SPREADING THE BENEFITS OF PRODUCTIVITY INCREASES: PRICE INCREASES, DECREASES, OR BOTH? A CRITIQUE OF BAUMOL ON SUBSIDIES TO THE ARTS

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Abstract: This paper attempts to grapple with the market mechanism through which growth in one sector of the economy spreads to other sectors. It calls into question Baumol's argument for subsidies to the arts and by extension, to other economic areas that have not enjoyed productivity increases.

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I. Introduction

Baumol's cost disease[3] is the name given to the phenomena that many services[4], tend to lag behind material goods in terms of labor productivity increases. For example, consider the efforts of those who play in string quartets or symphony orchestras. It takes just as long to play a Mozart concerto, now, as it did almost three (3) centuries ago[5]. Assuming equal talents on the part of modern and ancient musicians, there has been no technological progress in such endeavors. A similar situation presumably applies to shoe shines, haircuts, massage, music lessons, prostitution and other such "pure" services.

Therefore, the "costs" of producing them and their prices tend to rise faster than those of material goods, making them more expensive and thus we enjoy relatively fewer of them than would otherwise have been the case.

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[3] Baumol and Bowen, 1965, 1966; Baumol, Baumol and Rubinstein, 1990; see also Cowen, 1998, and Ekelund, and Ritenour, 1999. As for commentaries on the Baumol disease; on 10/11/04, Google listed 3,810 published discussions of this concept (http://www.google.com/search?hl=en&q=baumol+disease&btnG=Google+Search; see also http://www.google.com/search?hl=en&q=%22The+Economics+of+the+Performing+Arts%22&btnG=Google+Search). Here are a few typical cites: http://www.ama-assn.org/amednews/2001/02/12/bica0212.htm; http://www.cpb.nl/nl/cpbreport/2002_3/s2_1.html; http://www.brook.edu/views/articles/bosworth/200309.htm; http://ideas.repec.org/p/wpa/wuwpdc/0309007.html; http://www.newyorker.com/talk/content/?030707ta_talk_surowiecki; http://www.boekman.nl/summecon.html

[4] This applies especially to governmental services.

[5] While it cannot be denied that the complements of these services, such as air conditioning, and transportation to and from the concert hall, have vastly improved, there are even *losses* in technology in this area. For example, the shellac (or is it the glue, or the varnish, or the wood, or the workmanship?) used to manufacture the Stradivarius stringed instruments has been lost, and modern violins, cellos, etc., are in many ways *inferior* to their predecessors.

Baumol used this phenomenon to argue for government funding of the arts! This is highly problematic. It is a case of confusing absolutes with relatives combined with elitism[6]. [1]That is, with labor productivity increases, the goods produced in the sectors that experience less than average labor productivity increases become relatively more expensive in terms of the of the goods produced in the sectors that experienced greater than average labor productivity increases. However, because of the labor productivity increases, society is now objectively wealthier, in that it can produce the same set of goods and have more leisure or with the same amount of leisure produce more of either or both goods. Then, if with labor productivity increases, the quantity of art produced goes down, it is because the substitution effect (working to decrease the quantity of art) outweighed the income/wealth effect (working to increase the quantity of art, presuming art to be a normal good). Or, if art is an inferior good, then the substitution and income/wealth effects work in the same direction (both to reduce the quantity of art)[7].

The present paper attempts to grapple with the market mechanism through which growth in one sector of the economy spreads to other sectors. It calls into question Baumol's argument for subsidies to the arts (and by extension, to other economic areas that have not enjoyed productivity increases. Section II offers an economic analysis of the uneven spread of technological progress across industries. In section III we analyze an example of this phenomenon, and conclude in section IV.

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[6] Baumol and his confreres know we should want to purchase more of the performing – and other − arts than we actually support. Lacking logical consistency, they, rightfully, refrain from advocating state subsidies to prostitution and other such services.

[7] This is not a case of the Giffen good. There, when the price goes up (because of a decline in labor productivity) with nominal income unchanged, real income is *reduced.* See on this Barnett and Block, unpublished.

