



Taxes, Capital and Jobs: The Variability of Valences

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Taxes, Capital and Jobs

The variability of valences

Mason Gaffney PhD

THE NEED for more capital to create jobs is a subject of continuous debate. Much of the talk may be discounted as axe-grinding by political lobbyists. Yet a case does exist. It must be taken seriously, argues Mason Gaffney, because it goes far toward destroying the case for fiscal progressivity, the argument that persuaded the public to accept the concept of the income tax. How does it destroy progressivity?

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■ Preferential income tax treatment of property income ring-fences the top income receivers from tax liability, especially when we exempt capital gains.

■ Preferential treatment exempts or favours the unearned increment in value that may be imputed to land, especially when we favour capital gains.

■ The outcome of reforms that many economists and political lobbyists champion would be to convert the income tax into another payroll tax. Thus they would socialize a large share of personal effort, while eliminating the public equity in the land and capital resources of the nation.

Preferential tax treatment for property also destroys the neutrality argument for income taxation. It encourages the substitution of capital and land for labour. It forces higher tax rates on personal effort, thus weakening the incentive to work while maximizing the incentive to lobby for public works and other tax-funded outlays which create unearned increments to land values. Are these fiscal "incentives" necessary to induce investors to create jobs? The author outlines an alternative thesis: that the *use* of capital rather than the simple quantity of capital is the key to full employment; and that tax preferences for property income prejudices investors against using capital to make jobs.

ADAM SMITH wrote: "the number of...labourers is...in proportion to the quantity of capital stock which is employed in setting them to work, and to the particular way in which it is so employed."

"The quantity of labour which equal capitals are capable of putting in motion, varies extremely according to their employment."

"A capital employed in the home trade will sometimes make 12 operations, or be sent out and returned 12 times, before a capital employed in the foreign trade ... has made one."¹

Adam Smith is here evidently referring to capital as stock in trade. For generating employment, fixed capital frozen in buildings or turnpikes was so sterile as hardly to be worth mentioning. Time has not changed that much. One modern desk worker occupies about 200 s.f. of floor space. The cost of constructing that is roughly \$100 per s.f., or \$20,000 per desk worker. Some 20%-30% of on-site construction cost is labour, say \$5,000 per desk worker. If the mean desk worker earns \$30,000 a year, and the floor space lasts 60 years, the labour input in using the space comes to \$1,800,000, or 360 times the construction labour. It is *using* floor space, not building it, that makes most jobs and produces most goods and services. The greater importance of building is that it gives labour better access to the location, which might otherwise go unused.

Consider retailing. Sales per square foot (p.s.f) in modern department stores might be \$300 p.s.f. per year – much more in downtown New York, less in smaller markets. Over 40 years, thus, sales total \$12,000 p.s.f., or 120 times construction cost. The flow of capital through the store – the throughput – accounts for so many times more jobs and products than the capital in the store building that a macro-economist can nearly ignore building construction as a job source.

John Stuart Mill makes this graphic by distinguishing between fixed and circulating capital. "Capital ... in unsold goods does not set in motion any industry. [Thus] Capital may be so employed as not to support labourers, being fixed in machinery, buildings,... locked up in the form useless for the support of labour. Suppose half [one's capital] effects a permanent improvement.... He will employ next...year only half the number of labourers."²

That is, the owner of capital does not get his money back from the permanent improvement next year – no "reflux" – and therefore has nothing to spend on another payroll. Likewise, a lender who finances the improvement recovers little or none of his principal for a few years, and cannot therefore invest in anything new. A modern economist might object that the money could be printed by a friendly central bank, but John Stuart Mill would correctly answer that this printed money would not deliver any final goods to consumers and therefore only drive up prices. He had not

learned to accept inflation with the same facility as we have today, or to regard it as anything but a fraud.

Assuming if you will that Smith and Mill make sense, a capital shortage has two causes, and therefore two solutions. The cause we hear most about – let's call it Theory A – is a simple shortfall in quantity. The solution obviously is to get more. The proposed method is to exempt capital and its income from taxation, and incidentally shift taxes to wages and salaries and other rewards of personal effort.

This method wastefully gives away more than is needed to accomplish its goals. In practice, it exempts land income, especially when preferential treatment of "capital" gains (mostly land gains) is emphasised. This method in practice exempts capital overseas, which really should be called home if the purpose is to make jobs in our own country.

