Income Distribution, Employment Growth & the Kaldor-Verdoorn Growth Facts

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This paper advocates two different demand side explanations of the Verdoorn-Kaldor law that permits two different types of increasing returns with different employment implications. One is the realization of economies of scale that does not permit a strong relationship between employment growth and productivity growth. The other is the division of labor-led increasing returns as part of economic progress with robust induced employment growth for maintaining division of labor-led productivity growth in a cumulative manner. This paper shows that division of labor-led growth sticks to prices, in the face of productivity increases that translate into intermediate cost reduction, shapes the evolution of distribution of income that in turn shapes the employment-productivity relationship.

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Introduction

In the Solow model, growth of employment is associated with productivity growth that also allows growth of wages and profits (keeping the shares of labor and capital constant). However, full employment along the path of growth is maintained by a perfectly competitive price mechanism, which implies that individual initiatives make only static adjustments that cannot generate the growth path; productivity growth is exogenous. At the same time, if the continuous developed status of countries should highlight the strong positive association between labor productivity growth and employment growth, with higher wages, and if this can be attributed to firm-specific initiatives, which has to be compensated in terms of higher profits, there is the need for an alternative perspective that can capture the essence of such initiatives. In this context, the present paper endeavors to illustrate that a broad reinterpretation of Young (1928) can identify such firm-specific individual initiatives. The basic hypothesis developed in this paper is that more

productive investment that shapes the desired evolution of income distribution induces in turn increases in more (and more productive) employment opportunities that in turn permit the possibility of higher growth of productivity that can ensure still higher wages (and profits). This process can continue in a cumulative manner.

In the literature (Kaldor, 1966; 1972; 1975; Rowthorn, 1979), it is recognized that the Keynesian insight that investment creates higher market size is indispensable for the Youngian thesis that better supply response can beget further better supply responses (and that can go on in a cumulative manner). Here, the paper tries to show that (if the focus is on higher employment growth that should be associated with higher labor productivity growth) any investment that embodies better supply responses as such is not important for further elaboration of the Youngian thesis. There is, in fact, the need to bringing in the importance of division of labor-led growth processes. More specifically, the present paper tries to show that division of labor-led price stickiness, in the face of intermediate cost reduction, shapes the evolution of the desired distribution of income, which, in turn can permit the association between higher employment growth and labor productivity growth. This issue of income distribution was not discussed by Young (1928; and in his further elaboration by Kaldor); this could explain, and here the contribution of the paper lies, as to why Kaldor (1975), in his elaboration of Verdoorn-Kaldor law, dismissed the possibility of a strong employment growth-labor productivity growth nexus, as irrelevant, in the conceptualization of a demand-led growth thesis. In the present paper, the division of labor-led income distribution permits a significant association between employment and productivity growth and is consistent with (or reinforces) the discussion of demand-led causality underlying Vardoorn-Kaldor law. Last, the paper concludes with an empirical study of Indian demand-led manufacturing growth that highlights that the demand-led increasing returns permits the discussion of two types of increasing returns, with different employment implications. One is the realization of increasing returns to scale-led income distribution that cannot support the strong association between employment growth and labor productivity growth; in any case, its role in promoting growth in a cumulative manner is also suspect. The second is the realization of division of labor-led increasing returns-led distribution of income that permits a strong association between employment growth and labor productivity growth, and reinforces the cumulative growth possibility. The role of a magnified increase in market size however is important for the division of labor-led growth process and the note, therefore, starts with the discussion of such a growth process in a post-Keynesian framework-based conceptualization of the aggregate market size.

