CHAPTER 4
Taxation and Entrepreneurship

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Introduction

This chapter examines the relationship between tax policy and Schumpeterian entrepreneurship. The word "entrepreneur" has a long history, but Joseph Schumpeter ascribed to it new meaning. *Entrepreneur* derives from the French word *entreprendre*, meaning to undertake or initiate (*Oxford English Dictionary*). In present use, one who undertakes self-employment or starts a business is sometimes referred to as an entrepreneur. Entrepreneurship is also often synonymous with initiative and risk-taking. These definitions differ from the one put forward by Schumpeter. Schumpeterian entrepreneurs often start new businesses, display great initiative, and undertake great risk. However, these attributes do not define them.

Schumpeter describes entrepreneurs as simply individuals "carrying out innovations" (1939: 100). Usage dating to 1553 defines innovation as "the introduction of novelties; the alteration of what is established by the introduction of new elements or forms" (*Oxford English Dictionary*). This aptly denotes the process that captured Schumpeter's attention. In drier economic parlance, Schumpeter "define[s] innovation as the setting up of

a new production function" (1939/1964: 84). In producer theory, the firm faces a production function relating output to the combination of inputs employed. The entrepreneur, through innovation, alters this relationship. In so doing, the nature of the inputs employed may fundamentally change; or, the output itself may represent a new product or an improved version of an existing product.

This chapter examines tax policies that likely influence economic growth by altering incentives for Schumpeterian entrepreneurship. Policies addressing entrepreneurship are complicated because, as Schumpeter himself notes, "It is not always easy to tell who the entrepreneur is in a given case. Nobody ever is an entrepreneur all the time, and nobody can ever be only an entrepreneur" (Schumpeter, 1939/1964: 103). For that reason—because entrepreneurship is neither a sector nor a factor of production—tax policies do not specifically target entrepreneurship, but rather focus on characteristics that are more prevalent among, or more important to, successful entrepreneurs.

The second section provides further motivation and backgrounds for this chapter. The third section focuses on the implications that taxation and capital accumulation imply for entrepreneurship. At least since John Stuart Mill's 1848 *Principles of Political Economy*, economists have recognized that a tax on all income results in the double taxation of returns to savings (Mill, 1848, book V, ch. 2). By contrast, a tax on consumption is neutral with respect to savings versus consumption decisions. While the capitalist and the entrepreneur may be distinct individuals, access to capital (either credit or equity) is essential for entrepreneurship to flourish.[1] Thus, to the extent that countries tax savings more heavily than consumption, they distort the savings versus consumption decision and, in so doing, reduce the supply of capital available to entrepreneurs (as well as for investment more generally). When taxes on investment returns are very high, the negative consequences, compounded over time, can be dramatic. This is exemplified in a stylized counterfactual focusing on the growth of

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1 The capitalist is the financier or investor, whereas the entrepreneur uses backing from the capitalist to develop or disseminate innovations.

the Ford Motor Company during the first half of the 20th century. In that example, an 80 percent effective tax on the returns to savings, compounded over 40 years, reduces Ford's capital stock by 99.997 percent compared to a no-tax scenario. The lesson from this section is not that tax rates should be zero. Rather, the section emphasizes the importance of access to capital to successful entrepreneurship and how different forms of taxation affect the supply of capital. In reality, the proverbial lone inventor working from his garage, with little access to capital, is limited in the degree that he can succeed.

The fourth section discusses taxes in the presence of risk. Risk that is not easily diversifiable discourages investment. This is important for entrepreneurial ventures, which often carry high risks that are not easily diversifiable. Depending on their structure, tax systems can either exacerbate or mitigate the costs associated with this risk—or leave these costs unchanged. There are clear benefits from not exacerbating costs associated with risk and a case can be made for using taxes to reduce them. Issues that could affect risk-taking include tax progressivity, and loss carryforwards or carrybacks. Steeper progressivity discourages entrepreneurial activity for risk-neutral groups, since risk lowers expected returns. However, individuals are generally risk averse with respect to investment decisions. For the risk averse, greater progressivity, holding expected taxes constant, could actually increase risk-taking. This is because of the diminishing marginal utility of income – i.e., the utility from an additional dollar decreases with income. As a result, progressivity shifts the *ex post* burden of taxation towards outcomes where income is higher and the marginal utility of income low, and away from outcomes where income is lower and the marginal utility of income higher. The degree to which progressivity encourages risk-taking depends on the degree of risk aversion—i.e., the rate at which marginal utility diminishes with incremental income.

