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Consequences of Unbalanced Productivity Growth in India: Lessons from the Scandinavian Model

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Abstract

Unbalanced productivity growth with one sector lagging behind is seen to spur aggregate inflation in the Scandinavian model of inflation. In other models, unbalanced wage growth embodied in a wage rise shock arising from the home goods sectors is seen to lead to a contraction of the private competitive sector while leading to an expansion of the public sector. Such analyses at a disaggregated level can offer some insights into some puzzling and distressing developments in the Indian economy, namely sluggish growth in manufacturing output and a persisting low level of agricultural productivity. This paper adopts a three-sector model including manufacturing, services and agricultural activity which does give a pointer about addressing the maladies referred to above. Data show that while productivity in services shows a healthy trend, there is a large differential between wages in services and manufacturing. The model gives the result that a hike in service sector wages has a positive effect on manufacturing output, if the propensity to consume out of wage income is higher than from wage income. The surplus in agriculture also increases, consistent with movement of labour into services (not modelled here) and a rise in agricultural productivity.

Keywords: Unbalanced Productivity, growth, India, Scandinavian Model, sector economy, manufacturing, agriculture, labour.

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I. Introduction

The pedestrian growth of agricultural productivity in India has been disturbing to observers and policy- makers alike. The pattern of development for a dual economy envisaged in Arthur Lewis's seminal paper (1954) includes a favourable outcome for the agricultural sector, with an increase in productivity as labour relocates from manufacturing / industry in that two-sector model. But this is not quite that what has been happening in the case of India - and a host of other developing and newly industrializing economies. The share of agriculture has, indeed, fallen, but not to anywhere near the low levels seen in the industrialized, high-income nations. Even more remarkable is the fact that agriculture remains the main provider of employment, a ready testimony to the sluggish development in agricultural productivity. It is also noteworthy that these developing economies seem to have skipped the "step" in the "hop, step and jump" process with the services sector becoming the largest sector without the industrial sector first occupying those heights - as had happened in the case of the present-day high-income nations.

It is our contention that the explanation for the abysmally low levels - and rate of growth - of agricultural productivity lies in the very structure of overall productivity development in the economy. In this paper, the consequences of unbalanced productivity growth discussed in Baumol (1967, 1994), Spann (1977) and the Scandinavian Model (see Lindbeck, 1979) are reframed to explain the sluggish growth of agricultural productivity as well as manufacturing output in India and to propose a possible remedy for this malady.

II. The Effect of Lagging Sectoral Productivity: Observations in the Literature:

The consequences of unbalanced productivity growth in a two-sector economy were first analysed by Baumol (1967). His model assumes identical nominal wages in the two sectors, thus being a precursor to. the centralized wage bargaining models that became popular from the 1970s onwards, after the real wage increases that predated the supply side shocks from oil price increases.

In Baumol's (1967) model, an uneven development with zero productivity growth in the - predominantly public - services sector can lead to the labour force continuously increasing in that sector with the progressive sector's output tending towards zero. A similar outcome is sketched in Soderstrom and Viotti (1978), with a nominal wage rise in the nontraded sector contracting the competitive tradables sector and enlarging the non-tradables sector; at work here is the government's role as the employer of last resort, absorbing the labour laid off from the progressive sector.

The Scandinavian Model of Inflation

For a thorough description of the Scandinavian Model of Inflation, also called the EFO model and the structural inflation model, and its applications, see Lindbeck (1979).

The EFO model is driven by the centralized wage bargaining process that equalizes wages across sectors. The labour share of income is maintained unchanged, so that WL/PQ = constant. Thus,

W / Pq = Constant ……(1),

where q is labour productivity.

The model recognizes a traded sector, T , for which good prices are fixed globally (abroad) and a nontraded sector N, subscripts used accordingly to differentiate in presentation.

From (1), $WT^ = PT^ + qT^$ ……(2)

with the hat ^ representing rates of change.

Now, the nontraded sector wage will change at the same rate due to collective centralized wage bargaining. So it can be seen that the price change in the nontraded sector is given as

$PN^ = PT^ + qT^ - qN^$ ……(3)

The aggregate level of inflation, represented by the consumer price index with weights α for PT and (1-α) for PN changes by

$PC^ = \alpha PT^ + (1-\alpha)(PT^ + qT^ - qN^)$ (4a)

or

$PC^ = PT^ + (1-\alpha)(qT^ - qN^)$ ……..(4).

(4) is the Scandinavian Model of Inflation, which makes the important observation that if productivity growth in the nontraded services sector lags behind that in the traded, competitive (read: manufacturing) sector, the aggregate inflation level in the economy keeps rising.