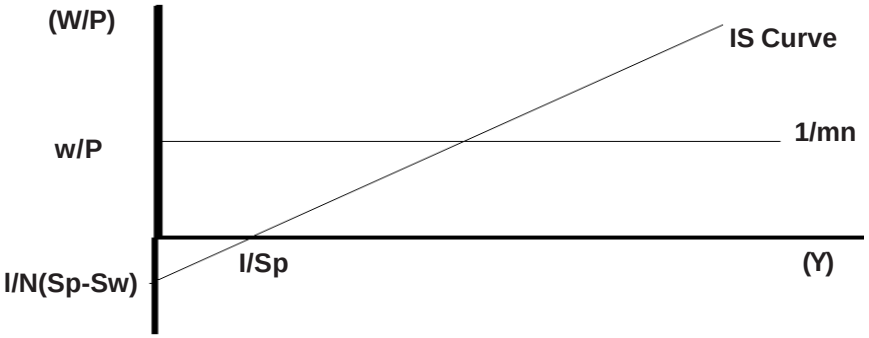
There is the need to bringing in the importance of division of labor-led growth processes.

Post Keynesian Statics

The post-Keynesian static (Yellen, 1980: 15-17) of saving investment identity is

$$S_w (wN/P) + S_p (Y - wN/P) = I \qquad (1)$$

Where S_w and S_p are the savings propensities of workers and profit earners, w and P denote the wage rate and price level, N and Y denote employment and real output, and I denotes real investment.



In the above diagram (1), the equation (1) (or equivalently, $w/P\ N(S_w - S_p)/S_p = I/S_p - Y$) (and assuming $S_w < S_p$), provides the post-Keynesian IS curve relating higher real wages (and demand) with higher real output, achieving commodity market equilibrium. According to Yallen, further, a consistent Keynesian closing of the system is to posit a fixed mark up m of prices over unit labor costs so that P = mwn or w/P = 1/mn. Collecting terms and rearranging, we have

$$Y = I/(S_p - (S_p - S_w)/m) \qquad (2)$$

If the denominator in the above equation shows the economy's average propensity to save, an increase in investment raises the output by the standard Keynesian multiplier. The firms' pricing policy and the value of m (with given labor productivity) would determine the real wages (and share of output) such that an increase in m would reduce output.[1] However, it is the real output that would determine the employment (by assumption). If so, in a dynamic framework, the growth of output (with real wages and wage share) would determine the growth of employment.

Modified Youngian-Kaldorian Contributions

In the post Keynesian literature, the above equation is discussed in I/Y terms (with given savings propensities and shares) and to retain the static framework (with given capital output ratio), the growth of output is driven mainly by

[1] If the firms increase m by reducing N, say an increase in working hours in Marxist parlance, that keeps the w/P unchanged, the real output, via a rightward shift of the IS curve, would increase. However, a decrease in m with given N, Y, and I can also permit higher output.

exogenous (Harrod-neutral) labor productivity growth. In addition, allowing for full employment, the labor productivity growth (and employment growth via output growth) has to translate into higher real wages growth (Kaldor, 1955-6; Passinetti, 1974). However, the problem of this dynamics is that, as the recent endogenous growth literature notes (Romer, 1991), one should not only realistically allow for the way in which individual initiatives create such productivity growth possibility but also permit (in modeling) compensation to such efforts. Therefore, if, in line with the emphasis on 'investment' in post Keynesian literature, the focus should be on the investment that allows for higher labor productivity (not a decrease in n with a given capacity, as noted above), the resultant growth process should allow for higher returns to such investment. However, if so, and if the focus is on higher m, the problem of the income distribution (as postulated by the post Keynesian static framework) would again resurface.

The focus should be on manufacturing investment that targets higher volume of output to permit division of labor.

It is here that the contribution of Young (1928) is particularly important. For him, investment that permits higher labor productivity can come in many ways, but nothing much of importance (in dynamic analysis) can be gained by focusing on the higher scale economies or the rationalization plans (Young, 1928: 530-1; Young 1990: 54). The focus should be on manufacturing investment that targets higher volume of output to permit division of labor. The production process is sub divided into sub tasks – that permits specialization. For Young, division of labor also implies that firms specialize in marketing, selling activities (as specializations) that permits higher market share (and profits) – for the purpose of realization of division of labor that targets higher volume of output (market size). Moreover, this possibility of higher profits realization creates external economies that promote division of labor in a generalized way in the economy, which in turn supports further division of labor that manifest itself in the coming up of specialized firms for specialized tasks, etc., and the process can propagate itself in a cumulative way.

