Journal of Cultural Economics **18:** 301–312, 1994.

Evidence of the Existence of the Cost Disease in the Performing Arts

MARIANNE VICTORIUS FELTON*
Indiana University Southeast, New Albany, IN, U.S.A.

Abstract. This paper examines the experience of 25 large U.S. orchestras over a 21-year period for the presence or absence of the cost disease. Appropriate measures of input and output are discussed. Measures of productivity, compensation per worker, and unit labor costs are calculated and compared to similar measures for the manufacturing sector. The history of ticket prices and attendance is reviewed, and price and income elasticities of demand are estimated. The relationship between all these variables is explored, and some policy recommendations are offered.

Key words: Cost disease, productivity, elasticity of demand, inflation, artistic deficit

In his seminal 1967 article, Professor William J. Baumol unveiled the theory of the "cost disease."[1] The now familiar argument is "that the unit cost of a product of a persistently more stagnant activity must rise without limit in comparison with that of a more progressive activity."[2] This assumes that the stagnant sector pays the same wage rate and the same prices for other inputs as the progressive sector. Agriculture and manufacturing are identified as belonging to the progressive sector, while education, governmental activities, finance and real estate, and the performing arts are thought to fall within the stagnant sector as measured by the growth of output per unit of input, or productivity.

It was originally feared that, with input prices in the two sectors moving in tandem and output prices constant, the ever-rising unit costs in the performing arts would result in an ever-increasing gap between expenses and earned income that would have to be filled by a higher and higher increase in contributed income each year, primarily from the private sector. The 1974 Ford Foundation report on *The Finances of the Performing Arts*[3] projected that, with given demand conditions, earned income would grow by 4.2 percent a year while expenses would increase by 7.1 percent through 1980, requiring private support income to grow by 11.8 percent annually in order for the financial condition of the performing arts just to remain unchanged.

The cost disease has since been amended to read that "the stagnant services have an inherent tendency to rise in **price** at a (compounded) rate faster than the economy's overall inflation rate."[4] At first blush this sounds like good news

* The author is grateful to Professor William Baumol and two anonymous referees for their helpful comments. She also wishes to thank Heather Dinwiddie and Dan Patterson of the American Symphony Orchestra League for making the orchestra data available. Support for this project was provided by a grant-in-aid of research from Indiana University Southeast.

TABLE I. Real expenses and revenues for a constant sample of 25 large U.S. orchestras, FY 71/72 and FY 91/92

	Percent change	Percent of total revenue	
		FY 72	FY 92
Total expenses	+120.5%		
Total revenues	+121.3		
Earned income	+126.6	64.0%	65.5%
Contributed income	+112.0	36.0	34.5
Private support	+158.9	24.8	29.0
Government support	+7.8	11.2	5.4
Deficit	+104.5	5.4	5.0

since rising prices would allow earned income to increase – until one remembers the downward slope of the demand curve. Will ever-rising relative prices mean fewer and fewer attendances and, therefore, still result in an ever-growing earnings gap?

This paper examines the evidence based on the experience of a constant sample of 25 large U.S. orchestras from fiscal year (FY) 1971/72 to FY 1991/92. The revenues of these 25 orchestras, at one time referred to as Major Orchestras, comprise about 7/8 of the revenues of all large orchestras reporting to the American Symphony Orchestra League, so the sample fairly represents the experiences of these large orchestras.

Table I shows that, over the 21-year period, real (inflation-adjusted)[5] total expenses grew by 120.5 percent while real total revenues rose by 121.3 percent. Of the total revenues, earned income grew somewhat more (126.6%) than contributed income (112%). Of the contributed income, private support grew by 158.9 percent, government support by a measly 7.8 percent. The combined deficit, defined as total expenses minus total revenues, of the 25 orchestras rose only 104.5 percent.

As a percent of total revenue, the portion derived from earned income increased from 64.0 percent to 65.5 percent, with a corresponding drop in the share of contributed income. Private support rose from 24.8 percent to 29 percent, while government's share fell from 11.2 to 5.4 percent. The deficit accounted for a slightly smaller percent of total revenue in FY 92 than in FY 72.

