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Major Themes in Economics
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TAXATION AND ITS EFFECT ON PERSONAL SAVING
Jack P. Nevius

The level of personal saving is an important element of economic growth. The money made available through individual saving is used for capital accumulation. Increases in the capital intensity of production result in a number of desirable results. These economic benefits include a rise in the wage rate, transferring gross income from capital to labor, and an increase in Gross National Product. Considering the impact saving has on the economy, it follows that the nation's best interests would be served by tax policies that promote personal saving. But many feel that taxation of capital income has quite opposite results.

This research paper explores the effect taxation of capital income has on saving and capital accumulation. In analyzing this issue, two fundamental questions come to the surface. First, do lower real net rates of return from saving significantly retard capital accumulation? Secondly, does national welfare decline from taxes that distort the choice between current and future consumption? The answers to these questions have far-reaching implications and play an important part in the current debate over tax reform. It shall be shown that the interest elasticity of the savings rate is the key parameter in the analysis of these issues.

The effect of taxation on saving centers around the interest elasticity of saving. Thus, I shall begin with an analysis of this controversial issue. The degree of elasticity will have implications for welfare and income distribution and these will be discussed next. The concept of tax-induced savings and capital accumulation is at the heart of supply-side economics. Consequently, a look at the Laffer curve and "Reaganomics" must be included. Finally, a discussion of the above issues would be incomplete without including the proposed consumption tax. The consumption tax is the reform proposed by those economists who maintain that current tax policies undermine personal saving and investment.

Capital income is income received from the return to private saving and includes savings accounts, stocks, bonds, and capital gains. This return to private saving is considered part of the total income and thus subject to
The issue is whether taxation of capital income tends to reduce saving by lowering the return a person can realize by saving. It is assumed that people gauge the amount they are willing to save by the rate of interest. People tend to save more when the return to saving is greater, which is indicated by the interest rate. The relevant rate is not the market rate of interest but the real net rate of return. The two rates differ due to capital income taxation. Interest income is subject to marginal tax rates that cut into the actual return received by the saver. Thus, market interest rates are higher than the real net rate and the difference depends on the appropriate marginal tax rate. Whether this divergence in rates actually reduces saving depends on the interest elasticity of saving.

The degree of interest elasticity of saving is a widely debated issue. The range of possible elasticity runs from completely inelastic to highly elastic depending on which economist is noted. The issue is important to these economists because, armed with calculated elasticity, they propose policies for capital accumulation and tax reform. Why, one might ask, is there no consensus on the proper interest elasticity of saving? The problem seems to lie in empirical testing. Although some researchers attempt to convince us otherwise, this problem does not lend itself well to empirical analysis. Depending on the parameters deemed relevant, regression analysis and two-period life-cycle models result in widely differing interest elasticities. Due to the difficulty with empirical analysis many fall back on a theoretical framework that also adds to the difference of opinion. This confusion led McLure to comment that "determining the effect interest rates have on saving is no mean trick. It involves considerable conceptual and econometric difficulties that still defy the best efforts of bright and dedicated economists."1 With this in mind, we shall look at some empirical results.

Although my research has turned up numerous studies which address the role of interest rates on saving behavior, I shall review only a few in order to indicate the range of possible results. I shall begin with those subscribing to the "interest inelastic" school of thought. One of the forefathers of this school was Edward Denison. Studying the gross private saving rate (GPSR) in the United States during the years 1948-56, Denison found the ratio to be remarkably stable. Also finding no real trend in GPSR, he concluded that the
saving rate is essentially constant and unaffected by changes in the tax system or other changes in the real after-tax rate of return. This conclusion came to be known as "Denison's Law."

Two researchers who align themselves with the afore-mentioned school of thought are E. Philip Howrey and Saul H. Hymans. Their approach was to disaggregate saving into personal and nonpersonal components, thus arriving at what they term "loanable funds" saving. This personal cash-saving component is what their analysis is concentrated on. The Howrey-Hymans estimate includes the "ultrarationality" proposition that households view business and government saving as a component of their income and as a substitute for personal saving. With these rather controversial parameters, Howrey and Hymans find saving to be interest inelastic and conclude that "there are many good reasons for tax reform, but there is no good evidence to support the view that a positive interest elasticity of loanable funds saving is one of them."

Arriving at quite the opposite conclusion was Lawrence Summers. He felt that the simple two-period life cycle model used by most researchers leads to misleading results. This is due to the inability of the two-period model to account for dissaving of older individuals, and it obscures the role of future labor income. To correct for these problems, Summers used a continuous-time life cycle model that generated very high interest elasticities of saving. Changing all parameter values to test for robustness, he found interest elasticities of savings ranging from 3.71 to 1.09. With this Summers estimated the long-run interest elasticity of savings to be around 2.0. His estimates are the highest of those who subscribe to the "interest elastic" school of thought.

One of the leading economists for the "interest elasticity" cause is Michael Boskin. His 1978 study presents new estimates of consumption functions based on United States time-series data. Although Boskin finds a substantial interest elasticity of saving, it is not nearly as high as the Summers estimate. He estimates the total (income plus substitution) interest elasticities of private saving to cluster around 0.3 - 0.4. The study goes on to show the positive relationship between saving and the real net rate of return to capital. This is accomplished by using a two-factor aggregate model in which the key is the size of the elasticity of substitution between capital and labor. Results
indicate that the substitution effect far exceeds the income effect, resulting in decreased saving from an increase in marginal tax rates. He also uses the elasticity of substitution to show that increases in the capital labor ratio will lead to increases in labor's share of gross income. This results only when the elasticity of substitution is less than unity. Boskin's CES production function estimates it to be around 0.44.7

The Reagan Administration's former chief economist, Martin Feldstein, subscribes to neither school of thought entirely. Although he feels that saving is somewhat interest elastic, he is critical of those studies that did not include compensated elasticities. The idea here is that a decrease or elimination of taxation on capital income will reduce tax revenues. These lost revenues will have to be recovered by higher tax rates on labor income or by going to a consumption tax. The point Feldstein tries to make is that substituting one of the above tax policies for the current tax on capital income may actually reduce saving.8 He argues that saving is an "expenditure" on future consumption, not the "quantity" of future consumption. This means a compensated increase in the net rate of return will increase the "quantity" of future consumption demanded. But the price of that consumption will also fall, thus "extra future consumption can be achieved with a less than proportionate increase in expenditure on that consumption, i.e., in saving."9

We will now assume for the moment that economists such as Boskin are correct in their contention, and we shall analyze the implications a significant interest elasticity has on welfare and income distribution. Boskin states that:

The current tax treatment of income from capital—primarily the personal and corporate income taxes—decreases the net rate of return to capital accumulation; the modest positive real net of interest elasticity thus implies a substantial tax-induced decrease in saving and the capital intensity of production, a reallocation of consumption from the future to the present, and a substantial transfer of gross income from labor to capital.10

Taxes, by their very nature, distort relative prices or relative factor returns. They cause people to alter their economic activity. For example, they cause people to work less or to save less. Such distortions result in an extra cost to society, commonly known as welfare loss. The tax on capital income results in a distortion of a person's choice between future consumption and present consumption. This happens because taxation alters the relative price
of future consumption. Simplistically stated, investment in future consumption is the same as savings, and we have already shown that capital income taxation lowers the net return to savings. Consequently, future consumption becomes more expensive, and people will tend to prefer present consumption to future consumption. But the tax-induced drop in the net real rate of return translates into a reduction in income of the individual. Thus, there is some incentive to "cushion" the reduction in future consumption caused by the tax by shifting some consumption from the present to the future.\textsuperscript{11} Here again, we are confronted with the substitution and income effects. The shift from future to present consumption is the substitution effect, and the attempt to cushion the drop in future consumption is the income effect. Which effect is dominant can only be determined through empirical analysis.