The EFO model lays bare the negative consequences of unbalanced productivity growth. In a similar framework, suitable for the analysis of highly open industrial nation economies, wage shocks that disrupt the wage- productivity balance in certain sectors can cause a contraction in those sectors while causing unwarranted expansion in other sectors. In a paper aptly titled " nominal wage disturbances and the endogeneity of the public sector", Soderstrom and Viotti (1978) present such a scenario based on actual developments in Sweden; the thrust and results of their analysis is, keeping it brief, as follows:

In a two-sector economy, consisting of an internationally competitive sector and a home goods sector, workers negotiate a wage increase in the home goods sector, an increase that is binding for the traded sector as well. Prices in the home goods sector can rise, but not in the traded sector that faces global export prices. The result is a contraction of the traded sector, with worker lay-offs. Here is where the benevolent Nordic state, in its role as the employer of last resort, has to act to sponge up the newly unemployed workers. The end-result of the wage increase is an expansion of the public sector due to the employment of discharged workers, and a contraction of the traded, competitive sector. Thus, imbalances in wage development can have negative consequences just like those created by unbalanced productivity growth.

The Lewis approach (Lewis, 1954) is more relevant for developing economies. It portrays a dual economy with a modern (or modernizing) industrial sector and a backward agricultural sector with low productivity. Naturally, there is no scope for wages being equal in the two sectors, given the vast pool of labour, literally in unlimited supply. However, if large investment in the industrial sector expands output, 9dSmthe rising labour demand will pull in labour from the agricultural sector and can eventually lead to more capital usage and rise in agricultural productivity.

The increased importance of the services sector in the developing economies implies that the highly successful. Lewis model needs to be modified to the contours of a three-sector model. In addition, the insights derived from the two-sector tradable (or progressive) – non-tradable services models of Baumol (1967) can come fruitfully into play in analysing unbalanced growth in developing and newly industrializing nations.

Such an approach is adopted in the next section, where a simple theoretical model is set up to show how differing rates of wage and productivity growth in the other sectors can affect outcomes in the agricultural sector and for the economy as a whole.

III. An Economy with Manufacturing, Services and Agriculture

It was seen in the previous section that in a neoclassical-type model, suited for analysing industrial country developments, a wage shock (increase) in the services sector can lead to a contraction in the other, competitive manufacturing sector. In this section we develop a Keynesian model, attuned to the approach in Bose (1989), in which a services sector wage ' disturbance' has entirely contrasting results. Such a model may be able to track macroeconomic developments at a disaggregated level more realistically for a developing economy than models for industrial nations seen in the work of Soderstrom& Viotti (1979), Corden and Neary (1982) etc. As Banerjee and Warrier (2018) point out with empirical support, these industrial country models typically give a result with expansion in one sector contrasting with the contraction of the other major sector, while Bose (1989) etc., and the model to be presented here give a scenario where the major sectors can all grow together.

Consider a three-sector economy comprising of manufacturing, services and agricultural production activities. We abstract from trade for simplicity - as it is not important in the context addressed. Prices are given by mark-ups over wages in manufacturing and services. In agriculture, as in Bose (1989), prices are market- determined. But whereas in Bose (1989) prices can fall due to an increase in marketed agricultural surplus, here the surplus adjusts to keep the price unchanged. So it is the marketed product surplus that is endogenous. Any stock surplus released by the government will also work to keep the agricultural price stable.

As we work with relative prices - which do not change in this price- mark up scenario, a money market to determine the nominal price level is not needed. Thus, it is not that the money market is being omitted by Walras Law, since the bond market comes along in the package; if a money market is included, it would be the bond market that is omitted by Walras Law.

The model is described below. Note that with exogenous mark-ups, relative prices do not change. So, we choose to normalize prices to 1. An important consequence is that in aggregate consumption functions only total income appears as the determinant, since relative prices do not change.

$$Sm = Cm(Y) + Im + Gm \quad \text{.....(5)}$$

$$Sh = Ch(Y) + Ih + Gh \quad \text{.....(6)}$$

$$Sj = Cj(Y) + Ij + Gj \quad \text{.....(7)}$$

$$Y = WmLm + (Sm - WmLm) + WhLh + (Sh - WhLh) + Sj \quad \text{.....(8)}$$

In equations (5) -(8), the supply S in each sector is given as determined by consumption demand C, investment and government demand, the last two kept exogenous. Subscripts m, h and j represent. Consumption is based on total income Y. 'Y' is given in (8) as the sum of wage and capital income in all sectors. W is the wage rate and L represents employment.