In short, the division between earned and contributed income remained virtually unchanged over the 21-year period. The increase in the proportion of private contributions mainly substituted for the decline in government support. Similar results were obtained for opera and ballet companies. Modern dance companies were the only performing genre studied so far to suffer a sharp decline in the share of earned income.[6]

1. Measuring Input and Output

To see how productivity growth for the 25 orchestras compares with that in the manufacturing sector, an index of orchestra productivity was calculated. Since productivity is output per unit of input, measures of both had to be selected.

The information for input was readily available. Our data set contains figures for both the number of players engaged by these orchestras and the number of paid weeks covered by the contract. Multiplying the number of players by the number of paid weeks gives the number of player-weeks, our measure of input.

Measuring output is somewhat stickier. From an artistic point of view, the output of an orchestra is a particular performance of a particular work. Clearly, this is not a feasible measure for our purposes. First, the information does not exist. Second, even if it did, a ten-minute Rossini overture is not the equivalent of an hour-long Bruckner symphony. What orchestras do, however, is rent out seats to these performances. From an economic point of view, an ideal measure of output would be the total number of tickets for sale per season. Regrettably, this information is also not available. It is possible to calculate the number seats for regular in-home subscription concerts, but these only comprise about 40 percent of all performances. We do not know the seating capacity of other venues where the orchestras may play.

In the past, the number of attendances has been suggested as a measure of output, based on the argument that what orchestras produce is cultural experiences.[7] Attendance is really a measure of demand rather than output. Besides, for the purpose of calculating productivity, using attendances would lead to circular reasoning. If lagging productivity leads to higher relative prices which, in turn, reduce attendance, productivity is guaranteed to fall with given inputs. A similar argument can be made for not using expenses. In the National Income and Product Accounts, expenses of nonprofits are taken as the measure of their contribution to Gross Domestic Product. But if relatively higher costs lead to higher expenses, using expense as a measure of output will cause productivity to rise compared with the progressive sector, again with given inputs.

The measure of output finally chosen was the total number of performances by full orchestra. This is not an unreasonable choice for orchestras since most performances are of similar length and require, on average, similar forces.

2. Productivity

The results of the calculation of productivity are shown in Figure 1 which plots the index of output per hour worked in manufacturing (1982 = 100) and the index of the number of performances per player-week. The data on which the orchestra index is based are shown in Table II. The years FY 72 to FY 78 are not strictly comparable to later years due to an apparent change in the way the number of performances was calculated. From FY 79 on, this number only includes performances by full orchestra. The 21-year history of orchestra productivity can be divided into three segments: 1) a period of decline between FY 72 and FY 78; 2) a period of stagnation from FY 79 to FY 86; and 3) a period of recovery since FY 86. What lies behind these figures?

TABLE II. Aggregated data for 25 large orchestras

Fiscal year	Number of performances	Number of players	Number of paid weeks	Real orchestra salaries[1,2]	Total season attendance[1]	Real average ticket price all concerts[3]	Total in-home subscription attendance	Real subscription price[4]
1972	4233	2289	1097	$79053.5	10414.1	$6.52	2787.4	$10.35
1973	4248	2266	1117	82972.9	10561.1	6.44	2912.6	11.08
1974	4225	2284	1145	86647.7	10902.5	6.30	2939.4	10.69
1975	4434	2310	1143	87756.4	11193.4	6.73	3133.2	10.98
1976	4448	2308	1165	88465.0	12110.2	6.33	3286.0	10.83
1977	4137	2297	1194	90926.2	11481.9	7.01	3293.5	10.75
1978	4142	2303	1206	93913.6	11503.2	7.56	3400.2	11.29
1979	3275	2314	1219	94546.8	11292.4	7.88	3369.8	11.59
1980	3190	2324	1223	98107.7	11646.6	8.08	3339.6	12.24
1981	3175	2329	1231	99572.3	10635.0	9.14	3438.5	12.30
1982	3388	2346	1237	99668.7	10369.2	9.68	3465.6	11.90
1983	3200	2354	1230	101882.3	9837.2	10.48	3553.5	13.36
1984	3165	2360	1235	107690.1	10435.2	10.48	3533.0	12.76
1985	3199	2356	1224	113552.5	11331.2	10.58	3554.6	14.32
1986	3301	2349	1253	118281.4	12521.6	10.14	3657.1	14.82
1987	3792	2346	1243	122812.6	11214.4	12.01	3634.2	16.46
1988	4207	2325	1230	124560.5	11487.3	12.09	3632.7	18.37
1989	3992	2346	1230	127503.5	10163.4	13.65	3653.0	18.66
1990	4402	2352	1250	129757.7	9990.3	14.62	3835.6	19.60
1991	4087	2359	1253	129972.4	9628.8	15.29	3698.5	20.06
1992	4165	2368	1251	129410.2	9402.1	15.87	3689.5	20.27

[1] In thousands.
[2] Includes salary of regular conductor.
[3] Calculated by dividing Real Concert Income by Total Season Attendance.
[4] Calculated by dividing Real Subscription Ticket Income by Total In-Home Subscriber Attendance.