II. Economic Analysis

Increases in labor productivity do not occur simultaneously and are not of the same magnitude across industries, much less individual firms[8]. This raises the issue of how the benefits thereof are spread across the entire economy. And spread they must,[9] else the real gains in profits, wages, and remuneration to other resources consequent on the increased productivity would accrue strictly to the entrepreneurs and suppliers of resources in those specific industries. In such a case entrepreneurs and resource owners would shift resources from other uses and industries to those, thus obviating this possibility. That is, if the benefits of labor productivity improvements are not to be limited to increases in production of those self same industries, but are to result in greater production of other goods as well, then these other industries must also experience increases in real profits, wages, and/or other factor compensation. Those must be at the expense of the resources in the enhanced productivity industries, in the sense that the latter's increased real profits, etc., will not be as great as if these industries received all of the benefits of the boosts in labor productivity. The original entrepreneurs and other factor owners in the initially enhanced productivity sector will not receive all the benefits in any case, for if that occurred, entrepreneurs and other resource owners would shift resources to those industries, competing away at least some of these added benefits.

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[8] We abstract from the causes of the increased labor productivity. Our analysis is invariant with regard to whether this stems from innovation, gains in mobility, education, trade, etc.

[9] Save in the case that people wish to take all of the benefits of the productivity increases in the form of (appropriately) increased quantities of the goods the production of which have been the beneficiaries of the increased productivity. For example, when the car supplanted the horse and buggy industry, logic alone did not rule out that all of the gains would have been taken in the form of improved automobile transportation.

The issue, then, is how are the benefits to be shared more widely.[10] Consider the following example, that, though simple illustrates the ways in which this can be done. Assume a two (2) industry economy, X and Y, in which average labor productivity in X doubles while that in Y does not change.

1) Then, if wage rates in X are increased proportionally to the rise in average labor productivity, profits[11] and factor prices can also be boosted proportionally, in which case factor *shares* of total revenue are unaffected[12]. and all of this without an alteration in the price of X. However, for profits, etc. in Y to maintain their relative positions given the absence of labor productivity gains therein, the price of B will have to climb in the same proportion as labor productivity in X. Therefore, the appropriately weighted average price of X and B will increase, the amount depending on the relative sizes of X and Y, and the size of the productivity rise in X.

2) However, if wage rates, profits, and other factor prices in X are not increased, then the price of A will decrease in inverse proportion[13] to the increase in labor productivity in X[14]. Then, in spite of there being no rise in

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[10] For an interventionist perspective on this, see: Hansen (1964, 679-680).

[11] But not profit margins. The reason for this is that if the profit *margin* rises with labor productivity, that means the *share* of profits in total revenue will increases, whereas if profits rise in pari passu with labor productivity, the share of profits in total revenue will not change. On this, see appendix 1.

[12] Why proportionately? To say so smacks of neutral money, surely a fallacy (see on this tba). The reason is to illustrate the point that productivity gains to labor can be spread not just to labor but to all factors and profits *without* price rises if each factor's payment increases by the amount of gain in labor productivity.

[13] That is, e.g., if productivity increases by X, the price would decrease by 1 - 1/(1+X). Then for a 10% increase, X = 0.1 and the price would have to decrease by $1 - (1/1.1) = .0.1/1.1 = 0.09^+$

[14] Does this imply that labor is the *only* factor of production in X? The argument in favor of this position is that otherwise, the price of X would decrease, all right, but *less* than in proportion to the increase in labor productivity in X. But the answer to this question is No, it implies that no increase in any other resource is required to increase output.

labor productivity in Y, wages and profits, etc. in Y can maintain their relative positions without any increase in the price of Y.