This method perpetuates and adds to structural distortions that misallocate capital and tie it up in the form of labour substitutes in highly capital intensive industries and activities. Some examples of this are premature streets and water supply systems financed by tax free municipal bonds. Tax sheltered exploration for oil and gas is another example. It ties up capital for decades before recovery and it finally produces energy which is complementary to capital in downstream uses. Yet another example is timber allowed to regenerate naturally, i.e. without the effort of planting – which ties up land for 80 to 150 years under each crop with minimal application of labour.

Finally this method shifts the tax burden to payrolls, thus leading employers to substitute capital for labour and causing many workers to prefer welfare, crime or the pursuit of charity and unearned income to productive labour. This tax shift, a necessary counterpart of downtaxing capital, does not help with the formation of new jobs.

Misuse of capital stocks THE SECOND cause of a capital shortage – Theory B – is relatively neglected. Theory B follows the lead of Adam Smith and John Stuart Mill and looks at the misuse and misallocation of the capital we already have. Misuse and misallocation have the same effect as cutting supply. There is a lot of fat in the capital structure, where capital is locked up in less productive uses to which it is attracted by tax shelters. "Fat" also suggests that the capital is torpid and combines less with labour, thereby making few jobs.

The solution under Theory B is to tax capital uniformly in neutral and non-distorting ways. Not only should different investments be taxed at the same effective rate, but the rate on capital income should be no lower, and perhaps higher, than the rate on wages. The rate on both wages and capital income should be lower than the rate on land income, for the last is neutral and taps economic rent.

Professors Robert Murray Haig and Henry Simons and others have long noted that an increase in one's wealth is current income, and that a tax on capital gains, to be neutral, must tax gains at the time they accrue and not, as now, later when the owner finally, if ever, sells. Simons and the others then despaired of taxing unrealized capital gains in practice. Note, however, that the property tax does take a bite of unrealized capital gains each year, and it is easy to show mathematically that a property tax in a rising land market is exactly a tax on unrealized capital gains. The property tax also takes a bite of that other kind of invisible income that the income tax exempts entirely, and even subsidises: imputed income of owner occupied residential and recreational property.

A non-distorting way to tax capital income therefore under the income tax is to make it resemble as much as possible the property tax. At the other extreme it is easy to show mathematically the necessary corollary: our present income tax on realised capital gains has an effective rate that falls towards zero as the asset is held longer.

GOING BACK to Adam Smith, the quantity of labour that slow turning capital "sets in motion" is much less than the same capital moves when it is turning fast. The solution implied by theory B, therefore, is to make the income tax as uniform as possible in its treatment of different kinds of capital or, if anything, to favour faster-turning capital. This is not the place for technical details of a comprehensive tax base with inter-temporal neutrality. There is a substantial literature by William Vickrey, Joseph Pechman, Paul Samuelson, Richard Musgrave, Henry Simons, Robert Murray Haig, Emil Sunley and others³ to which I subscribe and to which I have added a few foot notes dealing with land income, which the other writers neglect.⁴ Suffice it here that this line of reasoning does not imply preferential treatment of capital gains but if anything the reverse. Neither does it support revenue-sharing, which replaces the more neutral property tax with the less neutral income tax.

Phantom Incomes

Inflation has the effect of creating phantom taxable profits for capital. We could perhaps, in the name of neutrality, justify lower nominal rates on property income than labour income, in order to compensate for the taxation of phantom inflationary profits on property income. Be aware, though, that champions of this idea, both political and academic, push it most strenuously where it is least appropriate, that is, for long term capital gains. The phantom profit realised on working capital is taxed continuously from year to year as the phantom profits are realised. It needs relief. The phantom profit on long term gains on the other hand is not taxed until the capital asset is sold, if ever. Thus the phantom profit of year one of a long-term holding period is not taxed as it accrues; but the taxation is deferred until sale, as with all capital gains. The effect of

inflation, therefore, is to increase the tax system's inter-temporal bias in favour of slower-yielding capital.⁵

If we do grant a lower nominal tax rate to capital income we should not do the same for land income because there is no phantom income in rents. This is because there is no turnover of the corpus of value: no depreciation of land, and no capital recovery allowance. Neither is the cause of full employment served by encouraging the substitution of land for capital or labour.