In Bose's model, the link between worker demand from the services sector and manufacturing output was highlighted, a fall in agricultural price increasing the worker

marginal propensity to consume manufactured goods. We keep this marginal propensity constant, but do focus on services- manufactures interaction, ignoring intersectoral consumption demand between agriculture and manufactures to keep the model tractable.

We now proceed to examine the effects of a wage disturbance, a rise in the labour wage rate Wh in the service sector, on all sectors of the economy.

Totally differentiating (5)- (8) after substitution of Y into the other equations, and representing in matrix format,

$$\begin{vmatrix} 1-\psi & -\theta & 0 \\ \psi & \theta & -\lambda \\ 0 & \theta & 1 \end{vmatrix} * \begin{vmatrix} dSm \\ dSh \\ dSj \end{vmatrix} = \begin{vmatrix} Lm(\mu-\lambda) \\ Lm(\mu-\lambda) \\ Lm(\mu-\lambda) \end{vmatrix} . dWm$$

…….(9)o

where μ and λ are the marginal propensities to consume from wage and capital income respectively, and

$\psi = (dLm/dSm)(\mu-\lambda)$; $\theta = (dLh/dSh)(\mu-\lambda)$ ….. (10)

dLm/ dSm (similarly in the 'h' sector) is the inverse of the marginal productivity as well as average productivity, and is less than 1, since the productivity level is manufacturing is in three figures.

Both ψ and θ are positive if

$\mu > \lambda$ …….(11),

i.e., if the marginal propensity to consume from wage income is greater than the marginal propensity to consume from capital income, which is generally seen to hold. Also, applying (11) in (10), it is easily seen that

$1 > \psi, \theta > 0$. …….(12)

(11) and (12) are sufficient to sign the determinant of the matrix in (9), and also to sign the solutions obtained later for sectoral outputs and the agricultural market surplus.

The determinant of the matrix (9)is given as

$\Delta = (1-\psi)\theta(1+\lambda) + \theta\psi > 0$

By applying Cramer's rule, we get

$\Delta.(dSm/dWm) = (Lm(\mu-\lambda)\theta(1+\lambda) + \theta\, Lm(\mu-\lambda) - \theta Lm\lambda(\mu-\lambda)) > 0$

Thus, output in the manufacturing sector is seen to rise following a wage increase in the services sector.

Proceeding in a similar fashion,

$\Delta. \ (dSh \ / \ dWm) = \ (1-\psi) \ Lm(\mu-\lambda) \ (1+\lambda) - Lm(\mu-\lambda)\psi \ > \ 0$

&

$\Delta. \ (dSj \ / \ dWm) = \ (1-\Psi)\theta(1+\lambda) + \theta\psi Lm(\mu-\lambda) + Lm(\mu-\lambda)\theta\psi \ > 0$

Thus, it transpires that an increase in the wage rate in the services sector raises output both in the manufacturing sector and the services sector. There is a positive impact on marketed agricultural surplus as well.

Though not modelled here, it may be mentioned that a rise in service sector wages will act as a catalyst for the movement of labour from agriculture to services as the wage differential between the two sectors increases. Such an intersectoral movement of labour will tend to increase labour productivity in agriculture. The positive impact on agricultural surplus obtained in this model may, in such a scenario, arise from productivity increases.

VI. Empirical Evidence and Implications

The theoretical framework laid out in the previous section implies that the slow transformation of the Indian economy's structure, with agriculture continuing to provide the lion's share of employment could be due to unbalanced productivity growth. We will now investigate if the data supports such a hypothesis.

The rates of productivity growth in the main sectors of the Indian economy are given in table 1.

Tabe 1: Sectoral Labour Productivity, India

Sector	Level 2010 (constant 2005 Rs)	Growth 2000-10
Services	213,014	6.3
Manufacturing	125,349	4.2
Reg. Manufg	360,442	5.4
Unreg. Manufg	50,312	1.2

Source: Economic Survey 2014-15

Rather surprisingly, perhaps, productivity growth in the services sector has - more than - kept pace with that in the manufacturing sector. A similar picture emerges in the international comparison in Tables 2 and 3.

Table 2: Ratio of Sector Labour Productivity to that in Manufacturing, 2005.

Country	Agriculture	Services	Construction
Indonesia	0.18	0.49	0.42
India	0.2	1.41	1.17
Korea	0.28	0.29	0.51
Malaysia	0.44	0.73	0.23

Philippines	0.2	0.34	0.32
Thailand	0.11	0.43	0.18
USA	0.57	0.57	0.34
Japan	0.19	0.64	0.46

Source: Asian Development Bank (2014); also, for table 3

From Table 2, it can be noted that service sector labour productivity (as well as that in construction) relative to that in manufacturing is highest in India. Manufacturing labour productivity relative to that in services is highest in that industrial powerhouse: Korea. Table 3 below compares productivity growth rates.