Boskin certainly believes that the substitution effect is dominant. He estimates annual welfare cost from current capital income taxation to be roughly $50 billion.\textsuperscript{12} This huge welfare cost results from tax treatment that induces people to save less than is socially optimal. Finally, he notes that such inefficiency may be the reason we have begun to see favorable tax treatment of retirement plans such as the IRA accounts.

Feldstein is quick to point out that estimates of welfare loss such as Boskin's are too high. He does agree, however, that a welfare cost from capital taxation does exist. Again he cites the compensation that must be made after a reduction or elimination of the capital income tax. Feldstein states "the welfare gain that results from eliminating the distortion in future consumption must be balanced against the welfare cost of further distorting the choice between consumption and labor."\textsuperscript{13}

Current tax policies causing a reduced real net rate of return have implications for income distribution. It is felt that such tax treatment redistributes a substantial amount of gross income from labor to capital. This results from an income tax that retards capital accumulation leading to a lower level of income and lower wage/rental ratio than would otherwise exist. Labor's share of gross income falls with increases in income taxation because the elasticity of substitution falls short of unity.\textsuperscript{14}
Another important tax-incidence issue is whether current tax treatment allows for a sizable shifting of capital income taxes from capital to labor. If lower, net rates of return lead to decreased capital/labor ratios, then it is felt by Feldstein and others that capital has the ability to shift up to one-half the burden of capital income taxes onto labor. This point is significant because it leads to the observation that taxes on income from capital are much less progressive than normally assumed.

It should be clear at this juncture that a significant interest elasticity of saving has far-reaching consequences. It can alter the level of gross national product and national income. In view of such implications, some economists have seen a need to alter government policy. This crusade to change tax policy decisions has been dubbed "supply-side economics." This philosophy is consistent with Boskin's findings, in that supply-siders believe "government programs, especially taxes, can reduce national output (and hence national income) by reducing the incentive to work, save, and invest." The supply-siders did not stop there, but went on to propose that an increase in tax rates does not necessarily increase tax revenues. The contention is that the tax base may fall substantially in response to higher tax rates.

The inverse relationship between tax rates and tax revenues is explained with the help of the Laffer curve. The curve is used to show that excessive tax rates cause an erosion of the tax base. The cure to such a problem is to reduce rates, leading to a stimulation of economic activity through increased work, saving, and investment. This increase in economic activity results in a larger tax base and, consequently, more tax revenues.

Although a full analysis of supply-side economics and the Laffer curve is beyond the scope of this paper, it may be instructive to relate these ideas to Feldstein's compensated tax theory. Recall that Feldstein maintains that any reduction in the rate on capital income must be compensated by increases in the rate of labor taxation. This is necessary in order to maintain a given amount of tax revenues. Such compensation also reduces the welfare gain produced from lower capital income rates of taxation. But, if supply-side economic theory is a reality, there would be no need for the compensating tax on labor income! Economic activity would be stimulated, tax revenues would increase, and society
would realize the total gain in welfare.

My research into supply-side economics has led me to many articles expressing criticism of this theory and the Laffer curve. Since the shortcomings of the Laffer curve are rather well known, I choose to include here only my own observations. The Economic Recovery Tax Act of 1981 was a rather strong endorsement of supply-side economics. This act contained a package of Tax Breaks designed to induce capital accumulation and economic growth. It also embraced the Laffer curve concept that such incentives could lead to an expanded tax base and increased revenues. Does supply-side economics work in the real world? Today the jury is still out, but the giant Federal deficit with projections of even higher deficits through 1987 is certainly not a good sign.

If supply-side economics isn't the answer, then is there a better way? Boskin, Feldstein and many other leading economists say there is—the consumption tax. The consumption tax as an alternative to capital income taxation has been alluded to a number of times throughout the paper. The proposed tax reform would completely eliminate taxes on income and replace it with a consumption tax. My intention is not to detail the working of such an expenditure tax but to indicate the implications it has on saving and welfare.

A consumption tax tends to be more favorable to saving. It does not reduce the rate of return of saving and therefore avoids the substitution effect of the income tax, which is adverse to saving. Consumption taxes also tend to be regressive. Since the marginal propensity to consume falls as income rises, the consumption tax has a heavier impact on expenditures and a lighter impact on saving than does the income tax.\(^{17}\)

The consumption tax will remove the distortion in the relative price of future consumption. It will remove the wedge between gross marginal social yield and net marginal private yield on investment caused by capital income taxation. Although, as Feldstein points out, it would be difficult to determine whether the overall welfare cost will be lower than with the income tax. This is due to the increased burden on labor income. If, as Boskin maintains, labor supply is inelastic with respect to taxes while saving is interest elastic, then the consumption tax will result in "increased saving, capital intensity of
production, income, and welfare, and further, will transfer gross income from capital to labor."18

This paper has attempted to highlight the basic issues surrounding the current debate over taxation of capital income. We have found that the key determinant in this discussion is the interest elasticity of the saving rate. The difficulty in determining this elasticity through empirical analysis leads me to conclude that no consensus will be found. It is my personal opinion that no optimal tax policy exists, thus, we can only hope to minimize the inefficiency and welfare loss caused by taxation. Since the welfare cost of the current tax treatment of capital income appears to be so large, the consumption tax may be an improvement and worth a try.

FOOTNOTES

11. McLure, p. 520.
REFERENCES


THE ECONOMIC AND SOCIAL DESIRABILITY OF THE AMERICAN FAMILY FARM SYSTEM AS COMPARED TO THE ALTERNATIVE OF CORPORATE AGRICULTURE

Mark Willard

Tony Dechant, in his introduction to The Corporate Invasion of American Agriculture, by Victor K. Ray, makes what is becoming an increasingly common allegation concerning corporate takeover of America's "family farms." He states:

We in the National Farmers Union believe that the corporate invasion of American agriculture by non-farm interests is real. It is leaving behind wasted towns, deserted communities, depleted resources, empty towns, empty institutions, and people without hope and without a future. The invasion is still in the beginning stage. Some people see this trend as inevitable, that it can not be stopped. Not only can it be stopped, it must be stopped. ¹

Are corporate interests destroying the foundations of our rural society as Mr. Dechant insists, or are his accusations overstated and/or slanted? The topic which I will discuss deals with the "family farm" system, the changes it is experiencing, and its desirability compared to other systems of agricultural production (most specifically corporate farming).

As I began to do research on this issue, I expected to find evidence and statements supporting a corporate takeover of American agriculture. To my surprise, though, the empirical evidence and statements from experts that I came across said otherwise. Slightly more than 1% of American farms are corporate owned, accounting for only 15% of American agricultural output. In addition, 90% of these farms are owned by fewer than ten shareholders. ² In fact, evidence displays that the greatest risk to the family farm is larger family farms. Most of the acquisitions of farms in America have been by family farms. You can say that the family farm isn't dying, the scale of operation is only increasing. On the surface, anyway, the trend towards corporation in agriculture seems more hearsay than fact.