That is, if nominal factor incomes in the sector with enhanced productivity rise in response thereto, the only way the benefits of such productivity improvements can be spread to other sectors is by price increases in the latter. However, if nominal factor incomes in the sector with increased productivity do not increase, but instead, output prices are decreased, then the factors employed in other sectors can share in the benefits of the rise in productivity without the need to increase output prices. It should be noted that in the former case, productivity increases[15] can and will result in unemployment. The only exception, and this would be coincidental, would be if hoarding; i.e., people's average holding period for money, decreased, or, alternatively, unless the stock of money increased. Such an increase in the case of a commodity money would also be a fortuitous coincidence. However, with fiat money, the government/central bank might get lucky, as they are always increasing the money stock for their own purposes, in any case. This is because in order to receive the benefits of improved productivity, save in the case where all of it is taken in the form of more leisure with no increase in output, a most unlikely occurrence, output must rise. If prices do not fall in proportion to the increases in output, total expenditures must grow. Unless additions are made to the stock of money in proportion to the increase in total expenditures, or hoarding decreases, there will be a disruption in the economy involving "involuntary unemployment," until prices, including that of labor, adjust to the new amounts of output. However, if prices in the sector experiencing productivity gains decrease in proportion thereto, total

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[15] Such events are devoutly to be desired as the only way to increase general standards of living.

expenditures would not expand. Therefore, the extant stock of money (without either being supplemented or a decrease in hoarding) would be sufficient to mediate the desired exchanges without the economy having to go through a period of adjustment in which virtually all prices and wages would have to be adjusted – a lengthy and disruptive process, as each entrepreneur searched for his optimal set of prices and wages[16].

In sum, it is better to spread productivity increases via output price decreases than by output and factor price increases, which is the likely outcome if government does not interfere.[17] A business *in a free market* is much more likely to prefer to decrease prices of output and try to increase volume and market share than to increase wages and hold prices constant, foregoing the opportunity to use the increased productivity as a means to increase quantity and market share. Of course, in a free market, some entrepreneurs experiencing productivity increases might choose to raise wage rates while holding prices constant or, perhaps, to raise wage rates to some degree and

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[16] Barnett and Block (2004) claim that the optimal quantity of money is the extant stock *if* it is fiat money, but is the market generated quantity if it is a commodity money. In this case, with a commodity money, if wages rise in the increased productivity sector, and wages and prices in the other sector, the market will respond partly by increasing the stock of money form non-monetary uses of gold, partly by mining and coining new gold, and partly by reducing hoarding; but this will not occur instantaneously and there would be unnecessary unemployment during the adjustment period. However, if instead, prices were decreased in the enhanced productivity sector, there would be no need to enhance the stock of money and/or decrease hoarding, so the spreading of the benefits of the productivity increases would be quicker and less disruptive of the economy, as there would be no need to adjust any wage rates and the only prices that would need to be adjusted (downward) would be those for products the production of which had become more efficient. The same analysis applies to a fiat money system.

[17] More generally, if there are differences in productivity gains in an economy, the only way the those gains can be shared more or less equally among those earning incomes (of various types) in different sectors is by changes in relative output prices. It is far less disruptive if these relative price changes result from price decreases than from increases. If price increases are involved, so also will be wage increases. However, wage increases should be the means by which changes in relative output are brought about, and not a means to distribute widely productivity increases.

lower prices to some extent. However, they would find either more difficult than simply lowering prices with no change in wage rates, *unless and until* the effective stock of money was increased either by reduced hoarding or by increases in the actual stock itself, either from mining and coining or from the reallocation of gold from other non-monetary uses. Entrepreneurs could be expected to learn this rather rapidly, and thus price reductions, only, would come to be the method of choice for them as they attempted to capitalize on their increased productivity.[18]

III. Empirical illustrations

There are some interesting illustrations of this phenomenon. Although one must always be cautious in making claims of this sort, it seems relatively safe to say that there has been little or no technological or other such progress in the last full century in the following fields: barbering, baby sitting, shoe shining, teaching, lawyering[19], and in several individual crafts such as hand made basket weaving, knitting, crocheting and pottery making. Little or nothing has changed in the way these callings are conducted. Great grandmother probably knitted, for example, in much the same way as does great granddaughter, now. Prostitution, table-waiting, massages, and bartending, probably, are other good examples.