Table 3: Labour Productivity Growth by Sector, 1990-2005 %

Country	Agriculture	Manufacturing	Services	Construction
Indonesia	2.6	3.3	1.8	-0.3
India	1.3	3.8	5.5	1.2
Korea	5.5	8.1	1.1	1.0
Malaysia	3.1	4.1	4.2	-0.4
Philippines	1.0	0.9	0.8	-2.0
Thailand	3.0	2.6	-0.7	-4.8
USA	3.4	4.5	1.5	-0.7
Japan	0.1	3.7	1.0	-2.1

It is seen that labour productivity growth in the services sector has been strongest in India, Malaysia also registering high rates. Korea which has a manufacturing sector productivity growth far in excess of that in other countries, has a fairly dismal record in the services sector.

Hence, India ought not to be afflicted by the - fallout of the - malady of unbalanced productivity growth discussed in this paper earlier. But has the good performance in services labour productivity been mirrored in, rewarded by, sector wage developments? The answer is “Evidently not, at least not in all service branches”, as data in table 4 and 5 below reveal:

Table 4: Daily Wage, Rupees, 2011-12, for Workers in Sectors, India

Sector	Regular Workers	Casual Workers
Manufacturing	312	148
Services trade	210	170
Hotels &rest.	228	193

Personal services	140	132
Real estate services	618	155
Banking & Finance	704	173
Agriculture	188	125

Table 5: Real Wage Growth % in Sectors, India, Regular Workers

Sector	2004-05 to 2011-12	1993-1994 to 2011-12
Manufacturing	4.9	2.4
Trade services	5.2	2.8
Hotels & rest.	3.8	3.3
Personal services	3.3	1.9
Banking & Fin.	1.4	2.8
Real estate	4.7	6.2
Agriculture	6.6	4.6

Source for tables 4 & 5: ILO (2014)

From table 4, wages in the informal sector, predominantly comprising of services, have remained below those i manufacturing; the rate of growth of wages in services has also been lower. Such conditions imply that the urban informal sector has not been the magnet it should be to attract labour from the agricultural sector and to lead to the chain of reactions leading to agricultural productivity increases and a continuing expansion of the manufacturing sector.

The sluggish development of wages in the services sector, below that warranted by high productivity increases in the sector, implies - in the light of the theoretical model presented in the previous section- that an acceleration of this process can have positive consequences for the economy. Higher wage incomes in services will create higher demand of manufactured goods. Manufacturing production has seen only sedentary growth, far below that required for a nation aspiring to be an industry powerhouse. But, for the required wage increases to materialize in services, wage bargaining processes now only functioning in the formal industry sectors have to be in place.

The question that naturally arises is about the inflation implications of a service sector wage increase. When wage levels trail productivity levels in a marked fashion, one - on - one increases in price mark-ups in response to wage hikes are unlikely. Besides, when inflation does rear its head eventually, it will not be a stagflation scenario with falling sector outputs accompanying price increases.

Concluding Remarks

The structural transformation that has taken place in the Indian economy over the years has not been quite what had been hoped for. While a rapid ascendance of the services sector is not unwelcome, the sluggish growth in manufacturing is distressing. This paper seeks an explanation for such lacklustre performance in the pattern of wage and productivity developments, taking cognizance of similar work carried out for industrial, high-income nations. Economy-wide models developed for industrial models identify the negative impacts of unbalanced sectoral productivity and wage growth. In these models, low productivity growth - relative to that in the competitive manufacturing sector - in the services sector spurs on aggregate inflation, while wage increases in the services sector lead to an expansion of the public sector and a contraction of the manufacturing sector. The approach in this paper reflects realities in India and other developing nations more intimately, the results hinging upon a comparison of the marginal propensities to consume from wage and capital owner incomes. It is seen that a wage rise in the services sector increases output in the manufacturing sector and elicits a market surplus in agriculture that is consistent with (but not modelled here) an increase in agricultural productivity as labour moves to services based on the higher wage differential now prevailing.

The key finding in the present analysis is perhaps that the sluggish growth in manufacturing could be due insufficient demand growth, in which the large wage difference between the manufacturing and services sector plays a role. Closing of this gap, perhaps by stronger labour organization in the services sector, can create more demand for manufactured goods from workers. In a nutshell, imbalances in productivity growth as well as in wage growth need to be addressed as these can have negative consequences for the economy.

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