Before I discuss some of the respective merits of large and small farms, I would like to present some of the current trends in American agriculture.
First of all, the size in acreage of farms has increased some over the past thirty years. Average farm acreage increased some, but not a lot, between 1959 and 1974. Average cash grain farm size was 441 acres in 1959 and 485 acres in 1974. The total increase was only about 10%.\(^3\) It appears that concentration in American agriculture is less significant than many would believe.

Another trend we should concern ourselves with is the increased capital intensity of our farming system. Productive assets per farm worker have risen 88\% from $3300 per worker in 1940 to $6200 per worker in 1975. During this time, units of machinery used have decreased, but their value and size have increased. Man-hours in agricultural production has also fallen considerably from 20.5 billion hours in 1940 to 5.3 billion in 1975.\(^4\) This increase in capital intensity is linked to increases in farm size as declining average production costs become possible.

Probably foremost to the discussion of the economic merits of small vs. large farms is the nature of economies of scale in American commercial agriculture. All of my sources generally agreed that after a certain point, economies of scale in agriculture are minimal to non-existent. The long-run average cost curve for agriculture appears to be L-shaped. Most of the decline in average costs is due to the ability of larger farms to utilize technology to a greater extent than smaller farms. This is due to monetary constraints for small farmers and the existing economies of scale. But, at a modest acreage (100-320 acres) most of the benefits of technology can be achieved; after this point, economies of scale are for the most part constant. Cost advantages range from 0-15\% for very large farms over medium-sized farms. The evidence, however, does not suggest any diseconomies of scale for farms with a very large scale of production.\(^5\)

Studies in California and Illinois both support the idea of constant economies of scale in agriculture. The California study also showed that most farms over eighty acres incur less than a dollar of cost per dollar of sales, and therefore can be referred to as profitable.\(^6\) Although larger farms tend to have lower production costs, the break-even point (as far as size is concerned) is low in agriculture.
The issue of economic efficiency is also very important in critiquing the "family farm" system of agriculture. The determination of constant economies of scale in agriculture implies that smaller farms will be equally efficient as large farms. This in fact appears to be the case. A study on efficiency of various sized farms in Illinois compared the efficiency of smaller farms with that of larger farms. Farms were divided into two groups, those less than 700 acres in size and those more than 700 acres. After extensive data collection and high powered calculation, researchers concluded that small farms were no less efficient than large ones. This same viewpoint was reiterated in the aforementioned California study.

Another interesting argument states that smaller scale "family farms" will be more efficient and productive than larger farms. It is argued that a family farmer has a profit incentive to work the hard, long hours needed during crucial times of the growing season. Efficiency declines when the farm gets so large that the family members have to hire less motivated employees to do much of the work.7

The ability to adapt to changes in technology is important when determining the "best" farm size. Medium-sized farms appear to be the most responsive to technological and other types of change. Very small farms cannot afford to experiment with new technology and thus become technologically rigid. Very large farms also seem to resist change, as they feel that they might lose their favored position if situations were to change. When they finally do change, the change comes all at once and at great social cost. The medium-sized farm, on the other hand, appears to be the happy compromise. Here the farmer is wealthy enough so he can afford to experiment and implement new technology. He is also much more willing to implement change so that he can remain as competitive in the marketplace as possible. With medium-sized farming, change is implemented gradually and at minimum social cost.8

A final economic consideration which favors small "family farms" is that small family farmers are less responsive to shifts in the business cycle than corporate profit maximizers. While a corporation holds profit maximization as its first and foremost goal, family farmers have many non-monetary rewards to farming which would keep them in the farming business despite periods of low
or negative profits. Small farmers hold such things as pride of ownership, continuity of family, freedom of choice of work time and pace, and ability to identify effort with reward as important non-monetary rewards to agriculture. Because of this, family farmers will hold the large sums of land and capital required at nominal rates of return that no large scale business can tolerate.9

When comparing farming scale, non-economic aspects must also be taken into consideration. The main concern here is the social costs that usurpation of the "family farm" system might bring. The effects of such change on rural society must be considered as well as its effects on the makeup of the farm family. Popular opinion on this issue must also be considered.

There is mixed opinion on whether consumers would be harmed or benefited from increasing scale in agriculture. Some say that the large scale farms will be able to realize all potential economies of scale and therefore consumers will pay lower prices at the supermarket. Others claim that efficiency will fall (because family farmers are better motivated than hired workers) if farming increases in scale, and consumers will actually pay more for food. The arguments implying consumer harm appear to be more convincing based on the fact that economies of scale in agriculture are minimal.

As far as rural society is concerned, it seems clear that erosion of our "family farms" would generate significant social cost. Increased scale generally causes a decline in the number of farmers and farm workers. Also, the composition of farm labor (fewer owner operators and more hired workers) would also change. Primarily because of the greater proportion of hired laborers, the overall characteristics of the farm population would tend to shift towards inequality of land ownership, lower educational backgrounds, lower job and residential stability, lower levels of per-capita income, and lower degrees of participation in community institutions.10

Rural communities are severely affected by declines in the farm population. The decline in population of small rural communities is in fact greater than the decline in the rural population itself. Small businesses cannot survive if their customers move away. It seems that increased scale in agriculture will probably lead to the demise of the rural community.
It does appear also that the American people support the concept of the family farm. One poll in 1971 showed that 80% of the respondents agreed that the family farm is very important to democracy. Farmers are even more supportive of the family farm and most feel that it is a cornerstone of our democratic system. Such public sentiment must be taken into consideration. The conclusion you can make from such attitudes is that many Americans would resist change in our agricultural system.

As far as economic considerations go, the family farm appears to be the match of larger scale farming. Economies of scale after a relatively medium sized level of farm size seem to be almost constant. Therefore, large farms have little advantage over medium-sized farms as far as minimizing costs is concerned. The evidence also supports the idea that large farms are no more efficient than smaller farms. Smaller farms may even have an advantage over large corporate farms in that the owner operator tends to work more industriously than the hired laborer and is less responsive to the business cycle than their corporate competitors. Therefore, more output may be produced in a given time period. I also pointed out that evidence indicates that medium-sized farm units are more responsive to technological change than large farm units.

There are numerous social costs to increased scale in agriculture and corporate ownership of farms. Rural society would all but be destroyed if corporate farming were to come into predominance. There would be a decline in the number of farm workers and subsequently a severe decline in the number and size of farm communities. There also appears to be large popular support for the maintenance of family farming.

I would conclude that corporate farming in America would be rather undesirable. Social costs would be high and economic benefits would be minimal, if any. It appears that economic trends in this country imply that medium-sized farming, not large scale farming, is the coming thing. Unless unforeseen circumstances come into play or the government implements some short-sighted policy which harms medium scale agriculture, the American "family farm" will have a bright, if not uneventful, future.
FOOTNOTES

10. Flinn, p. 948.
11. Flinn, p. 946.

REFERENCES


Economics and Philosophy would seem to be odd bedfellows. But they were becoming ever more inextricably linked in my mind as I listened to the professor explain Marx's interpretation of history in a Comparative Economic Systems class. There seemed a striking similarity between Marxian history and the theory of natural selection popularized by Charles Darwin. This required pursuit.

The further I investigated this matter, the more the plot thickened. So far as history was concerned, Marx and Darwin were saying virtually the same thing. One might argue that Darwinian evolution is random, whereas Marx had a teleological view of history. But the randomness of evolution vanishes when the instinct for survival is acknowledged: survival is purposeful, hence evolution too, is teleological.