However, as Kaldor (1972) noted, if the higher returns to division of labor is realized by the price reduction of the product (in response to cost reduction), and if the assumption is that price reduction makes the market more elastic, it only amounts to market diversion from others (in a closed economy framework). Then, such realization of profits by one cannot be consistent with the working of the Youngian external economies (i.e., the adoption of division of labor by others that requires larger markets for them), reducing the scope of the Youngian cumulative causation process. Therefore, Kaldor (1972) suggested that division of labor has to be seen as an investment that, in a Keynesian fashion, increases demand (i.e, aggregate market size), and various firms adopting division of labor provide market for each other; it has to be assumed that as market size for each firm is increased, the firms capture

market (and realize higher returns at a given price) by undertaking more specialized trading aided by more specialized employment. This generalized adoption results in an increase in aggregate demand[2] and induces further division of labor and the process can continue in a cumulative manner. As for Young (1928), this growth process would be associated with increased incidence of specialization *between* firms i.e., sophisticated industrial differentiation. If investment in division of labor targets higher profits based on higher volume of output, the realization of profits depends on the force of the external economies that defines new investment opportunities in the generalized adoption of division of labor (and its further scope). Therein lies the importance of the Youngian external economies.

Prices

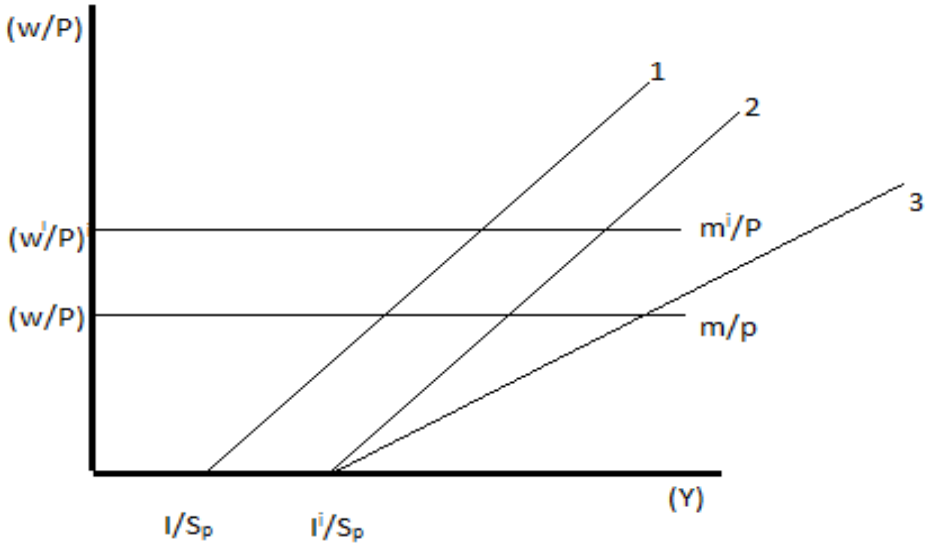
Here, the paper adds that if the above Keynesian perspective can be discussed with sticky prices [empirical studies (Basu, 1994; Huang, et al, 2004) supports that division of labor is generally associated with stick prices], it further enriches the Youngian-Kaldorian cumulative causation process. Though not discussed by Young or Kaldor, if division of labor-induced inter-linkages promote sticky prices, and it is consistent with Keynesian type demand growth in the cumulative causation process and if the process also permits intermediate cost reduction (through specialization in intermediate stages), there is the possibility of higher (money) value added per unit of real output as the latter is increased. That is, if there is the division of labor-led differential increase in price of the product and price of intermediate inputs (i.e., led by reduction in the latter in the face of constant product price), the nominal value added would be higher than the value added arrived by the double deflation method. If the increase in the latter reflects more specialization-led growth of output (with higher wages), the more than proportionate increase in the nominal value added supports higher 'trading' profits. Therefore, division of labor-led growth processes can permit increases in both m and w. Here, if it is assumed that division of labor (and its further scope) always induces specializations in an informal way (Stigler, 1951), it has to be supported by higher wages; specializations here include both specializations within manufacturing (in sub-tasks) and in many trading related tasks, such as in transport, marketing, packaging, etc. The latter permit higher market reach, which is crucial for the realization of economies relating to division of labor that targets larger volume of production.