And yet Congress has lowered tax rates on property income, in part using the rationale of needing to compensate for phantom profits. It has not adopted the "indexing" proposal specifically tailored to the phantom profits argument, but has kept ratcheting down the rates on gains, and allowing more loopholes for capital and land, to the point where "income property" worth trillions of dollars in the market is yielding no income tax revenue at all. At the same time, Congress has done nothing for another kind of phantom, viz. the excess of nominal salaries over disposable take-home pay. Income taxes are based on a mythical gross salary before withholding of income taxes, payroll taxes, involuntary pension exactions, and perhaps other items. This puts a large added tax burden on payrolls compared to sheltered property income. One way to do this might be to base the tax on after-tax disposable income. Some will see this notion as bizarre, because it seems novel; but it is not novel. It is simply a way of applying to the income tax the same diluting factor that is traditionally applied to the property tax (*see Box 1*).

**Capital
shortage as
a problem
of quantity**

PART OF Theory A must be the implication that capital is always complementary to labour, whatever its use. Advocates generally do take this position. There are two approaches, one which looks at the economy as horizontally integrated, and the other which looks at it as vertically integrated.

The first or horizontal approach is represented mathematically by the Cobb Douglas Function. In this much abused function output equals a constant multiplied by the product of labour and capital, each raised to a power (usually less than one). Differentiating output with respect to labour we get the marginal product of labour, a constant times the quantity of capital raised to a power (and divided by labour to a power less than one).

$$P = C H^{\alpha} K^{\beta} \quad (1)$$

$$\delta P / \delta H = C \alpha \times K^{\beta} / (H^{1-\alpha}) \quad (2)$$

[where P = Product; C, α and β are constants; H = Human effort; and K = Capital]. In the Cobb Douglas approach, therefore, more capital necessarily raises not just the average but the marginal product of labour as well.

Box 1
A Tax on Disposable Income

THIS IS PRESENTED to show the simplicity and the implications of taxing disposable income rather than before-tax income. It is not necessarily the best of various reforms that might be considered, but merely a worthy new entrant with important mind-stretching qualities.

This proposal will strike many as bizarre, because it seems novel. It is not novel, however: it is simply treating the income tax base the same way we now treat the property tax base. The property tax base is the market value of property, which is its after-tax value: the value after deducting property taxes themselves – a process called “tax capitalisation.” This dilutes the property tax in the same way that the proposal offered here would dilute the income tax base. The present asymmetrical tax treatment of payrolls and property creates a strong bias tending to tax property less than appears, and payrolls more. I am not aware of any writer who has shown any consciousness of this bias – a neglect which itself constitutes or betrays a cultural bias so strong it has blinded most of us to the obvious.

Let us consider basing income taxes on disposable income, D , rather than, as now, on gross income, G . If T =Tax, and t =tax rate, and $D=G-T$, then under this method $T=t(G-T)$. From that it follows (by collecting terms) that $T=t/(1+t) \times G$. Thus, for example, a tax rate of 100% on D is just 50% on G .

This change would allay the existing bias against payrolls caused by withholding against them, while at the same time deferring the taxation of wealth accruals until they are realised in cash. This would devalue many basic tax loopholes for property income. At the same time, it would increase after tax work incentives by reducing the basic progressivity of the rate structure. One easy way to implement this would be simply to let people deduct Federal tax payments from Federal tax base each year as they made out their returns. The effects of this one simple change would be quite profound.

A side-benefit of this proposal is to clarify the favouritism to property that results from “tax capitalisation,” which means lowering the tax base with each hike in the tax rate. If the proposal made above is a bizarre idea, the present treatment of property taxation is a bizarre fact.

Implicit assumptions like this one are sneaky. Those who make them indeed are often as unaware as anyone of what they are doing. Calling it a mathematical function makes the implicit assumption easier to detect mathematically, but the use of mathematics in general discussions, where half the listeners or readers are not really following, makes it harder to detect in fact.

Once the implicit assumption of complementarity is put across, then you may rest your case on the law of diminishing returns.⁶ Alternatively you can take engineering “requirements” as your approach and say that one job requires X thousand dollars of capital. A third method is to buy the models of Professors Harrod and Domar, with fixed ratios of capital to output.