TABLE III. Percent change in orchestra output and inputs

	FY 72-FY 78	FY 79-FY 86	FY 86-FY 92
Number of performances	−2.1%	+0.8%	+26.2%
Number of players	+0.6	+1.5	+0.8
Number of paid weeks	+9.9	+2.8	−0.2

Table III shows the percent changes in the total number of performances (output) and the number of players and paid weeks (inputs). Between FY 72 and FY 78, the number of performances fell while the number of paid weeks increased sharply, resulting in a large decline in productivity. FY 79 to FY 86 saw only moderate changes in each of the variables, leading to a slight decline. From FY 86 to FY

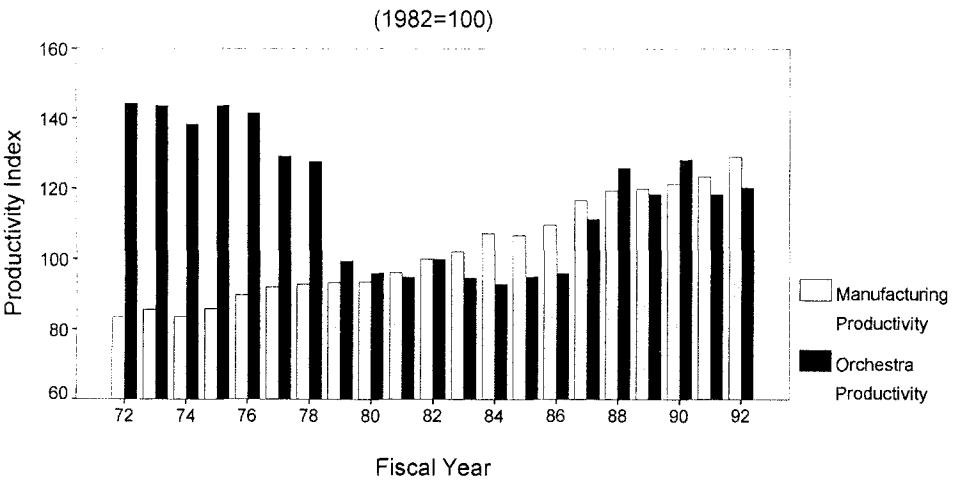

Fig. 1. Index of productivity for manufacturing and 25 large U.S. orchestras.

92, the number of performances increased by more than one-fourth, leading to the observed increase in productivity.

3. Compensation per Worker

Figure 2 shows the indexes of real compensation per worker in manufacturing and for the orchestras. The latter was computed by dividing real orchestra salaries by the number of player-weeks, then calculating an index number. While real compensation per worker in manufacturing only increased by ten percent over the whole period, salaries per player-week rose by almost four times that, 38.7 percent. The increase was fairly uniform in the two sectors during the first ten years. The divergence took place between FY 82 and FY 92, particularly from FY 82 to FY 88. This development clearly violates the assumption that wages are the same in the two sectors. Since one would normally expect wages to lag in the stagnant sector, their relatively more rapid increase should serve to exacerbate the cost disease.

4. Unit Labor Cost

Unit labor costs are plotted in Figure 3. For orchestras, they are computed by dividing real orchestra salaries by the number of performances, then calculating an index number. An equivalent algorithm would be to divide the index of real compensation per worker by the productivity index, times 100. The increase in manufacturing productivity, combined with nearly stagnant real compensation per worker, resulted in a decline in real unit labor cost by 28.8 percent. For orchestras, unit labor costs rose by 21.3 percent from FY 72 to FY 78, primarily due to the drop in productivity – a clear indication of the presence of the cost disease. From