Another feature of tax systems that could influence risk-taking, as discussed in the fifth section, is the ability of small businesses to choose whether to be subjected to the corporate income tax—allowing owners to defer income taxes and receive preferential treatment of capital gains—or instead to have profits passed through to the owners on accrual. This is

the case in the United States. As Cullen and Gordon (2006) illustrate, the fiscal position of firms with losses is generally better when opting for pass-through status. However, smaller firms with positive profits may be able to form corporate subsidiaries that fall into the 15 percent corporate tax bracket (pre-2018). The benefit of this strategy rests on deducting losses at a relatively high rate, while paying taxes on gains at a relatively low rate. Beginning in 2018, this calculus changed. Starting in 2018, the US corporate tax rate was lowered to 21 percent and rates for the self-employed were effectively lowered by more than 20 percent.[2]

To reiterate my earlier caveat, lower taxes will always encourage greater entrepreneurial activity than higher ones. This is no great insight. However, the emphasis here (both for progressive rate structures and strategic use of the corporate income tax) is that, holding expected tax burdens constant, more favorable treatment of losses tends to encourage risk taking. One would be remiss in concluding that increasing overall tax burdens via greater progressivity will increase entrepreneurial activity.[3]

The sixth section addresses the relationship between taxes and the allocation of entrepreneurial activity between productive and unproductive channels. In a path-breaking 1990 article and subsequent 2002 book, William Baumol takes a more expansive view of entrepreneurship than the one Schumpeter espoused. Whereas Schumpeter focused on productive entrepreneurship, Baumol's notion also includes unproductive and de-

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2   This was a substantial cut from the roughly 35 percent rate faced by all but very small corporations. (Firms under the corporate tax with annual income greater than $75,000 faced statutory rates ranging from 34 to 39 percent, with the top bracket set at 35 percent.) However, for firms with profits less than $50,000, the new 21 percent flat rate is greater than the previous 15 percent bottom bracket.

3   Tax progressivity could also increase entrepreneurship as measured by entry into self-employment because the self-employed can more easily shelter income. That is, the self-employed can more easily evade or avoid taxes, which becomes more remunerative when tax rates are higher. Gentry and Hubbard (2005) examine this hypothesis, but their empirical analysis does not support it.

structive activities.[4] In Baumol's assessment, the industrial revolution was not driven so much by the great flourishing of entrepreneurial activity as it was by a redirection of entrepreneurial pursuits from primarily unproductive and destructive activities and towards productive ones. His "central hypothesis… is that it is the set of rules and not the supply of entrepreneurs *or the nature of their objectives* that undergoes significant changes from one period to another" (Baumol, 1990: 894, emphasis in original).

Baumol's conception of the redirection of entrepreneurial efforts has implications for tax policy. High taxes discourage productive entrepreneurship by reducing after-tax returns. At the same time, high tax rates encourage innovative methods for shifting income outside of the tax base, since the private return from this socially unproductive activity is directly proportional to the marginal tax rate. As a tax accountant quoted in the *New York Times* put it: "That's the nature of tax in general... Every time you write a rule, there are people out there who think about 'How do we get creative with it, and how do we get around it?'" (Kitroeff, 2017, December 28). One lesson from this section is that low tax rates discourage unproductive entrepreneurship. A second lesson is that, for a given rate structure, unproductive entrepreneurship will be mitigated to the extent that the tax system is resistant to both finagling by taxpayers and tinkering by legislators in response to lobbying or political donations. The Tax Reform Act of 1986 is widely heralded by tax experts. This US reform closed loopholes, broadened the tax base, and lowered rates. However, a downside of the reform was that it was susceptible to constant tinkering. As Auerbach and Slemrod (1997) noted in their review of the effects of the reform, "Even the simplification potential of radical tax reform depends on how enduring a simple, broad-based tax can be, in the face of constant political pressure to reintroduce special 'encouragements' or to redistribute the tax burden" (p. 628).

This chapter does not review the large empirical literature on taxation and entrepreneurship, though it does discuss select papers. The relevant literature is broad and includes research into economic growth

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4   In this chapter, entrepreneurship is treated as productive, unless noted otherwise.

models, patents and intellectual property, as well as self-employment decisions and small business formation. A major strand of the literature focuses on self-employment (which typifies one definition of entrepreneurship, but not necessarily the Schumpeterian notion).[5]

Motivations and background

Schumpeterian entrepreneurship is central to economic growth. Further, the degree of entrepreneurship, and thus growth, is sensitive to economic and cultural institutions. William Baumol, like Schumpeter before him, emphasized the environment in which entrepreneurship and growth flourish: "what differentiates the prototype capitalist economy most sharply from all other economic systems is free-market pressures that force firms into a continuing process of innovation, *because it becomes a matter of life and death for many of them*" (Baumol, 2002: 11, emphasis in original).