But this approach should leave unsatisfied many of the unconverted, because common observation tells us that much capital substitutes for labour and disemploys workers. Sheep, cattle and timber are obvious examples. There is a third factor of production – land. Sheep, cattle and timber have high “valence” (to borrow a chemical term) for land, but a low valence for labour. They have long historical records as depopulators of the countryside. An equally obvious example is farm machinery; which is one species of a large genus of machines that substitute for labour. In industrial plants we may add automation and cybernation. Some other examples are power generation and distribution, which are very capital intensive; mineral extraction and refining, which may be even more so; and so on. Every local public finance officer knows that some plants are much more capital intensive than others, because, unfortunately for national employment, localities now have stronger incentives to attract capital intensive plants than labour intensive ones, and it is his job to know the difference.

To meet these obvious objections to Theory A in its horizontally integrated form, the advocates turn to a second approach which is vertically integrated. Farm machines may displace farm workers, but it is labour that produces the farm machines. Turning this around we have the Keynesian variation which stresses not the labour producing capital, but the capitalist hiring workers by investing in capital. Here, capital intensive projects are a boon because they are outlets for investment: outlets needed to activate surplus savings and thus keep money circulating. Ironically this approach, used to shelter property from taxation, is quite Marxian. In Marx the economic universe is always tending to run down like an old clock and has to be wound up by fabricating investment outlets to move along savings that got stuck. Keynesian macroeconomics, in spite of its variations, elaborations, and intricacies, is ultimately based on this old clock concept.

There are many troubles with this paradigm. It is based for one thing on the implicit assumption of declining velocity or turnover of money, and pervasive deflationary pressures. Now we have had several decades of increasing velocity and increasing money supplies.

The old paradigm is based on the idea that supply fails to create its own demand. Today, and for decades before now, it is demand that is not creating its own supply, thus steadily inflating product prices, year by year. Incomes that are created today by paying people to produce capital which will not be ready for consumption for 30 years are clearly inflationary in the short run. In the long run they are inflationary, too, because they lower the number of real transactions that any given money supply must finance.

In Keynes, one solution to over-saving is simply waste. However, to

satisfy the puritan prejudice we store up capital for the remote future as a more culturally acceptable alternative to waste. Any sort of spending would be equally good, but the promise of "pie in the sky in the sweet bye and bye" is offered as a sop to convince crusty Presbyterians to spend money.

Whatever we may think of Keynesian economics today, Theory A in its vertically integrated approach is based on the Keynesian ethic that the sources of capital are excessive and the solution is to freeze capital in forms that will contribute as little as possible to the overproduction problem of the near future. The checkmate for the followers of Theory A is that this Keynesian ethic flatly contradicts a theory of capital shortage. It poses an insoluble problem for those who favour Theory A.

THEORY B has it that capital may either complement labour or substitute for it, and which kind of capital investors create depends on relative prices. Thus the capital structure may adjust so that the existing supplies of capital and labour will match each other. In addition to relative prices, however, the capital structure is affected by institutional bias, including tax bias; and such bias may interfere with the market's homing in on full employment.

Capital structure and jobs

We may approach Theory B first of all from the horizontally integrated viewpoint. An investor who is contemplating substituting machinery for labour observes that the machinery gets him an unreasonably generous deduction, while to employ labour costs him a payroll tax. The minimum wage and unemployment compensation, stingy though they may be, keep wage rates from falling, and the combination makes entrepreneurs substitute capital and land for labour, as by pulling out fresh-market tomatoes and planting barley. Similarly the deductibility of interest and property taxes, and the capital gains preferences, lure him to substitute land for labour.

Replacement of persons by machines is the most dramatic example of substitution, but probably not the most important. Some other kinds of substitution are the substitution of capital and resource intensive materials for labour intensive materials. Processes as well as products are malleable. We can substitute capital by building in more durability at the front end to reduce maintenance and repair later. We can adapt to variability of demand by having excess capacity on standby in preference to utilising more labour. We can shift the stage of production at which value is added as for example letting timber add more value on the stump so that less labour is required in the mills. We can substitute land for labour by using fewer men per acre on farms and shifting to less laborious kinds of crops. The possibilities are limited only by the imagination and the observation of actual practice.

Critics of my Theory B might now say, Ah ha! Capital "locked up" in power plants and hydro electric dams and premature highways and excess capacity represents investment opportunities, exactly what Dr. Keynes ordered. Investment is what draws money out of hoards, keeps it circulating, and keeps the big clock from running down.