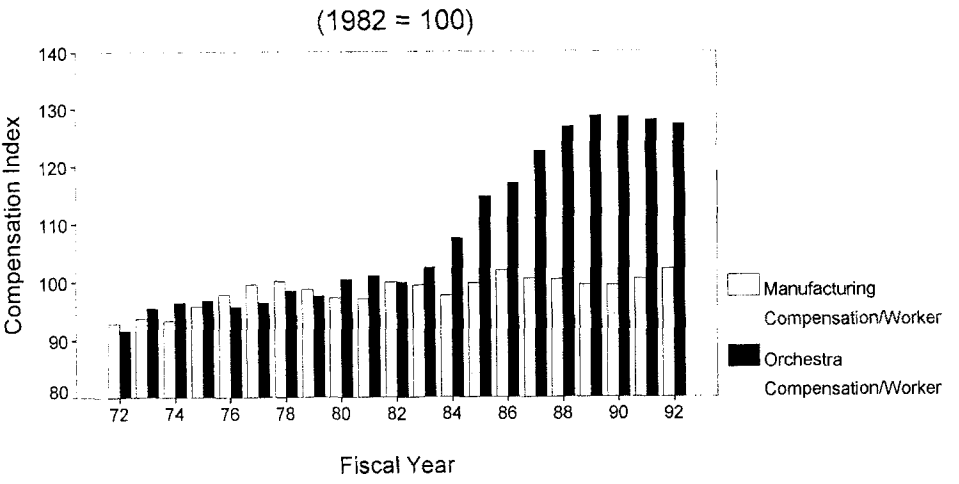

Fig. 2. Index of real compensation per worker.

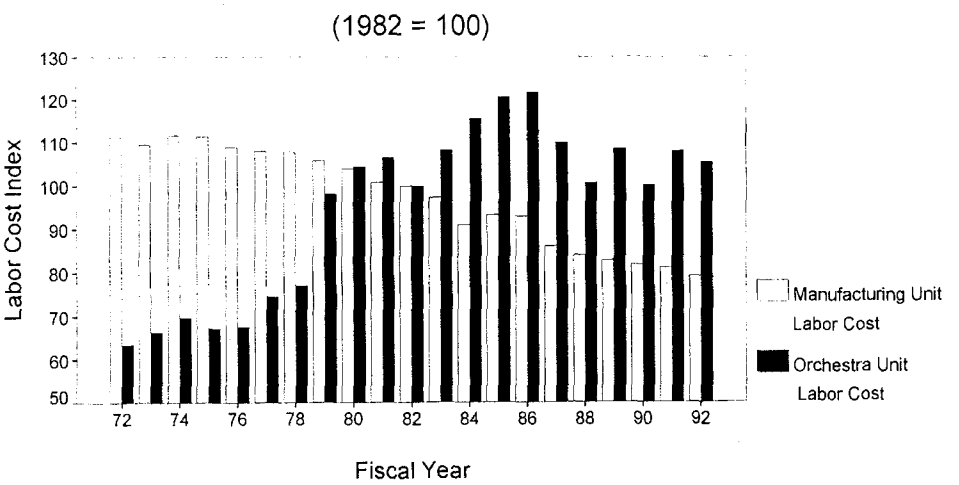

Fig. 3. Index of real unit labor cost.

FY 79 to FY 86, unit labor costs rose by an additional 16.6 percent, this time mostly due to the large increase in real compensation. The table below shows what unit labor costs would have been, had orchestra compensation mirrored that of the manufacturing sector according to the assumption of equal wages, compared to what actually happened.

Since FY 86, unit labor costs have declined as compensation growth moderated and productivity increased.

TABLE IV. Hypothetical versus actual unit labor cost

	Manufacturing compensation Orchestra productivity	Orchestra compensation Orchestra productivity
FY 79	99.3	98.1
FY 80	101.2	104.5
FY 81	102.3	106.6
FY 82	100.0	100.0
FY 83	105.1	108.2
FY 84	105.3	115.7
FY 85	105.1	120.7
FY 86	106.3	121.8

TABLE V. Percent differences in productivity growth and price changes

	FY 72–FY 78	FY 79–FY 86	FY 86–FY 92
Differences in productivity growth	−22.8%	−20.9%	+7.2%
Ticket price change	+16.0	+28.7	+56.5

5. Prices

The cost disease also predicts that prices in the stagnant sector will rise without limit compared to those in the progressive sector. Real ticket prices indeed rose, but the timing was not quite as expected. Real average ticket prices for all concerts increased from $6.52 in FY 72 to $15.87 in FY 92, an increase of 143.4 percent. Ticket prices for subscription concerts increased somewhat less, by 95.8 percent. The fact that they rose at all demonstrates that they outpaced the average price level. Our theory would lead us to expect that, the greater the deficit in productivity growth, the greater the price increase in the stagnant sector. This did not quite turn out to be so.