Growth
Baumol's depiction of capitalism is different from the canonical model from welfare economics. In that model, under certain conditions, capitalism results in the efficient use of resources and a (Pareto) efficient distribution of outputs. However, economic growth in that model can occur only if the economy is initially not using all of its resources or if the production possibilities frontier (which depicts the different combinations of outputs that are possible given available resources) shifts outward. Exogenous shocks can push the frontier outward. However, such shocks (e.g., a drop in energy costs or a reduction in marginal tax rates) imply only temporary changes to the growth rate and last only until the economy reaches a new equilibrium. Likewise, in the Solow-Swan growth model, increased savings increases economic growth, but only for a time. Solow (1956) also discusses how taxes in his model affect growth. Here, too, the tax rate

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5 For a review of this literature, see Schuetze and Bruce (2004). For a recent contribution to this literature, see Bruce and Glenn (2016).

does not affect long-term growth—and only affects per capita income to the extent that it affects savings. Growth stops once a new equilibrium is achieved. Perpetual growth, of the variety observed in many parts of the world beginning in the 18th century, is possible in the Solow-Swan model only as a result of technological progress, or, as it were, innovation. Solow-Swan treats technological progress as exogenous and thus does not provide insight into the process of perpetual growth. However, the model was a great advance by, among other things, demonstrating that savings, in and of itself, is not enough for perpetual growth. The area of endogenous growth theory attempts to better understand the role of innovation in sustained growth. As Robert Solow states, with endogenous growth theory, "you don't depend on some… poorly understood process of changing, improving technology… [Y]ou treat creating higher productivity as itself a business, with the costs and payoffs. And you try to incorporate that in the whole story of economic growth" (Solow, 2014, October 27). In Solow's view, the restrictions needed to make such endogenous growth models tractable have also prevented them from being particularly insightful.

Externalities and their magnitudes

Externalities, often concomitant with entrepreneurship, threaten to curtail economic growth. Creative destruction is a double-edged sword. The creative aspects are central to economic growth (and tend to be associated with positive spillovers). But, the destructive side implies negative spillovers that offset some of the advances. Externalities, or spillovers, are third-party effects. That is, they are costs or benefits that accrue to people who are external to the transacting parties. People do not fully account for the costs and benefits that accrue to third parties. Thus, activities that impart negative externalities are over-produced and those imparting positive externalities are under produced. For example, a farmer may account for the negative costs she experiences from dumping waste in a stream running through her property. But, this will result in an inefficiently high level of waste because she is unlikely to fully account for costs this activity imposes on others downstream. Likewise, people weigh the private costs

and benefits from vaccination against contagious disease but tend to underweight the benefit to third parties from vaccination.

One approach for addressing externalities is Pigouvian taxation, which entails taxing activities associated with negative externalities and subsidizing those with positive externalities. Externalities can also be viewed as resulting from the absence of a market or of property rights. For example, if those living downstream from the farmer were given the right to clean water, those upstream would need to pay those downstream for the right to pollute. Those downstream would no longer be external to the transaction process, and thus the externality would be eliminated. In many cases, transacting with those harmed or helped by an activity may be impractical. Thus, simply assigning property rights when transaction costs are very high is unlikely to resolve the problems associated with externalities.

Innovation often requires substantial investment while the costs of free-riding on innovations are often small. The benefits that accrue from free-riding are positive externalities, in that free-riders are third parties who benefit from economic activity from which they are not a transacting party. For extreme examples, consider computer software. Microsoft may spend billions developing its Windows operating system, which then can be produced and distributed at near-zero marginal cost. Such externalities could severely curtail entrepreneurial activity.

What costs are imposed on innovators as a result of freeriding? Baumol employs a crude but reasonable approach to estimate the "spillover ratio" from innovation for the US from 1870 to 2000. He assumes that growth in per capita gross domestic product (GDP) over this period, conservatively estimated at 800 percent, is due to innovation. He then uses estimates of total investment and entrepreneurial investment over this period. He assumes that the risk-adjusted private returns to both types of investment are the same and that spillovers from entrepreneurial activity (i.e., gains to society not captured by those investing in entrepreneurs) are responsible for the remaining growth. This simple exercise yields a spillover ratio of 0.8, implying that 80 percent of the gains from innovation accrued to third parties. Nordhaus (2004) also develops a model for examining the returns to entrepreneurship. He estimates that for the period 1948–2001,

entrepreneurs captured just 2.2 percent of the surplus generated by their innovations. While Baumol's and Nordhaus's estimates are far apart, they point to the same conclusion: that entrepreneurial activity is nowhere near growth-maximizing levels.