The earnings in of all these cases, however, have risen remarkably since 1904. This is certainly true in terms of money wages; but even real wages

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[18] If one asks why is this not the usual course of action in modern times, the answer is the inflationary monetary policy of governments combined with less than free labor markets, especially in those industries that typically both experience the largest increases in productivity and are unionized under coercive labor laws.

[19] Objections to teaching and lawyering might possibly be sustained on the ground that computers have promoted progress in these two fields. The argument is strongest in the former case for grades kindergarten through six.

are astronomical compared to their levels at the turn of the previous century[20].

Suppose this had not occurred, however. Posit, that is, that wages in terms of real earning power had remained constant in all of these fields that have not (much if at all) experienced productivity gains.[21] Would any worker have stayed in these positions under such unlikely assumptions? Not likely. Instead, there would have been a crawl up and to the left along the downward sloping demand for labor curve, based as it is on a falling marginal productivity function as the supply of labor in those fields decreased. The decline in employment in such arenas would have had one of two results: either the increased marginal productivity would have been sufficient to raise the MRP of labor and other factors to the point where incomes were sufficiently high compared to those in the enhanced productivity sectors, or, eventually, those endeavors could not have commanded any resources and those industries would vanish.

Wages, after all, do not depend solely upon the marginal revenue product in the area in which the worker is employed. The salary of the shoeshine boy is partly dependent upon the productivity in that particular job and partly a function of what he can produce in his *next best* alternative foregone. In 1904, the opportunity cost of the shoe shiner, we may suppose, was as a broom pusher. As neither of these occupations was particularly fruitful in great grandfather's time, wages in both were nothing to write

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[20] See Scholliers (1989). For historical statistics on wages, see
http://fisher.lib.virginia.edu/collections/stats/histcensus/.
http://fisher.lib.virginia.edu/collections/stats/histcensus/. On teachers' wages, see
http://www.uni.edu/museum/school_wages.html

[21] This, itself, would have required an increase in nominal wages because of governmentally generated price inflation.

home about. In 2004, the next best alternative foregone by the shoe shiner, we may suppose, is *still* as a broom pusher. But now, thanks to the modern wonders of automatic floor washing and cleaning machinery, the productivity and wages in the latter profession have radically catapulted. But the compensation for the modern shiner of shoes are still linked to that of the floor cleaner. Thus the former "free rides" on the good fortune of the latter. Or, to put this in another way, the technological progress in floor cleaning acts as a sort of "coat tails" for the man who shines our shoes. Of course, productivity increases in other, non-competing sectors also play a role in that as productivity of "suits" increases as do their real wages and thus they can afford to pay more for a shine; i.e., even though the shoe shiners' marginal physical product may have increased little, if any, over the past century, his marginal revenue product has increased as his customers have been willing to pay a higher *real* price for his services. It is this combination of a decreased supply of shoe shine labor because of enhance productivity and thus wages in substitute employment opportunities and an increased demand for such services that has caused real wages in that line of employment to increase sufficiently so that one can still get a shine.

Although for the ease of explication, especially re examples, we have stated our position in terms of a two industry model, with an increase in productivity in one industry and with none in the other, the argument more properly put, though it affects neither the analysis nor conclusions, is in terms of firms *and* in terms of differential productivity gains, not all or nothing. Consider the following examples in tables 1 (scenarios 1-5) and 2 (scenarios 1, 6-8).

Scenario 1 shows two (2) industries, X and Y, identical save for the nature of their outputs. Situation 2 shows the same industries if X experiences a

doubling of labor productivity (while there is no change in Y) with the benefits thereof passed on through a doubling of the wage rate and profits in X, with no increase in the price in X. This creates a shift in the relative incomes between those who earn their incomes in X and Y. Then in situation 3, in order to maintain their relative positions, the price of the output of, and the wage rate in, Y is doubled, with attendant doubling of profits. The only differences between X and Y, at this point, is that the quantity of the former has doubled to 200 units while its price is still $10.00, whereas the quantity of the latter has remained the same at 100 units, whilst its price has now doubled to $20. If consumers prefer to take the entire gain from the productivity increase in additional X, the weighted-average price increases to $13.33. In this case, the benefits of the productivity increase are spread pro rata to profit and wage incomes and between industries.