Table V shows that average ticket prices increased least during the period when the productivity growth gap was greatest, and increased most when orchestra productivity growth was actually outstripping manufacturing productivity growth.

6. Attendance

Rapid increases in ticket prices naturally raise a concern about their effect on attendance. One of the most worrisome trends in the recent history of performing arts organizations has been a sharp drop in attendance. For our 25 large orchestras, total season attendance hit a peak in FY 86 with 12,521,600 attendees. By FY 1992, this had fallen to 9,402,100, a drop of 25 percent. Attendance at in-home subscription concerts, on the other hand, has been remarkably steady at just under 3,700,000 since FY 86, except for FY 90 when it topped 3,800,000.

TABLE VI. Regression results

Dependent variable	LSEASATT	LIHSUBAT
Adjusted R^2	.83	.90
Standard error	.031	.027
F	50.35**	91.45**
LAVTIKPR	−.85**	
	(−9.38)	
LIHSUBPR		−.24**
		(−3.17)
LRDPI	1.40**	.82**
	(8.19)	(7.37)
Durbin-Watson	1.63	1.78
n	21	21

Numbers in parentheses are t-ratios.
** Significant at the .01 level.

While attendance depends on many factors, it was nevertheless deemed worthwhile to explore the relationship between attendance, real ticket prices, and real disposable personal income. The original model also included real advertising expenses and the number of performances as independent variables, but both are highly correlated with income and turned out not to be statistically significant.

The double logarithmic models used were:

$$\text{LSEASATT} = \log ß_0 + ß_1\text{LAVTIKPR} + ß_2\text{LRDPI} + \mu$$

$$\text{LIHSUBAT} = \log ß_0 + ß_1\text{LAVSUBPR} + ß_2\text{LRDPI} + \mu$$

where:
LSEASATT = the natural log of total attendance for the season
LIHSUBAT = the natural log of attendance at in-home subscription concerts
LAVTIKPR = the natural log of the average ticket price for all concerts
LAVSUBPR = the natural log of the average ticket price for in-home subscription concerts
LRDPI = the natural log of real disposable personal income for the U.S.

The coefficients of the independent variables ticket price and income are the price and income elasticities of demand, respectively. The results, shown in Table VI, demonstrate that subscriber attendance is less sensitive to both ticket price changes and income changes than overall attendance.

The interpretation of the price coefficients is that a ten percent rise in average ticket prices is associated with only a 2.4 percent drop in attendance at regular subscription concerts, but an 8.5 percent decline in attendance at all concerts. Similarly, a ten percent change in income correlates with an 8.2 percent change in

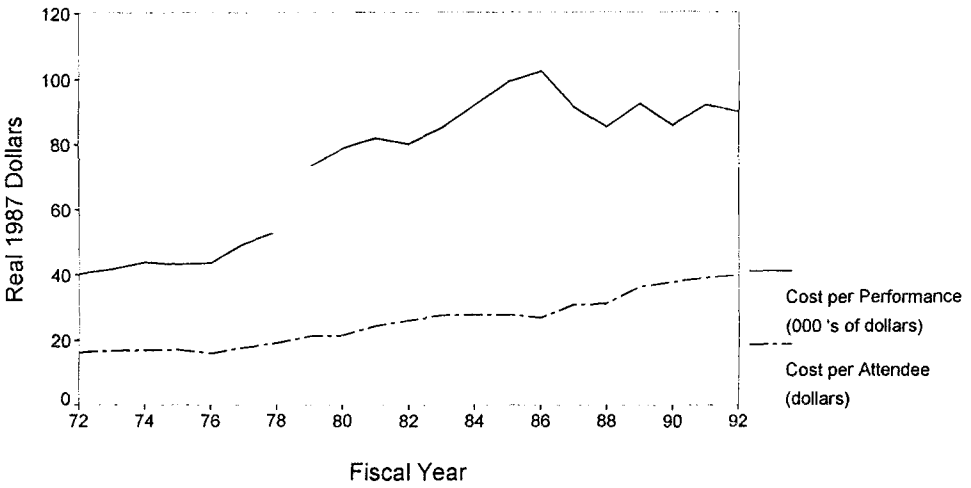

Fig. 4. Cost per performance and per attendee.

attendance at subscription concerts in the same direction, but a 14 percent change in total attendance. These results help to explain the relative steadiness of attendance at regular subscription concerts.