Positive spillovers from innovation are counterbalanced, somewhat, by a negative externality or "business stealing" effect. That is, innovations diminish the value of assets that they marginalize or make obsolete. Aghion and Howitt (1998) demonstrate this effect in a model in which "there is a negative spillover in the form of a 'business-stealing effect,' whereby the successful monopolist destroys the surplus attributable to the previous generation of intermediate goods by making it obsolete" (Aghion and Howitt, 1998: 54). This represents the destructive aspect of creative destruction. That is, innovations impart a process of destruction, where certain types of human and physical capital are made worthless, or at least substantially less valuable.

Related to business stealing, Dasgupta and Stiglitz (1980) argue that innovation races also have negative welfare consequences. In innovation races, the innovation has benefits to society, but the race is akin to a zero-sum game between a handful of competing groups. Such races may involve duplicated efforts and extra resources to complete the project a bit faster. The competition will have salutary effects, which may lead to a superior product or a variety of products satisfying different segments of a market. Thus, innovation races involve some degree of waste, but are not true zero-sum games.

It is generally believed that positive spillover effects dominate business stealing effects and losses from innovation races. Thus, the business-stealing effect means that a portion of positive spillovers are not inefficient, but rather, offsetting negative spillovers.

Distribution of gains

Schumpeter credits capitalism and innovation for the great increase in standards of living since the Industrial Revolution, and in particular for the great gains made by the masses. Baumol and others emphasize that the breadth of these gains was not due strictly to entrepreneurship, but rather

to entrepreneurship in conjunction with positive spillovers. Researchers emphasize a sharp tradeoff between the growth effects from entrepreneurship and the distribution of that growth. Entrepreneurs cannot capture the full returns from their innovations. The prospects of free-riding discourage innovation and thus economic growth. It follows that policies to reduce freeriding should increase economic growth. However, many argue that the gains from this elevated growth will redound to only a small proportion of the population. An alternative to reducing free-riding is to provide tax preferences or Pigouvian subsidies to entrepreneurial endeavours. This should have similar distributional implications by redistributing income towards those engaged in entrepreneurship.

In fact, Baumol concludes "that the bulk of the unprecedented rise in the developed world's living standards since the Industrial Revolution could not have occurred without that Revolution's innovations. Consequently, a very substantial share of the benefits of innovation must have gone to persons other than the innovators in the form of spillovers." Above some threshold, this creates an "inevitable tradeoff between the number of innovations actually produced and the standard of living of the majority of the population" (Baumol, 2002: 231–232).

The views of Baumol and others notwithstanding, it is not clear that, with zero spillovers, living standards for most of society would have remained stagnant since the Industrial Revolution while overall economic growth would have been much more rapid. The implications from reducing spillovers are complex and only briefly sketched here. Of course, eliminating spillovers is wholly impractical. However, such a thought experiment may be useful when considering options that could limit, but not eliminate, positive spillovers.

First, as a counter argument to Baumol et al., innovation, absent spillovers, may not have repugnant distributional implications because it often imparts positive shocks to physical and human capital that are complementary to new innovation. These are different from externalities (or third-party effects), since the increased returns to complementary factors need not result from free-riding, but from voluntary exchange with the owners of the new innovation.

Second, zero (or reduced) spillovers would initially increase the private returns to entrepreneurship. However, this would draw more and more labour and capital into entrepreneurial ventures. This adjustment process would continue until the risk-adjusted returns from entrepreneurial and non-entrepreneurial activity are brought back into equilibrium. As a result, the benefits from reducing spillovers would not accrue solely to entrepreneurs. Windfall gains would be competed away, and, once the dust settles, equilibrium wages should, in general, be higher for both entrepreneurial and non-entrepreneurial endeavours.

Furthermore, many innovations confer reciprocal benefits. To the extent that this is the case, the distributional consequences from positive spillovers may be lower than what would otherwise be the case, and the negative implications for economic growth smaller. With reciprocal benefits from spillovers, the returns to innovation are reduced (as with positive spillovers in general). However, the costs of innovation are also reduced by the ability to free-ride on the innovations of others. This may partly explain why many economists find that strong patent systems often have an adverse impact on innovation (Boldrin and Levine, 2013). For an example of reciprocal externalities, consider cities and agglomeration economies. Knowledge spillovers are positive spillovers associated with agglomeration economies. But, these spillovers are reciprocal. Thus, returns to firms producing positive spillovers are diminished, but this is offset by reciprocal gains that lower the costs of innovation. The fact that firm clustering is so prevalent suggests the benefits exceed the costs from these *de facto* reciprocal arrangements.