Further, if the process leads to sophisticated industrial differentiation that also highlights the existence of specialized firms in the 'service' sector (related tasks) to coordinate the sub-tasks in manufacturing, this specialization between firms, seen as an interrelated whole, implies that

[2] The increase in investment is independent of the savings propensities and therefore the existence of prior finance (and its source) can be an issue. However, allowing for such an increase in aggregate investment, and allowing for higher consequent real output (with higher returns) at a given price, an increase in 'money' is purely non-neutral. According to Kaldor (1972), this Keynesian view is necessary to enable the Youngian cumulative causation process.

Specialization between firms, seen as an interrelated whole, implies that the outsourcing in manufacturing can take place at lower intermediate costs.

the outsourcing in manufacturing can take place at lower intermediate costs, allowing increases in nominal value added per unit of nominal output. This can sustain further increases in both m and w, supporting in turn the growth of industrial differentiation in a cumulative way.



Here, as the above diagram (2) suggests, to study such a dynamic framework, the focus is on the possibility that investment permits an increase in w/P and m/P, say at given prices and for simplicity one can assume that w/P = m/P. In this dynamic system for any given IS curve (allowing for the growth of investment), a particular way to close the system is replacing w/P = 1/mn by w/P = m/P (both w and m > 0).

Then, investment, associated with higher w and m, increases the size of the market (more than what could have been achieved through static investment multiplier), and therefore investment in division of labor results in an increase in market size in a magnified way that can support further division of labor.

However, employment also matters. If increase in investment is associated with a given employment, there is the parallel right ward shift of the IS curve (i.e., IS (2)). On the other hand, if employment increases, there is the shifted IS curve is IS (3) that permits much larger increase in market size, which in turn supports greater division of labor (and much higher further increases in w and m). It can be seen that if employment decreases, the resultant increase in market size would be lower, and further division of labor (and the evolution of income distribution permitting higher w and m may not take place).

Investment in division of labor results in an increase in market size in a magnified way that can support further division of labor.

This presents Youngian-Kaldorian-Keynesian perspective, therefore, in a way that tries to show that further growth in productivity depends on a strong positive association between labor productivity growth and employment growth in manufacturing and labor productivity should be a reflection of intermediate costs reduction that permits both higher wages and profits. Here, it should be noted that though division of labor in a particular industry, say in printing, reduces employment, it creates sub-tasks, new industries, new products (industries) that endogenously creates higher employment opportunities, seen as an interrelated whole. As Young (1928) noted: "The successors of the early printers, it has often been observed, are not only the printers of today, with their own specialized establishments, but also the producers of wood pulp, of various kinds of paper, of inks and their different ingredients, of type-metal and of type, the group of industries concerned with the technical parts of the producing of illustrations, and the manufacturers of specialized tools and machines for use in printing and in these various auxiliary industries. The list could be extended, both by enumerating other industries which are directly ancillary to the present printing trades and by going back to industries which, while supplying the industries which supply the printing trades, also supply other industries, concerned with preliminary stages in the making of final products other than printed books and newspapers." "New products are appearing, firms are assuming new tasks, and new industries are coming into being. In short, change in this external field is qualitative as well as quantitative."