Having established this link between the views of Marx and Darwin, I decided that understanding Marx's economic analysis demanded something beyond combing through Das Kapital or the Manifesto. The knowledge that Marx was a philosopher first and economist second left me certain that only by going to the source, his philosophy, could I really come to understand Marxian economics. The German word for philosophy translates literally into English as "world view." And behind all the economic vitriol Marx aimed at the free enterprise system there is a world view that deserves dissection.

It has been said that all other disciplines rest upon some collection of philosophical assumptions about the way things operate. What tenuous foundations! Epistemologists can't agree whether or not sense experience is a reliable source of knowledge, or for that matter, if certain knowledge is possible at all! The ethicists haven't produced one uncontested moral imperative, and metaphysicians have yet to decide what significant difference makes existence distinct from non-existence. Ridiculous issues perhaps to one who has a healthy suspicion of philosophy. But life must be reflected upon with all its clothes off so to speak, if one is to truly the thing, even if the exercise defies any resolve. The fact remains that some of the most gymnastic minds in history have limped away from their own encounters with these very questions.
If in philosophy the ultimate questions are unresolved, what are we to do? Well, we continue to live our lives according to some body or collection of guiding principles, usually the religious kind, and we can function quite well if our presumptions about the nature of things are more correct than not. But let us be aware that secular living involves as many leaps of faith as any monk might affirm in his own life of religious asceticism.

The scientist proceeds with his experiments on the assumption that a posteriori (experiential) knowledge is valid and true. The man who uses an electric razor in the morning assumes a causal link among separate events: He throws a switch, current flows through circuits, blades turn, his face is smooth. They are both proceeding on what are really philosophical assumptions, causality and certainty, matters which are yet on trial among people who spend their lives trying to define them.

Clearly, to better understand Marx the Economist one must get acquainted with Marx the Philosopher. His world view, his perspective on the essential nature of things and particularly economics, is reliant in large part on the basic "leaps of faith" he makes. Aware of these, one can gain a more firm grasp of his economic thinking.

At the root of Marx's economic analysis lie his interpretation of history and his theory of value. Both subjects have been addressed by genuine scholars, but I hope to add at least a trickle of insight to the reservoir of thought already dedicated to them. Relying upon just such sources for direction, while lending to their discussions my own brand of pedantry, I can at least provide a different, if not clearer perspective.

**MARX THE PHILOSOPHER**

Marx began his university studies in Bonn in 1835 but spent the next year in Berlin as a law student. Philosophy soon became more interesting to him however and he joined the Young Hegelians, a group of students whose radical social criticism was based on the philosophy of the same name. Hegelianism claims that within any system are contained internal contradictions, the seeds of its own undoing. Doubtless it was in this period of his life that "revolution" became
a catchword for Marx. In 1841, at the age of 23 he received his Doctorate. The fact that his dissertation was on Democritus and Epicurus, two Greek materialistic philosophers, betrays an affectation for skeptical metaphysics.

Metaphysics can be considered the trunk of philosophy, and other disciplines the branches from it. It deals with such questions as Being, Nothingness, the existence of God, Good and Evil, Casuality, etc. His metaphysical studies must have been casual. Like Hegel, he holds that all that is is Substance, a materialistic notion of the universe. The problem here is, what caused Substance? No answer is supplied. If everything is ultimately particulate, isn't everything predetermined? What distinguishes Man from the rest of existence? Why should he be accorded any special consideration in the scheme of things?

What is Man? It is a haunting question since one's reply will dictate how one looks at and treats others. The Christian sees Man as a miraculous fusion of spirit, mind, and body. Consequently, one must respect his needs in each of his dimensions in order to treat him justly and in accordance with the wishes of his Maker.

Two philosophical views of Man evolved in Western philosophy which hold otherwise. One is the Idea-ist or Skeptic's position which reduces Man to the mind or conscious state. It is held that nothing outside of that can be irrefutably demonstrated, and any claim to objective knowledge is suspect. On the other extreme is the materialist's conception, which says Man is merely an accidental (they should be more careful in choosing terms) if albeit complex occurrence in the motion of matter.

In each of these cases, one sees reductionism at work. They are nihilistic. The materialist cannot distinguish himself as an entity distinct from the rest of existence unless we are so gracious as to overlook the inconsistency. And the skeptic, as Descartes demonstrates, is entitled to no other assurance than that he exists, somehow.

Hegel's view is a sort of fusion of these two traditions. His view, to which Marx subscribes, attempts to permit consciousness as separate from matter, while holding that all else is matter. The two act upon each other. No real
source of consciousness is argued thoroughly however, and since matter is a
fixed form of existence, a plenum and not creative, consciousness seems to
arise here by some synergism inconsistent with the materialists' scheme. Marx
wrestled with this problem more than Hegel, and held that existence is the
source of ideas, and that Man then transforms these ideas, and hence his environ-
ment, through a creative, dialectical process.

Marx is a materialist. But he, like Hegel, tried to circumvent the crucial
issue of Man's role in this scheme by introduction of the "dialectic," which in
this regard asserts that Man is both determined by his environment, and by per-
ceiving the order in it with his mind, is able to reshape it. God, as a creative
or moral entity is conveniently negated, if the thing worked, that is. It doesn't.

If matter is the only stuff that goes into making a man, what miraculous
process affords matter the power to reflect upon itself, and to alter its envir-
onment? Marx's philosophy, like his economic analysis, as we shall see later,
contains an internal contradiction, as he before anyone should have seen. You
cannot have it both ways: either all is matter or not all is matter. The dial-
ectic is a rhetorical end-run on this issue. It is bogus.

The error in such thinking stems from oversimplification, as pointed out
by Jaques Barzun below:

The materialist and the idea-ist both insist on making only
one abstraction from the concreteness of daily experience.
Their legacies remain however, and we still use the terms
'subjective' and 'objective' in such ways as to imply that
subjective experiences aren't real, or that objective ex-
periences can exist outside of a subjective mental framework.¹

A substantial part of Marx's critique of capitalism is devoted to moral
invective decrying the treatment of workers. Yet he speaks in ethical terms
which are inconsistent with his basic conception of Man. Here however, we must
be careful not to discount his moral criticisms on this basis: they are right
or wrong regardless of their inconsistency with the rest of his philosophy.
And he does pose some very difficult questions about the inequities that abound
in capitalistic societies.
I turn now to the Marxian interpretation of history. Marx shared the scientific-materialistic world view with Charles Darwin, author of *The Origin of Species*. Can it be merely coincidence that the characteristic works of both appeared in Victorian England in the same year, 1859? While Darwin was developing a law of organic progression Marx was formulating his own version of social development. The static conceptions of nature and society that had reigned since Newton were being nudged aside by notions of continual change and strife; in a word, evolution. Random, inevitable progress, was now the prime mover of the cosmos.