Taxes and capital accumulation

> Why is it that all of us from top to bottom, including the poorest in this country, are so much better off than we were a 100 years ago in the horse-and-buggy days? Because, instead of horses and buggies we have the railways, the automobile, the airplane, the substitution for primitive capital of small value of the gigantic capital today… not

only have we improved means of transportation, but we have better houses, better refrigerators, better clothing, better food, and better everything. Why? Because of the inventions and accumulations of capital… I feel so strongly about the destructiveness of the system that we now have… that if we had had it 50 years ago I do not think you would have today the automobile industry, because Henry Ford's plant built out of savings would not exist. If you calculate what was actually done by him and then see what the taxes would have been under the present system, he simply could not have built up his automobile industry. (Fisher, 1944: 475)

This claim by Yale economist Irving Fisher is supported by an exercise from his 1942 book, co-authored with his brother Herbert. In one section, the Fishers note that Henry Ford's wealth is reputed to have grown one-million-fold over a 40-year period, from $1,000 to $1 billion. Ford started out before the federal income tax. However, by 1942 the top federal individual income tax rate was 88 percent, and was to continue to rise. The Fishers estimated effective taxes on the returns to savings at 80 percent (for top income groups). Using Ford's hypothetical alter ego "Henry Forward" and a 40 percent annual rate of return, the Fishers show that, with no taxes, Forward's $1,000 investment would grow to $700.5 million after 40 years. With an 80 percent effective tax on savings (and no changes to behavior), Forward's investment grows to just $21,700 after 40 years. In other words, 99.997 percent of Forward's capital stock is dissipated as a result of the compound effect of the tax. Of course, since behavior is assumed not to change, the government could have invested its annual tax proceeds. However, government's track record in picking investments is extremely poor.[6]

Tales abound of the independent inventor relentlessly pursuing their idea to the exclusion of all else. Thoughts of Steve Jobs and Steve Wozniak developing a personal computer from Jobs's garage come to mind. One may conclude that hard work and ingenuity are all that is required for suc-

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6   This excepts a handful of areas, such as sanitation, public health, and infrastructure, where the returns to government investment can be high.

cessful innovation. In fact, these are generally necessary, but not sufficient, conditions. That is, in order for an innovation to be manufactured on a large scale and reach large swaths of society, large infusions of capital are needed. According to Schumpeter, "one does not ordinarily attain the status of capitalist… by saving from a wage or salary in order to equip one's factory… The means required in order to start an enterprise are typically provided by borrowing other people's savings…" (Schumpeter, 1976/2003: 16). Capital must come from private savings or from government. Prior to the nineteenth century, government was the major financier—and, rather than the norm, growth was a short-lived aberration.

High tax rates discourage both consumption and savings. But, for a given average tax rate, taxes on an income base penalize savings more heavily than taxes on consumption. The double-taxation of savings under an income tax was a major argument behind Irving Fisher's (1937) and Irving and Herbert Fisher's (1942) interest in moving to a consumption tax base. As Fisher remarked, "it is the taxing of savings… which is doing the mischief" (1944: 475). Fisher's concern is underscored by his exercise involving Henry Ford, as well as the following example.

In 1944, when Fisher was promoting the replacement of the US income tax with a consumption tax, top marginal income tax rates were 94 percent for ordinary income, 40 percent for corporations, and 25 percent for capital gains. Consider a baseline with no taxes where one invests $100 of labour income in corporate stock and eventually realizes $100 in capital gains. Now consider the effects of taxation. Before investing, the person would first owe $94 in personal income taxes, leaving $6 to invest. This $6 would grow to $12 (instead of $200). This $6 in corporate income would face 40 percent tax rate, leaving $3.60. After realization, the capital gain of $3.60 would face a 25 percent tax rate, leaving not $100, as in the no-tax scenario, but rather $2.70. Thus, the effective tax rate on the returns to savings would be 97.3 percent.[7]

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7   Of course, this is a highly stylized example. Effective tax rates on savings would be much lower for those in lower tax brackets and would also be lower the longer capital gains are deferred before being realized. Also, plentiful loopholes would further lower

Table 1: Income Taxes Double Tax Returns to Savings

	(1)	(2)	(3)	(4)
	Income Tax		**Consumption Tax**	
	Thriftless	**Thrifty**	**Thriftless**	**Thrifty**
Income, Period 1	$1,000	$1,000	$1,000	$1,000
Taxes, Period 1	500	500	500	250
Consumption, Period 1	500	246.99	500	250
Savings, Period 1	0	253.01	0	500
Interest income, Period 2	0	12.66	0	25
Taxes, Period 2	0	6.33	0	262.5
Consumption, Period 2	0	259.34	0	262.5
PDV* of Consumption	500	493.98	500	500
PDV* of Taxes	500	506.02	500	500

This assumes a 50 percent tax-inclusive tax rate and a discount and interest rate of 5 percent.