In answering that, Theory B gets particularly interesting and wonderfully useful, giving important insight into where modern macroeconomics has gone wrong. Austrian economics, following some insights from Ricardo, has long anticipated this objection by looking at factor proportions in a vertically integrated scheme. When we look at the relations of capital and labour in sequence instead of in parallel, the capital content of value-added depends on how long capital is tied up before its recovery.

For example if we finance a house over thirty years we pay twice as much in interest as in principal. The service flow over life is highly capital intensive because two-thirds of the payments go as interest to pay for the use of capital.

Production of houses accordingly is very sensitive to the cost of capital, as we know. It is much less sensitive to wage rates. Observation has it, therefore, that if interest rates are low they entice investors into housing, and other investments of long life. High wage rates push them out of short investments like textiles or vegetable farming, but have small relative effect on housing. Using this approach, we allow for the fact that labour produces capital, and investment creates jobs. But the capital in housing only creates jobs once every twenty years or so on the average (assuming it is half recovered and reinvested after twenty years). Let's compare this with a farmer's investment in growing carrots. The farmer recovers and reinvests his capital at least once a year (and maybe more often because he won't let it sit idle during the off season). Carrots are to be compared to Adam Smith's capital in the "home trade" making twelve operations while the same capital in foreign trade makes only one. Foreign trade here is comparable to housing. In a word, a given sum of capital keeps more people busy over the years if it turns over faster. Each act of reinvesting creates a new payroll.

At the same time, each year's output of carrots feeds the brutes. The house to be sure also shelters them; but the value of its service flow is only interest on the value plus a small recovery of principal. The value of the carrots is interest on the capital plus the whole principal. The house gives a year's service; the carrot gives its all, its corpus.

It is common for users of Theory A to justify tax shelters for housing (or municipal bonds or oil exploration or other capital intensive investing) by pointing to the jobs created. But all this capital is switched away from other investing, such as growing carrots. *The true comparison is not*

between something and nothing, but between capital-intensive and labour-intensive investing. The comparison has to be made over the whole life cycle of the slower capital, wherein the fast capital may, as Adam Smith said, make 12 operations while the slow capital makes but one.

It follows that in any one year, in a balanced economy where retirements are matched by new investments, a given capital in (things like) carrots generates a regular flow of gross investment 12 times greater than an equal capital invested in (things like) trees of 12 year life.⁷ (This is not limited to examples that resemble trees. It includes any other capital, e.g. a commercial jet airframe, whose average recovery period is 12 years.) The reasoning by which this follows is analogous to that by which one "stacks" the echo effects of the Keynesian horizontal multiplier into the vertical or simultaneous multiplier. (A mathematician would call it, inverting the order of integration.) Such stacking gives another true comparison of the employment effects of switching investment from fast to slow capital.

But are the carrots an efficient use of capital? The margin of profit is much less. Here we hark back to another paragon of the Age of Reason, Benjamin Franklin, who told us that "little and often makes much". It is not just the margin of profit that makes capital efficient, it is *margin times turnover*. This has been one of the leading principles of rational business management at least since Alfred Sloan reorganised General Motors in the 1920s with some advice from Donaldson Brown who came in from Dupont to help straighten out the cash flow crisis created by the over expansive Will Durant. Sloan and Brown took great pains to require each division to earn a minimum return on capital. The rate of return was defined as margin times turnover, divided by capital.⁸ Elementary as this may sound (and oversimplified besides), it played a leading role in the rational management of that enormously successful and job-making mass of capital at General Motors. And it is not so elementary that we can assume it to be incorporated in the management of the nation's capital as influenced by its tax system. The tax system, based on the working principle "shoot anything that moves," militates against turnover, because each turnover creates one or more taxable events. In this respect, retail sales taxes are the worst offender. They tax capital each time it turns over. Little wonder that Adam Smith, keen observer that he was, attributed the fall of Spain's economic power to its high reliance on a national sales tax, the *alcabala*.

When a manager considers turnover in addition to profit margin this pushes his capital into faster turning forms. These have smaller margins, but more of them, so the return on capital may be just as high or higher.

What, then, is the difference? A given capital rolling over faster employs more labour and produces more output for consumers. It "sets in

motion," as Adam Smith would have said, more workers; and it sets them in motion productively so their employment does not simply generate inflation.