Darwin's contribution to the materialistic scheme was not the theory of evolution as a whole, but a theory which explains evolution by 'Natural Selection from accidental variations.' The entire phrase, and not just the words *Natural Selection*, is important, for the denial of purpose in the universe is carried in the second half of the phrase - accidental variations.2

Marx's view of history is quite similar to this theory of biological evolution. And while Darwin failed to see that survival is an implicit assertion of purpose, Marx failed to see that the inevitability of progress through revolution robbed revolution of any claim to "progress." They arrived at similar points, if albeit through different errors. In fact, Marx himself saw his work as a parallel to Darwin's, and even wished to dedicate a portion of *Das Kapital* to him, but Darwin declined the honor. Frederick Engels, speaking at his friend's burial site, called him the "Darwin of sociology." He wasn't far off. A quote from Marx serves to illustrate the point:

'A social state never dies before there has been fully developed within it the sum of all the productive forces that it contains. New relations of production superior (emphasis mine) to the former ones never come into being before their material reason for existence has developed in the womb of the old society.... And the relations of bourgeois production constitute the last form of the productive process to be based on antagonism.'3

Evident here are both the influence of Hegel and echoes of Darwin. The notion of dialectical change is supplied by Hegel. The assumption that this inevitable change is necessarily progressive (superior) bears striking similarity to Darwin's own frame of thought. Despite the incompatibility of materialism and evolutionary progress, class antagonism remains for Marx, like competition
among preying animals over time, the engine of social evolution. History, like Nature, is unforgiving, and tough. And "Force is the midwife of Progress."

MARX THE ECONOMIST
Marx is most often attacked by his critics on the basis of his predictions. He did not foresee the development of truly effective trade unions, nor the role that government has come to play in the regulation of industry, labor conditions, or the distribution of wealth. Capitalism has not experienced ever-worsening crises, and generally, those societies which have become socialist had no proletariat to speak of.

He brought this upon himself really, since accepting a materialistic world view supposedly lent him a mechanism for predicting the future. And in his critique of capitalism he did in fact predict the course of its collapse. Analyzing a state of things, however, is very different business from predicting their future states. Today's economist is very timid about predictions, even with all the computerization and econometric tools at his service. Giving Marx more than his due is in order here. We must deal with his analysis of capitalism if we are to truly defend it or improve its workings.

Marxian economics is based on his Theory of Value, which is really very similar to that shared by all Classical economists. Marx discounts any influence by demand on the final value of a product, and following David Ricardo's analysis, asserts that value is completely determined in the production process. Value, however evasive a concept, is the touchstone of Marxian analysis.

It follows that the valid exchange of a particular commodity express something equal.... What does this equation signify? It signifies that a common element of identical magnitude exists in two different things.... both are therefore equal to a third thing.4

That third thing according to Marx, is labor input, or "labor-time". Such an idea was not unique to Marx, but was proposed by others before him including Smith, Ricardo, and even Benjamin Franklin. Marx however, was the first to see here the basis for social revolution, for reasons which we will explore below. At this point though, it is most important to note two things: 1) All value is created in the production process; 2) all value is created by labor.
What then is occurring in exchange markets? Utility on the part of consumers is ruled out as a determinant of value. Utility or use-value is a psychological factor, something not relevant in a world of Substance. "Substance is material: Hence utility is not a universal, subjectively comparable valuation, but rather must derive from matter. To Marx, use-value is inevitably as particular as the properties of things which are commodities."\(^5\) Say's concept of utility has no role in the Marxian scheme. It is quite compatible with the Labor-command Theory of Value which Smith offered in his Wealth of Nations, but rejected because he felt that it led to a circular definition of value. I find this theory attractive, but a doctrinaire such as Marx could never resign himself to permit such a nebulous, paradoxical definition of value, though he was surely acquainted with it. The German mind rebels against mystery—a good thing for engineering, but that hardness of mind has often led to radicalism in less concrete sciences, such as philosophy and economics. The value of every commodity must have a common, identifiable source, and that source could only be labor. Marx was predisposed to such a view because he was a materialist. He became a fire-spitting advocate of it after reading Ricardo.

Money serves as a proxy for the exchange of commodities. And implicit in the exchange of commodities is the exchange of labor value. The equation reduces to something like: \((\text{labor-time}) \times (\text{amount of commodity A}) = (\text{labor-time}) \times (\text{amount of commodity B})\).

"By no means however, is it necessary that exchange be conceived as an equation. It could be viewed as an equivalency, in the sense that both parties agree to the terms of exchange and receive what they were promised."\(^6\) Hence, a utility theorist will argue that exchange is based in part on the use or satisfaction one anticipates will be his. Here it is not necessary that the value of the commodities equilibrate, only that they occur in some ratio acceptable to both parties.

To say that all value is determined in the production process, especially in the wake of fairly successful Keynesian demand-management economics, seems to be yet another of those abstractions from the concreteness of daily experience that Barzun spoke to earlier. If subjective valuation occurs in the marketplace, and helps determine the returns to the producer irrespective of
the labor-time involved, then Marx's entire argument is under fire, since he himself claims that "Wages are determined by the same laws which determine the value of every other commodity."7

Where do profits come from in capitalist economies? Somewhere they represent a value. To Marx, again, "If we leave out the consideration of use-value of the commodities, they have only one common property left, that of being products of labor."8 The production sphere generates all value and only one factor creates value. Marx's equation helps to illustrate the point:

Let

\[ C^* = \text{gross value of the product} \]
\[ c = \text{constant capital (plant, machines, etc.)} \]
\[ v = \text{variable capital (wages)} \]
\[ s = \text{surplus value (profits)} \]

then

\[ C^* = c + v + s \]

Constant capital represents physical inputs, including raw materials. It transfers its value into the commodity, but does not create any new value. Variable capital is wages. It represents the value of the commodity owing to labor input and for which labor is compensated—and wages to Marx are only what is necessary to sustain the worker and his family. That part of the commodity's value which is created by labor but is not returned is surplus value, "s." This is the source of the capitalist's profit. Hence labor is being exploited to the extent that the capitalist class expropriates privately what in fact labor produced.

We might ask then, what are the just returns to the capitalist? As the owner and organizer of the production process isn't he entitled to some fraction of the gross value of the product? Couldn't we just say that surplus value, or profit, is the price the worker pays the capitalist for access to his productive facilities in order to make a living? Capital is thus a social relation whereby the hired worker gains a broader market for his services and the owner of the physical capital employed takes profit as his fee. Such is not the case says Marx, because the physical capital was created by labor to begin with. Therefore
the social relation of Capital is a form of exploitation and oppression! Something very interesting is going on here.

Private property seems to be at the core of this dilemma. Without the institution of private ownership of the means of production, "Capital," the capitalist could not exploit the laborer by privately expropriating what the worker produced. The capitalist, according to Marx, is taking what is rightfully the workers'. Eliminate the institution of private property and the situation will be rectified. But to say that the surplus value thus expropriated should return to the worker is by definition an assertion of privacy. The value supposedly created in its entirety by labor is being treated as private to labor. Now, Marx cannot have it both ways (dialectics notwithstanding). If we eliminate the institution of private property, which is the basis of the institution of capitalism, we not only take ownership of the means of production away from the capitalist, but we also take away the worker's claim to the value of his contribution. Marxism collapses on itself.

The existence of an economic surplus is hard to deny, even if Marx's prescription for its distribution is flawed. What else can explain the unprecedented history of growth associated with capitalism? Capitalism demonstrates an innate capacity for producing wealth in ever greater proportion to inputs. Post-Keynesianism, a relatively new school of economic thought, deals intensively with the creation and distribution of economic surplus, though their approach to the issue is somewhat different than that of Marx. A thorough discussion of their views is beyond the scope of this paper, but I raise the point only to suggest that other perspectives exist. And the question as to whether or not the classicists' surplus exists is not on trial here, only Marx's analysis and prescriptions are being called to task. It is when Marx welded Classical theory to his interpretation of history that the thing got muddy.