* PDV stands for present discounted value.

When compared to an income tax, and when holding tax revenue constant, a consumption tax base is neutral between the decision to save versus consume. By contrast, an income tax base results in the double taxation of savings. To illustrate, consider Thriftless and Thrifty in table 1. Thriftless spends all of her after-tax income immediately. Thrifty, by contrast, carefully plans so as to equalize her consumption (in present-value terms) across periods. Other than preferences for savings, Thriftless and Thrifty are identical. Both earn income of $1,000 in period 1. Each chooses consumption and pays taxes in period 1. Neither has labour earnings in

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the effective tax rate. On the other hand, effective tax rates would be higher due the fact that capital gains taxes are not indexed for inflation. And, if the scenario were altered so that the investment income was realized as dividends, the effective tax rate would rise to 99.8 percent.

period 2. Consumption in period 2 (e.g., retirement) is based on savings from period 1.

Columns (1) and (2) depict a flat-rate income tax with a tax-inclusive rate of 50 percent—equivalent to a tax-exclusive rate of 100 percent.[8] Both pay $500 in income taxes in period 1. Thriftless spends the remaining $500, leaving her with no savings. Thrifty consumes $246.99 of her after-tax income and saves the other $253.01. In period 2, Thriftless has no income, no consumption, and pays no taxes. Thrifty has retained her $253.01 of savings, plus receives 5 percent interest on this savings, for $12.66 in income. She then pays $6.33 of this additional income in taxes, leaving her with $262.50 for consumption. In present value terms, values for period 2 must be adjusted by the discount rate. This results in the present value of Thrifty's consumption equal to $493.98, and tax payments equal to $506.02. Thus, while both individuals faced identical circumstances, Thrifty's discounted consumption is lower than those of Thriftless, and her tax payments are higher, solely because she chose to save. This distortion increases with the tax rate, the discount rate, and the number of periods that income is saved before being consumed.

Next, consider a consumed-income tax. Many think of a sales tax as synonymous to a consumption tax. However, a consumption tax can take many forms, of which a sales tax is just one possibility. The key distinction between an income and a consumption tax is that a consumption tax does not double tax the returns to savings, whereas an income tax does. In fact, with a consumed-income tax, for example, as proposed by Irving Fisher (1937) and Irving and Herbert Fisher (1942)—a consumption tax could maintain a similar structure as an income tax and could maintain graduated rates. However, the returns to savings would not be included in the tax base.

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8   A tax-inclusive tax rate equals taxes divided by the tax base including taxes. By contrast, a tax-exclusive tax rate equals taxes divided by the tax base net of taxes. Tax rates can be expressed in either form. However, income taxes are traditionally presented as tax-inclusive rates, whereas sales taxes are traditionally expressed as tax exclusive rates.

Returning to table 1, see columns (3) and (4). The treatment of Thriftless is identical to before. She consumes $500 in period 1, leaving $500 for taxes (equal to 100 percent of consumption) and no savings. Thrifty, on the other hand, consumes $250 and also pays $250 in taxes for period 1. In period 2, she receives interest income of $25 on her savings. This leaves her with $525, half of which she spends in period 2 and the other half which she pays in taxes. In present value terms, her consumption and taxes for period 2 are both $250. Thus, the present value of her consumption and taxes over both periods combined is $500—exactly the same as for Thriftless. Thus, unlike the income tax, the consumption tax does not impose an additional penalty on Thrifty for choosing to save.

Schumpeter and Baumol both emphasize the dearth of private capital prior to the nineteenth century. Thomas McCraw notes in his biography of Schumpeter that:

> *A primitive financial system that lacked paper money, stocks, bonds, or any other credit mechanism.* This was a particularly telling reason for the late arrival of capitalism, and a key to why Schumpeter laid such heavy emphasis on the creation of credit. For well over a thousand years, long past the Middle Ages, most major religions forbade the lending of money at interest…Without funds from royal, aristocratic, or religious patronage—the sources of money not only for art and architecture but also for enterprises such as Galileo's experiments and Columbus's voyages of discovery—inventors and businesspeople could find no credit to finance their ventures. Almost by itself, this situation was enough to stifle the surges of technology and entrepreneurship that came to define modern capitalism. (2007: 147–148)

Taxing capital more heavily, as many advocate, is not going to cause modern financial systems to revert to their states in the Middle Ages. At the same time, economic institutions do matter and taxing capital more heavily will have some unpleasant consequences for entrepreneurship and growth.