In situation 4 consumers prefer to split evenly the benefit of the productivity gain by increasing each output by the same proportion. And, in situation 5 consumers prefer to receive the benefit of the productivity gain solely in the form of more Y.

We start, again, from situation 1. Productivity again doubles in industry X (with no change in Y). This time the benefits are passed on in the form of a lower price for the output of X. Then, if consumers prefer to take the entire gain from the productivity increase in additional X, situation 6 arises, and the weighted-average price decreases to $6.67. Again, the benefits of the productivity increase are spread pro rata to profit and wage incomes and between industries.

In comparing the two (2) cases we note that in the first, output increases, the weighted average price increases, and total expenditures increase, whereas

as in the second case, there is an identical increase in output, but the weighted average price decreases and total expenditures do not change at all.[22]

Situation 7 shows the situation if consumers prefer to split evenly the benefit of the productivity gain by increasing each output by the same proportion. And, situation 8 shows the situation if consumers prefer to receive the benefit of the productivity gain solely in the form of more Y.

IV. Conclusion

We have seen no justification for the Baumol "market failure" argument. This founders on two shoals. First, it is a matter of paternalism to assume that the populace should be forced to pay for more classical music and other "elite" art than it wants. The same argument may be made for rap "music" and prostitution, yet we never find any adherents of this position carrying through on such reductio ad absurda. Second, this entire issue is moot in that the productivity gains in the X industry spread throughout the entire economy into the Y industry. Thus, there is no case for any special treatment of firms in the latter, or service, sector.

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[22] Were there other resources, e.g., raw materials, energy, and machine time, that had to be doubled (or increased in some proportion less than double) in order to double the amount of output using the same amount of labor, the results would be qualitatively, though not quantitatively the same; i.e., in the first case output price would have to more than double and in the second case output price would fall, but by less than 50%.

Table 1.

	industry	output	price	revenue	man-hours	wage rate	total wages	Profits	weighted-average price
1	X	100.00	$10.00	$1,000.00	80.00	$10.00	$800.00	$200.00	$10.00
	Y	100.00	$10.00	$1,000.00	80.00	$10.00	$800.00	$200.00	
2	X	200.00	$10.00	$2,000.00	80.00	$20.00	$1,600.00	$400.00	$10.00
	Y	100.00	$10.00	$1,000.00	80.00	$10.00	$800.00	$200.00	
3	X	200.00	$10.00	$2,000.00	80.00	$20.00	$1,600.00	$400.00	$13.33
	Y	100.00	$20.00	$2,000.00	80.00	$20.00	$1,600.00	$400.00	
4	X	133.33	$10.00	$1,333.33	53.33	$20.00	$1066.67	266.67	$15.00
	Y	133.33	$20.00	$2,666.67	106.67	$20.00	$2133.33	533.33	
5	X	100.00	$10.00	$1,000.00	40.00	$20.00	$800.00	$200.00	$16.00
	Y	150.00	$20.00	$3,000.00	120.00	$20.00	$2,400.00	$600.00	

Table 2

	industry	output	price	revenue	man-hours	wage rate	total wages	Profits	weighted-average price
1	X	100.00	$10.00	$1,000.00	80.00	$10.00	$800.00	$200.00	$10.00
	Y	100.00	$10.00	$1,000.00	80.00	$10.00	$800.00	$200.00	
6	X	200.00	$5.00	$1,000.00	80.00	$10.00	$800.00	$200.00	$6.67
	Y	100.00	$10.00	$1,000.00	80.00	$10.00	$800.00	$200.00	
7	X	133.33	$5.00	$666.33	53.33	$10.00	$533.33	$133.33	$7.50
	Y	133.33	$10.00	$1,333.33	106.67	$10.00	$1,066.33	$266.33	
8	X	100.00	$5.00	$500.00	40.00	$10.00	$400.00	$100.00	$8.00
	Y	150.00	$10.00	$1,500.00	120.00	$10.00	$1,200.00	$300.00	

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