Marx said that the evolution of society would take us from Capitalism to Socialism, and from there to Communism. To date however, Communism has yet to become the order anywhere in the world. Socialism, depending on how you define it, has been encroaching steadily upon the capitalist West. It is on the subject of Socialism that I would like to close this discussion. Here, I take issue with Marx on purely normative grounds.
A socialist society is one where the means of production are owned and ostensibly controlled by the workers. The state is still necessary because the ideal, the elimination of all class distinction, is yet to be accomplished. Why common ownership and elimination of class concepts? Possibly these imperatives for Marx are of Hegelian origin. Man, says Hegel, though individual, is happily lost in things larger than himself. The notion of the nation state taking on a "spirit" of its own which transcends the individuals within it, is original to Hegel. It seems to me to figure strongly in the Marxist scheme.

Under such a state everyone may very well get an equal share of the pie. But is this a desirable thing? If it is desirable, is Socialism the mechanism by which we want to see it come about? For me, the best reply to these questions comes from Gilbert Keith Chesterton:

Now I speak quite seriously and sincerely when I say that I for one should greatly prefer that world in which everyone wore someone else's hat to every Socialist Utopia I have ever read about. Sharing is nothing akin to giving. Remember we are talking here about the ideal only, not the difficulties of different ideologies; rather what we would have if we could get it. And if I were a poet writing an Utopia, if I were a magician waving a wand, if I were a God making a Planet, I would deliberately make it a world of give and take, rather than a world of sharing. I do not want Jones and Brown to share the same cigar box; I do not want it as an ideal; I do not want it as a very remote ideal; I do not want it at all. I want Jones by one mystical and godlike act to give a cigar to Brown, and Brown by another mystical and godlike act to give a cigar to Jones. Thus it seems to me instead of one act of fellowship (of which the memory would slowly fade) we should have a continual play and energy of new acts keeping up the circulation of society.

I have demonstrated that Marx's philosophy is the taproot of his economic analysis, and I have indicated where that philosophy led to errors, or at least inconsistencies, in his economic theories.

Still, Marx's critique and legacy loom as the most formidable adversaries the market economy of the West has ever faced. Economists may attack his predictions or lifestyle, but ultimately, it is with his analysis and social criticism, with Marx the Economist, Marx the Philosopher, that advocates of the market system must do battle. And though his theories be called to question,
a large portion of the world's people hear in his message the promise of better circumstances than they presently endure. "The power of ideas is sovereign," said Keynes, "and a man listens to whatever instruction of hope, illusion, or revenge is carried to him on the air." Capitalism must offer the disadvantaged of the world a better hope than Marxism if it is to continue to prosper.

FOOTNOTES

1. Barzun, p. 11.
2. Barzun, p. 185.
5. Wolfson, p. 45.

A special thanks is owed to Professor Kenneth McCormick of the Economics Department, University of Northern Iowa, for his many invaluable criticisms and insights.

REFERENCES


What is price discrimination? Simply put, when a seller is able to charge two distinct prices for the same good or service he is practicing price discrimination. Algebraically this can be stated by saying the ratios of price to marginal cost of providing the good or service differ among the groups of buyers. In order to price discriminate a seller must have some degree of market power. He must be able to alter price if he is able to search for the optimal (profit maximizing) price. The seller must be able to segment the market for his good or service into at least two distinct groups. Further, these groups must have differing price elasticities of demand at common prices.

This paper examines price discrimination with respect to movie theatres. Actual data were collected for ticket prices and sales for the various time periods during a week. A multiple regression analysis was performed to estimate the demand curve faced by the theatre during each period.¹

A theatre owner is able to practice price discrimination because he is able to segment his market into at least three parts. By using different colored tickets (each series with different numbers) a theatre is able to charge different prices for the same movie among afternoon, weeknight and weekend night periods. This allows the owner to face different demand curves (with differing price elasticities) for the same product.

One qualification which should be noted is that some economists feel a movie watched on a weekday afternoon is not the same product as one viewed on Saturday night and therefore does not constitute price discrimination.

The following example involves a multiple regression of actual data from a theatre.² These estimates do not include variables which consider competition faced by the theatre. The actual profit maximizing prices would be lower than those derived here. Given competition and the unliklihood that other firms would follow these prices, the elasticity of demand would be much higher, resulting in lower profit maximizing prices. Consider these profit maximizing prices an upper bound (constraint) on what the theatre would charge if it faced no competition.
\[ \Pi = \text{profit} \]
\[ Q_1 = \text{quantity of tickets sold in the afternoon} \]
\[ Q_2 = \text{quantity of tickets sold on the weekend nights} \]
\[ Q_3 = \text{quantity sold on weeknights} \]
\[ P_1 = \text{afternoon price} \]
\[ P_2 = \text{weekend night price} \]
\[ P_3 = \text{weekday night price} \]
\[ TR = \text{total revenue} \]
\[ TC = \text{total cost} \]
\[ \Pi = TR - TC \]
\[ Q_1 = 219.1 - 34.199 P_1 \]
\[ Q_2 = 237.3 - 34.199 P_2 \]
\[ Q_3 = 459.2 - 34.199 P_3 \]

Solving for price as a function of output
\[ P_1 = 6.407 - 0.02924 Q_1 \]
\[ P_2 = 6.939 - 0.02924 Q_2 \]
\[ P_3 = 13.427 - 0.02924 Q_3 \]

To find the critical points, the first partials are set equal to zero:
\[ \frac{\partial \Pi}{\partial Q_1} = 6.407 - 0.05848 Q_1 - C'(Q) = 0 \]
\[ \frac{\partial \Pi}{\partial Q_2} = 6.939 - 0.05848 Q_2 - C'(Q) = 0 \]
\[ \frac{\partial \Pi}{\partial Q_3} = 13.427 - 0.05848 Q_3 - C'(Q) = 0 \]

Solving for \( Q \):
\[ 6.407 - C'(Q) \]
\[ Q_1 = 0.05848 \]
\[ 6.939 - C'(Q) \]
\[ Q_2 = 0.05848 \]
\[ 13.427 - C'(Q) \]
\[ Q_3 = 0.05848 \]
By substitution

\[ \frac{[6.407 - C'(Q)]}{2} = 3.20 + \frac{C'(Q)}{2} \]
\[ P_1 = 6.407 - \frac{C'(Q)}{2} \]

\[ \frac{[6.939 - C'(Q)]}{2} = 3.47 + \frac{C'(Q)}{2} \]
\[ P_2 = 6.939 - \frac{C'(Q)}{2} \]

\[ \frac{[13.427 - C'(Q)]}{2} = 6.71 + \frac{C'(Q)}{2} \]
\[ P_3 = 13.427 - \frac{C'(Q)}{2} \]

This says that the profit maximizing price in the afternoon without any competition is $3.20 plus marginal cost divided by 2. On weeknights the profit maximizing price is $3.47 plus marginal cost divided by 2. Weekend nights the price that would maximize profits is $6.71 plus marginal cost divided by 2. In the theater business most costs such as film rental, property taxes and utilities are fixed. These costs do not change as output changes. The variable costs such as employee salaries do not change within wide ranges of output. Based upon these assumptions MC should be very close to zero. This would cause the second term in each price function to be zero and the profit maximizing prices to be:

- afternoon price \( P_1 = 3.20 \)
- weeknight price \( P_2 = 3.47 \)
- weekend night price \( P_3 = 6.71 \)

It is intuitively rational that \( P_1 < P_2 < P_3 \) when the elasticity of demand of each market is considered.