It should be noted that if greater market size enhances the scope of division of labor (i.e., industrial differentiation), the resultant increase in employment opportunities further increases the market size (and further scope of division of labor), and this division of labor begets further division of labor (via employment growth) is the essence of the modified Youngian perspective developed here.

The Empirics

To initiate the empirical analysis, the present Youngian-Kaldorian-Keynesian framework, no doubt, supports the Kaldorian demand-led productivity growth thesis; however, it is not demand growth that ensures productivity growth. The empirics looks at a manufacturing investment begetting further investment opportunities where investment in division of labor supports the generalized adoption of such investment, which in turn supports investment in further division of labor and such demand growth (associated with productivity growth) has a tendency to propagate itself in a cumulative way. Here, investment that generates demand in a Keynesian fashion is important; it in a way is an exogenous (to existing traditional firms) individual initia-

tive that defines the initiation of division of labor and is viewed as an invention (Young, 1928: 335).

The initial focus therefore is on whether data supports the Kaldorian thesis of demand-led productivity growth where the regression in which manufacturing employment growth is explained by manufacturing output growth (and the coefficient of regressor is significantly less than one) suggests that output growth determines labor productivity growth. For this purpose, the paper uses a cross-regional panel data analysis that takes in to account 16 major states of India. It focuses on the industrial sector as whole, assuming that the factory sector provides the opportunities for the initiation of division of labor with more productive employment opportunities. In this analysis, taking the Factory sector of India, the employment data refers both to workers and total persons engaged and the investment data refers to the net fixed capital formation.

The paper considers the period 1991 to 2012 to study the Kaldor's specification of productivity growth and the results (linear panel regression with fixed effects), taking both workers or total persons engaged as two indicators of employment, are given in tables 1 and 2.

Table 1 Dependent Variable: Employment (workers)

Independent variables	Coefficient	Significance of t-statistics(p value)	Significance of F statistics	R^2
Value Added	.0085	0.000	771 (0.000)	.55

Table 2 Dependent Variable: Employment (taking total persons engaged)

Independent variables	Coefficient	Significance of t-statistics(p value)	Significance of F statistics	R^2
Value Added	.11	0.000	720 (0.000)	.61
Constant	359267	0.000		

The results show that the relevant coefficients are positive, significant and less than one, and the association is significant, supporting the Kaldorian thesis. Therefore, they show that the pattern of output over time explains productivity growth in the relevant period for the factory sector.

A particular criticism can be that the present interpretation of Kaldorian thesis is based on investments in division of labor, and given the crucial role of investment, the above estimates are a reduced form that can give misguided results. As Scott (1989)(also see, Harris and Liu, 1999) noted, if investment is important (allowing also for the specialized employment opportunity), there is the need of the fuller equation where output is explained both by the patterns of employment and investment. In addition, he noted that if output growth requires more of investment and less of employment, it would support the statistics underlying the two variable regression equation without supporting the Kaldorian thesis of the

existence of dynamic scale economies. Therefore, according to him, the focus has to be on the regression where both employment and investment trends explain output growth. In this regression, allowing for the significance of investment, if the coefficient of employment is significant and also significantly greater than 1 then there would be the support for the Kaldorian thesis i.e., the reciprocal of employment coefficient would support the Kaldorian thesis that the coefficient of output in the two-variable regression is significantly less than one.

If one were to allow for the independent influences of the patterns of employment (taking workers and total persons engaged, alternatively) and investment, explaining the pattern of output over time, the results (without reporting the constant term) are given in table 3 and 4.

Table 3 Dependent Variable: Gross Value Added

Independent variables	Coefficient	Significance of t-statistics(p value)	Significance of F statistics	R^2
Workers	7.55	0.000	406 (0.000)	.58
Net investment	.44	0.000		

Table 4 Dependent Variable: Gross Value Added

Independent variables	Coefficient	Significance of t-statistics(p value)	Significance of F statistics	R^2
Total Persons Engaged	5.43	0.000	0.000	.64
Net investment	.50	0.000		

The results again show that even allowing for the significant role of investment the coefficient of employment is greater than one. These suggest that the Kaldorian thesis is valid even if one allows for the significant role of investment.