Taxes and risk

> By imposing an income tax on the investor, the Treasury appoints itself as his partner, who will always share in his gains, but whose share in his losses will depend upon the investor's ability to offset losses against other income. (Domar and Musgrave, 1944: 389)

The returns to entrepreneurship are riskier than for many other investments. Since individuals are generally risk averse, riskier entrepreneurial endeavours must offer a higher expected return than less risky propositions in order to attract investors. Taxes can alter this distribution of returns, either increasing or decreasing incentives for risk-taking.[9]

A tax can affect behavior on two dimensions. First, a tax on income distorts the relative price between productive activities (such as work and savings) and leisure (or other untaxed activities). Second, a tax can have an implicit insurance component.

First, we'll discuss the distortion of relative prices. Through this component, the tax system discourages entrepreneurship, more or less, to the extent that it discourages productive activity more generally (Saez, Slemrod and Giertz, 2012). That is, a tax that lowers the after-tax return to labour or capital reduces both entrepreneurial and non-entrepreneurial market activities. Thus, it should come as no surprise that lowering the tax rate is going to increase economic activity, including entrepreneurship. A more challenging question asks if there are ways to structure taxes that do not reduce tax revenues but also promote entrepreneurship. To the extent that entrepreneurs can be targeted by tax policy, even if imperfectly, they can be taxed preferentially. In order to maintain revenues, this means that other groups will be taxed more heavily. This could yield a net gain because the tax burden would be shifted towards groups producing limited positive spillovers and away from groups producing substantial positive spillovers. For example, if entrepreneurs are concentrated at the top of the income distribution, reducing progressivity should disproportionately encourage

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9   For a recent study estimating tax rates on entrepreneurial income, see Toder (2017).

entrepreneurship. Consider Moretti and Wilson (2017), who examine the responsiveness of star scientists to state tax rates in the US. They find that for this group of innovators, and especially for top earners in this group, location decisions are very responsive to state taxes. In fact, for scientists in the top percentile of the income distribution, they report that a one percent increase in the average after-tax rate (i.e., after-tax income divided by pre-tax income) results in a "1.8 percent long-run increase in the net flow of star scientists moving." Note that taxes impose costs to broader society not only from reducing the level of economic activity, but also from distorting the efficient geographic distribution of such activity. An important question is to what degree star scientists predominate among top income groups. A further question is how scientists respond to increases in national taxes, where it is more costly to move to a more favorable tax jurisdiction. For example, to what degree would star scientists (1) relocate to other countries; (2) not relocate and respond very little; or, (3) not relocate, but instead reduce their work effort or innovativeness.

Second, consider the implicit insurance component from taxation. In this respect, when government places a tax on income, it could be viewed as a silent partner—with its ownership share corresponding to the tax rate. Because the government does not actually purchase its share, it is usually a burden that distorts incentives.[10] Nonetheless, given that one has decided to pursue economic activity, the distribution of losses and gains are altered as a result of the tax. If the tax is proportional, this is unlikely to affect risk taking. This is because, holding expected pre-tax income constant, the expected tax burden is independent of the level of risk. However, with a progressive tax, the government's share of returns is larger for gains than it is for losses. For loss-averse or risk-averse individuals, this should increase risk-taking.

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10 It is possible to design a business tax that does not distort investment decisions. For example, immediate expensing, as opposed to depreciation, of legitimate business expenses with full refundability results in the taxation of only inframarginal returns. Thus, investment decisions face a zero marginal tax rate. See Carroll and Viard (2012).

Table 2: Risky Investment with a Constant 25 Percent Tax Rate

	(1)	(2)	(3)
	Succeeds	**Fails**	**E($)**
Certain Income	120,000	120,000	120,000
Entrepreneur Income	400,000	-80,000	160,000
Total Pre-Tax Income	520,000	40,000	280,000
Tax	130,000	10,000	70,000
After-Tax Income	390,000	30,000	210,000

The entrepreneur has a 0.5 probability of success. Losses and gains are treat symmetrical at a 25 percent tax rate.