7. Sequence of Events

An alternative way of diagnosing the cost disease is to track real cost per performance, calculated by dividing real total expenditures by the number of performances. Figure 4 plots these results, as well as cost per attendee. It shows that the large U.S. orchestras did indeed suffer from the disease between FY 72 and FY 86, but that it has since abated. The Baumols have noted that the malady seems to improve during periods of high inflation.[8] We do observe a slowdown in the annual percent change is real expenses in FY 75 and FY 76, and again in FY 80 to FY 83 (see Figure 5). If inflation is unanticipated and expenses are to a fair extent determined by long-term contracts, this is to be expected. Orchestra player contracts normally run for between three to five years. Figure 4 also shows that the disease worsened in FY 76 to FY 78 and FY 82 to FY 86, when inflation slowed while contracts reflected the previous high rates and expenses increased rapidly. We see on Figure 5 that, since FY 85, with inflation steady and correctly anticipated, the annual rate of increase in real expenses has slowed as well, and even became negative in FY 91 and FY 92. Real cost per performance actually declined in fiscal years 75, 82, 87,88, and 90. These were all years when there was an unusually large increase in the number of performances. Cost per attendee does not provide reliable evidence of the presence or absence of the cost disease since attendance varies with changes in ticket price and income.

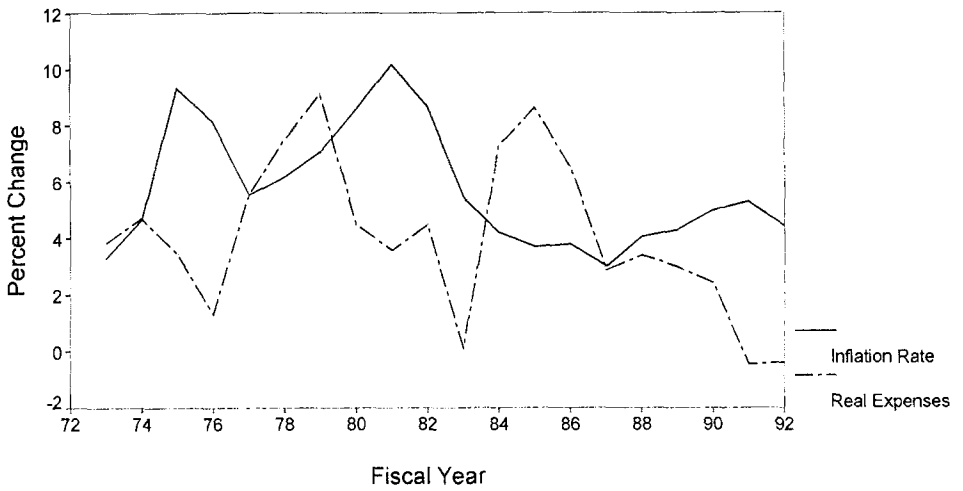

Fig. 5. Annual change in prices and real expenses.

TABLE VII. Percent change in various related variables

(1) Period	(2) Inflation	(3) Orchestra Salaries	(4) Ticket Prices	(5) Per capita Disposable Income	(6) Attendance
73–75	8.75%	10.01%	9.44%	8.57%	2.95%
(76–78)	6.72	9.07	15.79	10.23	−2.54
75–79	6.84	8.72	10.99	9.95	0.22
79–81	9.50	12.23	17.86	10.19	−2.95
81–83	4.83	8.29	14.60	6.09	−3.82
83–86	3.49	9.19	2.75	6.93	8.38
86–90	4.64	6.52	14.06	5.64	−5.49
90–92	4.12	4.72	9.25	4.26	−2.99

Sources: Inflation and Per Capita Income: *Economic Report of the President, 1994*, Tables B-4 and B-28; Orchestra Salaries, Attendance, and Ticket Prices: American Symphony Orchestra League Annual Reports.