Markets deliver optimal balance I DO NOT say that all our investing should go into working capital like carrots, and none into fixed capital like roadbeds, harbours, telephone poles, and buildings. There is a market mechanism that finds an optimal balance. If capital is scarce and labour surplus, this should lead to higher interest rates and lower wage rates. These, in turn, draw investing into working capital, and away from fixed capital, until the "valence" of capital for labour shall have risen, soaking up the surplus labour.

The problem is that this optimising mechanism is jammed by institutional biases. Minimum wage laws, union pressures, and welfare as an alternative keep labour from becoming cheaper. Demonisers of labour may reflexively applaud that statement, but are they consistent enough then also to note that payroll taxes, including most of the income tax and pension fund contributions based on payroll, have the same effect?

The great illusion of macroeconomic policy is that the way to make work for labour is to make work for capital by making capital cheap. This is Theory A. Some of its manifestations are or have been the following:

- the investment tax credit, with sliding scale to avoid giving preference to fast turnaround investments;
- the 20% additional first year depreciation for capital with life over six years;
- preferential treatment of long term capital gains;
- property tax relief in the guise of revenue sharing financed by increasing state and federal "income" taxes which hit payrolls harder than property income;
- guaranteeing loans to pump cheap capital into housing and many other capital intensive products;
- direct investing by government force feeding capital into highways, public works and so on;
- non taxation of state and local bonds, making cheap capital available to state and local governments;
- accelerated depreciation granted to durable capital;⁹
- multiple depreciation of old buildings;
- expensing of certain durable investments; and
- capping energy prices in lieu of taxing energy rents (the last point fits the bias because energy complements capital, substitutes for labour, and is capital intensive to produce).

Where the objective is really to make jobs, Theory A policies are self

defeating. An unrecognised self defeating policy is most dangerous, because its failure is taken as a sign that more is needed.

THE RELATIONSHIPS of capital, turnover and employment were particularly well worked out by Knut Wicksell, the "Swedish Austrian". Adam Smith and John Stuart Mill are terse and quotable, but often self contradictory, while Wicksell had the mathematical mind and tools to get the whole act together. (What he evidently lacked was the discrimination to lean harder on this discovery than less important interests, a problem that may be endemic to academicians.)

Valence in economics

Wicksell showed that the "wages fund" depends on how capital is used and specifically on how fast it turns over. It is only the part of capital "set free" – i.e. recovered – each year that can hire labour.¹⁰ Wicksell had the good judgment to call it the "wages-flow," because it is a variable flow, not a fixed fund or stock. Today we call it "income creating spending". Critics who spurn what they call the "wages-fund theory" seem not to have caught on to Wicksell or, perhaps, in some cases, not even to appreciate the difference of a fund and a flow value in economics.

One firm can invest in excess of capital recovery or reflux by tapping others. Fine, but the whole economy cannot, except by new saving. It is a closed system. For a whole economy to increase the capital "set free" each year it must increase turnover. Turnover delivers goods to hold down prices at the same time that it gives business free capital to invest in payrolls. Full employment and price stability are the joint products of an optimal rate of turnover.

To this end the needed policies are lower taxes on labour, higher taxes on land, no taxes on sales, and inter-temporal uniformity in the taxation of capital. The shortfall is not so much of the stock of capital, but of the flow of income creating, job creating investing, reflux, and reinvesting of capital. To remedy this, simply make it cheaper to use labour, and dearer to hold torpid capital and inert land.

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- 7 This is not limited to examples that resemble trees. It includes any other capital, e.g. a commercial jet airframe, whose average recovery period is 12 years. For the meaning of "average" recovery period see Gaffney, 1976, App.1. It is the period required for the lender, or other financier, to recover half his capital over and above interest payments.
- 8 Thomas J. McNichols, *Executive Policy and Strategic Planning*, (New York: McGraw Hill, 1977) p.44.
- 9 Accelerated depreciation lets one write off slow turning capital nearly as fast as quick capital, and sometimes faster.
- 10 Knut Wicksell, *Lectures on Political Economy*, Trans. E. Classen (New York: Macmillan, 1938), pp. 194-96. *Value, Capital and Rent*, Trans. S. H. Frowein (London: G. Allen and Unwin, 1954), pp.127, 160. Many critics wrongly dismiss Wicksell's demonstration under the impression that it applies only to assets that resemble wine – they trivialise it as "the grape-juice model". Such dismissal is merely weak mathematics. The model is actually perfectly generalisable, as shown in Gaffney, 1976, App. 1, using nothing more than basic financial mathematics.