In the afternoon the group of people served probably consists of retired, vacationing or unemployed people who would need to be offered a lower price relative to the other markets. That is, they have the highest elasticity of demand.

On weeknights demand is less elastic than afternoons as higher income individuals (people who work during the day for example) are served. They are less responsive to the higher price than the afternoon market, but their demand is more elastic than the weekend market.
People who can't attend during the week have the most inelastic demand, allowing the theatre to charge an even higher price on weekends. Income, the value of time, the availability of babysitters, traditional weekend date nights etc. may contribute to the lower elasticity.

To check the second-order conditions for a maximum:

\[ d \Pi = (6.407 - 0.05848Q_1 - C'(Q)) \, dQ_1 \]
\[ + (6.939 - 0.05848Q_2 - C'(Q)) \, dQ_2 \]
\[ + (13.427 - 0.05848Q_3 - C'(Q)) \, dQ_3 \]

Recall \[ d^2 \Pi = \left( \frac{\partial (d \Pi)}{\partial Q_1} \right) dQ_1 \, dQ_1 + \left( \frac{\partial (d \Pi)}{\partial Q_2} \right) dQ_2 \, dQ_2 + \left( \frac{\partial (d \Pi)}{\partial Q_3} \right) dQ_3 \, dQ_3 \]

\[ d^2 \Pi = 0.05848 \, dQ_1^2 + 0 \, dQ_1 \, dQ_2 + 0 \, dQ_1 \, dQ_2 \]
\[ + 0 \, dQ_2 \, dQ_1 - 0.05848 \, dQ_2^2 + 0 \, dQ_3 \, dQ_2 \]
\[ + 0 \, dQ_3 \, dQ_1 + 0 \, dQ_3 \, dQ_2 - 0.05848 \, dQ_3^2 \]

\[ d^2 \Pi = 0.05848 \, dQ_1^2 - 0.05848 \, dQ_2^2 - 0.05848 \, dQ_3^2 \]

Using the coefficients to construct a Hessian metrus:

\[ \begin{vmatrix}
-0.05848 & 0 & 0 \\
0 & -0.05848 & 0 \\
0 & 0 & -0.05848
\end{vmatrix} \]

The principal minors are

\[ |H| = f_{Q_1 Q_1} \quad |H_2| = \begin{vmatrix} f_{Q_1 Q_1} & f_{Q_1 Q_2} \\ f_{Q_2 Q_1} & f_{Q_2 Q_2} \end{vmatrix} \quad |H_3| = |H| \]
\[ |H_1| = -0.05848 \text{ which is } < 0 \]
\[ |H_2| = (-0.05848)(-0.05848) - (0)(0) > 0 \]
\[ |H_3| = (0.05848)[(-0.05848)(-0.05848)] < 0 \]

Since \( |H_1| < 0 \), \( |H_2| > 0 \) and \( |H_3| < 0 \) the sufficient conditions for a maximum are satisfied.

FOOTNOTES

1. I would like to thank Patrick Hurst, formerly of the University of Northern Iowa Department of Economics, for his guidance and the performance of the regression analysis.

2. Cinema Theatres, College Square Shopping Center, Cedar Falls, Iowa.

REFERENCES

IRELAND: INDUSTRY, AGRICULTURE, AND BALANCE OF PAYMENTS
Ellen McBride and James Shindelar

The republic of Ireland is a country that is dependent on the world economy for its economic survival. Ireland has had economic and political problems linked to a deterioration in the international competitive position of the nation. Ireland was a part of the United Kingdom from 1800 to 1922. The Anglo-Irish agreement was signed and Ireland was established as an independent member of The British Commonwealth. The last link with England was severed in 1948. England and Ireland have very close economic and trade relations. Ties have become still closer because of the free trade agreement signed between the two countries in 1965.

Ireland has few resources. The country has large areas of peat bog and grasslands. These grasslands are the mainstay of the country's large livestock population. Ireland is not rich in mineral resources although recent discoveries of silver, lead, and zinc have, nevertheless, been developed. Ireland's population in the early 1970's was little more than half of what it was in 1841. This is due to the exceptionally high rate of emigration. About 50% of the Irish born people live outside of their native land. There has also been a shift of population internally from rural to urban areas due to the fact of a reduction in agricultural employment and an increase in industrial employment.

The Irish government runs many sectors such as air services, transportation, radio, and television although private initiative is favored. Ireland's economy is tied very closely to Britain on trading and financial positions. The Irish and British pound have remained on a parity footing since 1922.

Agriculture is the mainstay of the nation's economy. Cattle and meat preparations are the dominant feature of gross agricultural output. Industry has increased since the middle 1950's through encouragement of the government by means of tax concessions, financed grants, and other incentives. Inflation in the late 1960's increased the price of their exports. This hurt Ireland's competitiveness with other nations causing a high balance of payment deficit.
The Central Bank of Ireland is the national monetary authority and its responsibilities include keeping the nation's current exchange rate at its present pegged rate. The bank does not transact with the public but exerts a considerable influence in Ireland's economy through the "advice" it gives associated banks. Associated banks are an Irish term similar in meaning to America's system of Federal Reserve member banks.

The Irish republic is a parliamentary democracy with a written constitution. There are diverse political parties at the state and provincial level. Irish law is based partly on common law and partly on statute law. Ireland has had its problems especially in dealing with Northern Ireland. Mounting religious and political crises have had diverse effects in relations with England. Steps have been taken to help these conflicts with voluntary national agreements and admission into The European Economic Community in 1973. In studying Ireland's economy, we will focus on the trade sector with particular emphasis in the balance of payments deficit and its supposed causes.

The balance of payments is a composite of two aggregate functions: total exports less total imports of goods and services. Any variations in the balance of payments are due to changes in volume of imports and exports, changes in prices, or a combination of the above two. Ireland in the past years has had a balance of payments deficit. This current balance of payments deficit is equivalent to the net foreign disinvestment in Ireland. Disinvestment is the amount of visible and invisible investment that is no longer taking place in Ireland at the previous rates. Visible exports and imports involve physical goods and services. Invisibles involve financial markets such as buying and selling securities, investments, etc. This disinvestment causes instability in Ireland's economy.

Instability in exports generally tends to increase uncertainty. This uncertainty adversely affects future investment and innovation. If a country does not invest in its industries presently, there will not be any new technology developed. If resources are utilized to increase the technology of today, today's knowledge will be used as a base for tomorrow's knowledge. Hence, if Ireland has instability in its markets, both the present and future will be adversely affected. This uncertainty is enhanced with the movement of skilled
Irish labor to The United Kingdom for the same reason as above. There will be a shortage of skilled manpower for any future technological advancements achieved. Ireland is already facing a shortage of skilled labor because of the changing composition of its exports.

The emphasis of Ireland's exports has recently been shifted from agricultural commodities to manufactured goods. Shifts have also occurred within the agricultural industry. The shift from the live animal category to meat and meat preparations accounts for the rise in domestic slaughter of cattle for export. Even with these internal switches, food products declined as a proportion of domestic exports from 72.5% in 1950 to 38% in 1981. A portion of this shift from agricultural commodities to manufactured goods can be accounted for by actions of the Irish government.