The present paper, however, notes that the above results need caution because the causality issue has to be taken care of. Instead of focusing on the issue as a statistical one, the present paper notes that different causality would indicate different evolution of income distribution, with different employment implications.

Kaldor (1975) had noted that if the causality runs from exogenous demand growth to productivity growth, the association between employment and labor productivity growth would be weak, on statistical grounds (i.e., measurement errors, all, fall on employment). However, the present paper also tries to show that there is a theoretical reason. It would be readily agreed that if the focus is on the need of exogenous demand requirements, the emphasis then is on the realization of labor productivity growth via the realization of scale economies (Murphy, et al, 1998; Krugman, 1992; Solow, 1998; 2003). What is important is that if the nexus between the realized

higher labor productivity and higher wages is strong (not reported), such realization of higher scale economies is based on higher fixed costs, which has to be compensated by higher profits, and if such realization does not lead to the intermediate costs reductions, the higher profits have to be realized through reduction in wages, and the adjustment has to come via reduction in employment; in fact, one can refer to Robinsonian economies of mass reserves that particularly point out that as the plant size is increased, the need for additional employment could be negligible. In these instances, the association between employment growth and labor productivity growth would be absent.

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There is however another demand-side causation (as in the present Youngian demand side perspective). Before discussing it, the present paper does not give much importance to a causality running from pure supply side productivity growth to demand growth (that can otherwise create the simultaneity problems). If supply side productivity growth is truly exogenous (i.e., specific to perfect competition with unchanged relative prices), firms provide market for each other, without generating any further (i.e., residual) growth of demand. In addition, the present perspective, by relying on sticky prices, also (reasonably) assumes away the causation (Rowthorn, 1975a) running from increases in productivity to reduction in price to the possible growth in demand.

In this context, the present perspective tries to show that productivity growth belongs to the causality that would stress the demand side, i.e. exogenous increase in demand is an aspect of the initiation of division of labor that (seen) as new investment increases the macro demand in the Keynesian fashion, and if the division of labor creates external economies, the generalized adoption of division of labor (and further division of labor) supports the demand growth (for the realization of higher profits). By design, then the external economies-led productivity growth is enabled by the successive increases in market size. Here, successive increases in productivity that reflect the intermediate cost reduction are important, because, they, permitting increase in w and m, result in an increase in market size more than proportionate to what mere increase in investment can bring forth; the increases in market size then sustain the productivity growth. This importance of increases in market size also highlights another inducement mechanism: the induced further division of labour can in turn induce higher (and more productive) employment opportunities that permits further (diagram 2) magnified increase in market size (and further induced division of labor). This shows that there is the induced employment growth that would be associated with higher labor productivity growth. (However, in the ultimate analysis, the employment growth - in a cumulative manner - depends on the force of the external economies, which has semi-

autonomous character i.e., even if market size is increased, there can be resistance to new changes). The employment growth can be maintained because the association between higher wages and profits, now, can be based on intermediate costs reduction. (Investment in division of labor that shapes the income distribution shifts the demand curve of labor, permitting higher employment to be associated with higher money and real wages).

For the purpose of empirical analysis, the above discussion suggests that a study of possibility of a strong association between labor productivity growth and employment growth is an important issue. Its presence would clarify that the demand-led productivity growth is based on the realization of the sophisticated industrial differentiation that permits the intermediate costs reduction; its absence would signify the realization of scale economies; the different cases would signify different evolution of income distribution.

The demand-led productivity growth is based on the realization of the sophisticated industrial differentiation that permits the intermediate costs reduction.