Table 7 summarizes the trends in inflation, orchestra salaries, ticket prices, income, and attendance over the twenty-year period. The rates of change in salaries, ticket prices, and income are based on nominal dollar figures to permit comparison with the inflation rate (calculated from the fixed-weighted personal consumption price index for GDP).

Columns 2 and 3 show that the increase in orchestra salaries exceeded the inflation rate every period, but particularly from FY 76–78 and again from FY 81–86, periods when the inflation rate slowed. Columns 2 and 4 show that the

increase in ticket prices also ran ahead of the inflation rate every period except from FY 83–86, when real ticket prices actually fell.

The really interesting results emerge from columns 4, 5, and 6. It appears that, whenever the percent change in ticket prices exceeded the percent change in per capita income by five percent or more, attendance declined. This seems to indicate that holding down ticket prices, one of the avowed goals of performing arts organizations, will backfire if carried to such an extent that stiff increases become necessary in subsequent years. While other factors were undoubtedly also at work, the gain in attendance between FY 83 and FY 86 was completely wiped out in the FY 86–92 period as increases in ticket prices far outpaced the rise in per capita incomes. They also ran far ahead of the rate of inflation. Perhaps, in addition, such high increases are resisted by consumers as being patently unfair.

8. Conclusions

These results demonstrate that orchestras are subject to the cost disease when their productivity lags. But they also reveal that productivity increases are possible. In a recent article, Lange and Luksetich[9] show that orchestras serving major markets can enjoy scope economies by diversifying their services. This means offering more summer concerts, engaging in more touring, and/or offering additional concerts by smaller ensembles of orchestra players. This is precisely what has occurred since FY 86, with the number of performances increasing by 26 percent. How long this can continue before bumping against the inevitable time constraint on the part of players remains to be seen.

In order for this strategy to work, there must, of course, be audiences for the additional performances. This means that ticket price hikes can outpace neither increases in per capita income nor the inflation rate by very much. The regression results indicate that raising subscription concert prices is likely to do less damage to attendance than increasing other concert prices. Such policies, aided by steady, correctly anticipated inflation and robust income growth should maximize the chances for financial health.

Unfortunately some smaller orchestras, faced with shrinking audiences and persistent deficits, are attempting to conquer the cost disease by reducing inputs. This involves cutting the number of weeks players are under contract and/or shrinking the size of the orchestra. Such policies inevitably lead to a loss of morale and, if the number of concerts is not reduced, less rehearsal time. The range of repertory shrinks as the orchestra can no longer do justice to the late Romantic literature without hiring additional players on a per-service basis. While Professor Alan Peacock's point that substituting Baroque music, which requires smaller forces, for Wagner does not qualify as a case of "artistic deficit," is well taken,[10] this approach of downsizing nevertheless does not bode well for the future.

Notes

1. Baumol, William J. (1967) "Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis," *American Economic Review* 57: 415–426.
2. Baumol, William J, S.E.B. Blackman, and E.N. Wolff (1989) *Productivity and American Leadership: The Long View*, The MIT Press, Cambridge and London, p. 313.
3. The Ford Foundation (1974) *The Finances of The Performing Arts*, Volume I. The Ford Foundation, New York.
4. Baumol *et al.*, 1989, p. 124.
5. The price index used to deflate the current dollar figures is the fixed-weighted personal consumption price index for GDP, not the CPI, which was seriously flawed in the late 1970's and early 1980's.
6. Felton, Marianne V.(1994) "Historical Funding Patterns in Symphony Orchestras, Dance, and Opera Companies, 1972–1992," *Journal of Arts Management, Law and Society*: 8–31.
7. Gapinsky, James H. (1980) "The Production of Culture," *The Review of Economics and Statistics*: 578–586.
8. Baumol, Hilda and William Baumol, "L'avenir du théatre et le problème des coûts du spectacle vivant," in Ministère de la Culture, ed., *L'économie du spectacle vivant et l'audiovisuel.* Paris, 1985, pp. 39–70.
9. Lange, Mark D. and W.A. Luksetich (1993) "The Cost of Producing Symphony Orchestra Services," *Journal of Cultural Economics* 17(2): 1–15.
10. Peacock, Alan (1985) "The Cost Disease: Analytical and Policy Aspects," in Mary Ann Hendon *et al.*, eds., *Bach and the Box: The Impact of Television on the Live Arts*, Association for Cultural Economics, Akron, Ohio, pp. 51–57.