The government wanted to encourage industrial development in the 1950's. One of the first steps taken was the establishment of The Industrial Development Authority in 1949. This group was responsible for promoting industrial development as well as attracting foreign industry. In 1956, an export tax incentive law provided for a greater share of the profit from manufacturer's exports to be received by the manufacturer. It was hoped that these increased profits would promote industrial development in Ireland. The growth of manufacturing did lay down a base for further expansion in the 1960's. In 1960, The Anglo-Irish Free Trade Area Agreement became effective. This agreement affected textile and clothing manufacturers' favorably. Other exports may also have been influenced. Other countries will not purchase goods from Ireland if Ireland has tariffs against their goods. Thus, when the grade agreement passed, trading increased with The United Kingdom which helped many of Ireland's exports. All of these measures aided in the export growth of Ireland since 1949.

Ireland's policy from 1949 to the early 1970's was appropriate and in accordance with the continuing expansion of world trade. Ireland's policy was to increase exports to meet the world demand. Large amounts of fuel were needed for the production increase. In 1973, just as Ireland was expanding its industries even further, world demand began to falter as a result of the oil shock. Thus, demand for Ireland's exports fell. Ireland's expansionist policies no longer applied to the faltering world economy. Unfortunately, Ireland did not
respond quickly enough. Balance of payment problems arose because Ireland still imported the high-priced fuel to manufacture goods to export that were no longer in such high demand.

The high price of oil also had internal effects. The people of Ireland experienced a decrease in their purchasing power parity which caused them to ask for increased wages. Inflation occurred in Ireland's economy. Unemployment rose as a result of inflation and the decrease in the quantity demanded of exports. Ireland was in an extremely difficult position of achieving a reduction in unemployment while simultaneously trying to obtain a reduction in the balance of payments deficit and control inflation. A possible solution could be a devaluation of their currency to help exchange rate problems which could help to turn around the balance of payment problem of Ireland.9

To help explain the balance of payment problems in Ireland, two separate hypotheses are proposed. The first hypothesis is that variations in the price of industrial goods, gross national product, the exchange rate, and the interest rate have an effect on the balance of payments of Ireland. That is, \( BOP = f(P_M, P_X, r, i) \). The second hypothesis is that variations in the price of imports, price of exports, the exchange rate, and the interest rate have an effect on the balance of payment deficit. The exchange rate, prices, and interest rate might be affected by inflation which might be influenced by monetary policy. To support the hypotheses, two regressions were run. (Supporting regression material may be found in Table 1).

A coefficient of determination was computed. This coefficient is a proportion of the total variation in the dependent variable that is explained by the full set of variables included in the model. It can take any value from zero, indicating no relation, to one, which indicates that all variation in the dependent variable is caused by the independent variables. In the first regression, where \( BOP = f(P_M, GNP, r, i) \), the value of \( r^2 \) was .7498. In the second regression, \( BOP = f(P_M, P_X, r, i) \), the value was .7437. For most work these values are acceptable.

Another statistic that was computed was the F-statistic. This test relates the relationship between the explained and unexplained variation. A value of
zero shows no relationship between independent and dependent variables. The value computed was more than sufficient to establish dependence between the independent and dependent variable. The standard error was also formulated. In the first regression, \( \text{BOP} = f(P_i, \text{GNP}, r, i) \), most of the standard errors were smaller than the estimated coefficients of the independent variables. This condition indicates a separate relation between each of the independent variables with the dependent variable.\(^{10}\)

The t-statistic was also utilized. The t-test is performed to see whether the estimated coefficient is significantly different from the projected value. It measures the number of standard errors between the actual value and the hypothesized value. In the first regression, the interest rate, gross national product, and the prices of industrial goods did not show much of an effect on the balance of payments. The independent variable that did exhibit a strong influence on balance of payments was the exchange rate. The t-ratio for this relationship was -2.258. A relationship between the exchange rate and the balance of payments can be inferred. To support this statement, the elasticity using mean values, was 3.5796 showing a very elastic relationship—a small change in the exchange rate constituted a large change in the balance of payments. Hence, as the exchange rate increased, the price of Ireland's goods and services became relatively more expensive to foreign goods, which might have caused a decrease in exports. One of the solutions previously mentioned to overcome the balance of payment problems was to depreciate the Irish pound. This could be a plausible solution to Ireland's current balance of payments problem.

In the second regression that was run, a couple of new independent variables were used. The price of imports and the price of exports were used along with the interest rate and the exchange rate. The coefficient of determination was similar to the first regression. The value computed was .8369, again suggesting that over 80% of the variation in the balance of payments was caused by the independent variables being studied. The F-value was similar to the first regression also. A slight difference was found in the standard error statistics. In this regression, the standard errors were larger than the estimated coefficients. Although the coefficient of determination was over .8, indicating that on a whole the model explains most of the variations in balance of payments, a problem had developed with the standard errors being larger than the estimated
coefficients. This problem is termed multicollinearity. This means the independent variables not only have a link with the dependent variable (balance of payments), but that there are indistinguishable relationships between the independent variables as well. The statistics are unable to clearly specify a unique relationship. When looking at the independent variables, this possibility can be shown. The relationship between price of imports, price of exports, and the exchange rate might be difficult to separate.\textsuperscript{11}

This difficulty might be cleared up by looking at the t-statistics for this second regression. The price of imports and the exchange rate are shown to have a more substantial effect on the balance of payments. This supports the hypotheses since Ireland imports would have a significant effect on balance of payments. An example of this mentioned previously was the oil shock of the 1970's. Again, the exchange rate was found as an influential variable on the balance of payments.\textsuperscript{12}

Aspects of the two regressions support the hypotheses somewhat. The exchange rate and the price of imports were found to have a significant effect on Ireland's balance of payment deficit. This is shown to be true where the price of fuel increased dramatically in the 1973 oil shock. Also, the plausible solution of depreciating the Irish pound might be an effective tool. Since the 1970's when Ireland's international competitiveness started to decline, inflation and weak demand for exports have been problems. Monetary policy and fiscal policy might be able to remedy Ireland's unemployment and inflation, and exchange rate changes might remedy their current balance of payment deficit.\textsuperscript{13}
Table 1
Regressions

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients of Payments</th>
<th>Coefficients of Payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance of Payments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exchange Rate</td>
<td>-2.258**</td>
<td>-2.9576**</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>.44245*</td>
<td>-.83406*</td>
</tr>
<tr>
<td>Gross National Product</td>
<td>-.43186*</td>
<td></td>
</tr>
<tr>
<td>Price of Exports</td>
<td></td>
<td>-.7324*</td>
</tr>
<tr>
<td>Price of Industrial Goods</td>
<td>-1.4495**</td>
<td>.93958*</td>
</tr>
<tr>
<td>Price of Imports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>1.8108</td>
<td>3.0356</td>
</tr>
<tr>
<td>R²</td>
<td>.7498</td>
<td>.7437</td>
</tr>
<tr>
<td>F</td>
<td>9.239</td>
<td>8.979</td>
</tr>
</tbody>
</table>

*Significant at .05 level
**Significant at .01 level

FOOTNOTES
4. Kennedy, pp. 81-84.
11. Regression analysis run on Ireland.
REFERENCES