Table 5 Dependent Variable: Labor Productivity (Workers)

Independent variables	Coefficient	Significance of t-statistics(p value)	Significance of F statistics	R^2
Employment	.0004	0.000	33 (0.000)	.003
Constant	269	0.000		

Table 6 Dependent Variable: Labor Productivity (Total Persons)

Independent variables	Coefficient	Significance of t-statistics(p value)	Significance of F statistics	R^2
Employment	.0002	0.000	22 (0.000)	.0005
Constant	224	0.000		

In tables 5 and 6, the very low coefficient of employment and negligible R^2 statistics suggest negligible association between employment growth and labor productivity growth. This non-association, given that there is the evidence of demand led productivity growth in India (table 1), would suggest that productivity growth is a reflection of the realization of higher scale economies; in fact, the data (post-1991), in India, also suggest that there is a slowing down of domestic investment specializing in intermediate costs reduction (Padhi, 2014; 2015).

Conclusion

A theoretical point is that Kaldor (1975: 893) should not have dismissed the association between employment growth and productivity growth as irrelevant, in

a study of demand-led increasing returns. He could have further elaborated his thesis on Verdoorn's law by explicitly taking into account his (Kaldor, 1972) Keynesian elaboration of Young's cumulative causation process. Then, he could have had the opportunity to advocate two different demand side explanations of the law that permits two different types of increasing returns with different employment implications. One is the realization of economies of scale that does not permit a strong relationship between employment growth and productivity growth. The other type is the division of labor-led increasing returns, as an aspect of economic progress (the present perspective) that shows that robust induced employment growth (with higher wage) is essential for maintaining division of labor-led productivity growth in a cumulative manner. Here, though Kaldor (1975) mentions of sticky prices in the face of productivity growth, he should have also taken note of the intermediate cost reduction that shapes the evolution of distribution of income that in turn shapes employment-productivity relationship.

Robust induced employment growth (with higher wage) is essential for maintaining division of labor-led productivity growth in a cumulative manner.

On the empirical side, taking Indian data, the relationship between demand growth and productivity growth that is associated with lack of robust employment growth suggests the exogenous increase in demand growth that supports higher realization of scale economies. It should be stressed again that such realization does not permit the realization of intermediate cost reduction that could have permitted increases in both profits and wages (with higher employment growth). What is important is that such an increase in productivity is susceptible to changes in demand conditions. Commenting on the need of such exogenous demand, Solow (1998; Krugman, 1991; Mookherjee and Ray, 2001) notes that they do not compare to the models that can predict such existence of exogenous demand for the realization of scale economies; the outcome depends on such factors like history, expectations, accidents, psychological factors, etc. In any case, even if there is the possibility of dynamic evolution of scale economies (i.e. the realized scale economies in one sector supporting such realization in others and the possibility of still further scale economies via learning by doing), there is a limit to such expansion (Scherer & Ross, 1990: 190). Therefore, the growth possibility, based on scale economies (even if realized through exogenous demand), is of limited relevance.

What is important is that both the conceptualizations of the 'increasing returns' have Keynesian flavors, suggesting that the lack of demand can lead to the non-realization of the growth processes. Here, in the case of increasing returns, based on scale economies, the possibility of demand short fall, resulting in Keynesian type of problems (Solow, 1998; 2003), is more acute. Further, if one allows for higher profits realization (to

higher investment in fixed costs), a decrease in demand growth requires that the prices to increase (permitting higher profits with lower real wages), which in turn can permit lower output realization as a symptom of deceleration. However, even if one corrects such demand deficiency by a big-push (Krugman, 1992), the present paper tries to show that continuous growth possibility, based on such scale economies, is slight.

Similarly, the division of labor-led increasing returns could also face periodic Keynesian type of demand problems; the continual coming up of new tasks, new processes, new industries can create uncertainty that can induce periodic over savings situation. However, if the demand management policies reduce such uncertainty (i.e., the resultant growth ensures market for both 'traditional' and new industries), a cumulative growth process is more assured.

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