income inequality within a country, the more limited is the impact of productivity growth on reducing poverty. On the other hand, the effect of productivity growth on poverty reduction is found to be stronger in countries with relatively low income inequality. I would end this exploratory journey on relationship between productivity growth and poverty reduction with an exhortation that economic research in this area should be a priority in India since poverty alleviation is the biggest challenge while increase in productivity is a necessary though not a sufficient condition for poverty eradication.

Before concluding, it is appropriate that there be some illustrations of the manner in which Reserve Bank has been contributing to enhancing productivity in our economy.

The first and foremost contribution is the lowering of inflation and more importantly, inflation expectations. A growing consensus has emerged in recent times, both in academia and policy circles, that price stability - a low and stable inflation rate - provides substantial benefits to the economy. First, it prevents over-investment in the financial sector. Second, price stability lowers the uncertainty about relative prices and the future price level, making it easier for firms and individuals to make appropriate decisions, thereby increasing economic efficiency. Third, price stability also lowers the distortions from the interaction of the tax system and inflation. All of these benefits of price stability suggest that by anchoring inflationary expectations, a stable inflation can increase the level of resources productively employed in the economy. In the Indian context, the Reserve Bank exhibits demonstrable commitment to price stability and growth, the relative emphasis being determined by the balance of domestic and global conditions. Measured in terms of Wholesale Price Index (WPI), the annual rate of inflation halved from an average of around 11 per cent over the 5-year period beginning 1990-91 to around 5 per cent for the first five years of the current decade. This, as you

would all agree, has been an important factor for business to thrive and prosper, with positive spillovers on productivity improvements.

Second, the ease of credit availability is a crucial ingredient for business to flourish. A growing economy needs to have access to credit on reasonable terms and conditions. Illustratively, the credit growth over the last five years has averaged 20 per cent, with the increase at around 25 per cent being particularly rapid during the last three years, riding on the back of broad-based credit demand across all sectors. In recognition of these facts, recent policies have placed explicit emphasis on streamlining credit delivery consistent with credit quality through a gamut of measures. Any discussion of productivity improvement needs to take on board the reach of the financial sector, particularly in rural and semi-urban areas. It is in this context that the recent Policy Statements of the Reserve Bank have rationalised branch licensing policy and emphasized the need for 'financial inclusion' of the vast segment of our population who have hitherto remained financially excluded. Self-help groups formed by non-government organisations (NGOs) and financed by banks represent an important constituent of this development process.

Third, the policy environment has been made conducive for Indian corporates to have global presence, including global acquisitions. In particular, the corporates are free to leverage through external commercial borrowings and Indian banks are enabled to fund such presence. These initiatives help exploitation of synergies of the domestic and foreign operations of our corporates thus enhancing overall productivity.

Fourth, as regards banking sector, Professor T.T. Ram Mohan has described succinctly (Economic Times, December 15, 2005) the current status in this regard. "There is the improved efficiency and stability of Indian banking. Banking has proved the soft underbelly of many an experiment in liberalisation. Not so in India. The decline in interest rates in recent years helped recapitalise the banking system. Now, the system is well placed to take advantage of this good fortune - both by garnering more savings and by delivering more credit. With financial markets having developed as well, the financial system is geared to meet the demands of growth".

Fifth, improvements in communication policy of Reserve Bank also have an indirect influence on productivity. For instance, the Reserve Bank has brought about changes in the institutional setting of the monetary policy by migrating from half-yearly announcements to a system of quarterly reviews since April 2005. The weight of evidence suggests that increasing transparency and accountability reduces the uncertainty about monetary policy, interest rates and inflation. The consequent conducive economic environment makes it easier for businesses to flourish. The Reserve Bank has, therefore, been making pro-active efforts to improve transparency and public availability of information. Such information dissemination leads to minimisation of uncertainties about policy intentions, enhances market stability and has a long-run positive effect on productivity. Of particular interest to this gathering may be the data available on the website of Reserve Bank through the "Database on Indian Economy" (available at https://reservebank.org.in). The website is being currently accessed extensively by market analysts and economic researchers from universities in the USA and the UK.

Finally, Reserve Bank has been interacting with market participants while being alert to the global developments in order to ensure financial stability since there is a clear global recognition of the disruptive effects of financial instability. India has been spared both currency and banking crises, unlike many other emerging countries. Further, amongst the major economies that do not contribute to current global imbalances, India and Euro area are noteworthy. It is widely recognised that the financial sector and the external sector reforms are amongst the most successful in India which also reflects the enabling conditions ensured by Reserve Bank for efficiency and stability. It must be recognised that stability has enabled acceleration of growth rates, notwithstanding the significant borrowing requirements of the public sector including the Government and the infrastructural challenges.

From the perspective of the monetary policy formulation by the Reserve Bank, an understanding of the underlying trends in productivity is of critical importance in order to aim for low and stable inflation. Ultimately, inflation is determined by mismatches between demand and supply in the economy. Monetary authorities, therefore, ought to have a good fix on the

movements in the trends in the economy's productivity since it is a key determinant of the potential growth of the economy. If the productivity of the economy is on an uptrend – that is, the potential growth of the economy has moved on to a higher trajectory – that would suggest, *ceteris paribus*, that the supply exceeds the demand in the economy and hence, it provides monetary policy flexibility to pursue an accommodative monetary policy without stoking inflationary pressures. From the view point of the conduct of the monetary policy, it is important to have reliable estimates of the evolving productivity dynamics, but it is critical to be able to form such assessments on a timely basis to avoid costly errors. Thus, for a central bank to deliver low and stable inflation while allowing employment and output close to their potential/natural levels, analysis of productivity – on a real time basis – remains a key input.

Let me conclude : Reserve Bank has a vital interest in research and analysis of productivity trends in the Indian economy, on a continuing basis and in a timely manner, keeping in view similar developments in other major economies in the world.

I have great pleasure in inaugurating the Annual Conference and wish the Conference all success. We, in the Reserve Bank, look forward to the guidance that we could get from the scholarly pursuits and deliberations in this Conference.

Thank you.

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