Note that in and of itself, risk is not an obstacle to entrepreneurship. As with investments more generally, it is undiversifiable risk that poses problems. Thus, the effectiveness of tax policies in increasing risk-taking depends on opportunities for risk pooling and on firms' access to capital in private markets. Investors could pool investments to include a broad array of entrepreneurial endeavours. Thus, while each endeavour may be quite risky, the pooled asset may not be especially risky. In such cases, taxes would not distort entrepreneurial investment any more that it distorts non-risky investments. However, asymmetric information may inhibit risk pooling. For example, firms may have a good idea as to their probability of success, but investors may not have access to this information. This could lead to adverse selection, where those with ideas that are less likely to prove fruitful are more likely to seek outside funding.

Symmetrical taxes

Taxes do not always alter incentives for risk taking. For example, Domar and Musgrave (1944) show that proportional taxation is neutral with respect to risk-taking, and thus entrepreneurial activity, so long as losses and returns are treated symmetrically. This holds with or without risk aversion.

First, consider the case of risk neutrality. Risk neutral individuals prefer the choice with highest expected income, without regard to risk.

As depicted in table 2, consider a family with \$120,000 in certain income, and entrepreneurial activity with a payoff of \$400,000 with probability 0.5, and a loss of \$80,000 with probability 0.5. A proportional 25 percent tax rate lowers expected total income from \$280,000 pre tax to \$210,000 after tax. The tax lowers expected returns for the family, providing incentives for it to shift their behavior towards leisure or other non-taxed activities. While this alters the returns to work and investment, it does so in the same proportion independent of risk. The effective (tax-inclusive) tax rate is 25 percent when the project succeeds and when it fails. The tax causes both expected income and the range of outcomes (income when the project is a success minus income when it fails) to fall by 25 percent. Thus, expected taxes in column (3) are identical to what the family would owe if they had earned \$280,000 with certainty.

If we consider risk-averse individuals (with constant relative risk aversion), the effect of a flat-rate tax remains neutral. An example of a risk-averse utility function with constant relative risk aversion is $U = ln(income)$. With such a utility function, moving from pre- to after-tax income in table 2 lowers certainty equivalent income by the same proportion as expected income.[11]

Note that while the symmetric treatment of positive and negative returns has a neutral effect when choosing between projects of various risk, a positive marginal tax rate discourages investment more generally—i.e., independent of risk. Thus, the introduction of a 25 percent tax rate on income (as opposed to accounting profit) discourages economic activity, but is neutral with respect to risk-taking.

Progressive tax rates

Under a progressive tax structure, marginal tax rates increase with income. The result is that after-tax income is a concave function of pre-tax income. (That is, the function is concave, if pre-tax income is on the x-axis and

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11 Certainty equivalent income is the minimum income that the individual would be willing to accept to move from the risky scenario to a certain one.

Table 3: Risky Investment with a Progressive Income Tax

	Certainty	Succeeds ($)	Fails ($)	E($)
Other Income	120,000	120,000	120,000	120,000
Entrepreneur Income	160,000	400,000	-80,000	160,000
Total Pre-Tax Income	280,000	520,000	40,000	280,000
Tax	40,000	136,000	4,000	70,000
After-Tax Income	240,000	384,000	36,000	210,000

The entrepreneur has a 0.5 probability of success. The first $240,000 of income is taxed at a 10-percent rate. Income above $240,000 is taxed at a 40-percent rate.

post-tax income on the y-axis.) Put another way, with progressive taxation, expected after-tax income is less than after-tax income that would result from applying the tax schedule to expected pre-tax income. For risk-neutral individuals, thus, progressive rate structures discourage risk-taking. This is an example of Jensen's inequality applying to concave functions.[12]

Table 3 illustrates this point. Consider the same circumstances as in table 2, except the tax rate equals 10 percent on income up to $240,000 and 40 percent on income exceeding $240,000. Column (1) shows the tax implications if expected income were certain. With no risk, total pre-tax income equals $280,000 and taxes equal $52,000. With risk, in column (4), expected pre-tax income is the same, however, taxes are $70,000. That is, the same tax schedule and same expected income results in an average tax rate of 18.6 percent for the situation with no risk and an average tax rate

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12   Confusingly, such concave functions are often referred to as "convex" because the resulting budget sets are convex sets. A *convex set* is one in which any linear combination of points in the budget set includes only points that are also in the budget set. By contrast, a *convex function* (or interval of a function) is one in which any linear combination of points lies above the function. A concave function (or interval of a function) is one in which any linear combination of points lies below the function.

Table 4: Expected Utility and Risk Aversion with Progressive Taxation

	(1)	(2)	(3)	(4)	(5)	(6)
	Flat Tax			Progressive Tax		
Utility	Success	Fail	E(U)	Success	Fail	E(U)
Pre tax	13.16	10.6	11.88	13.16	10.6	11.88
After tax	12.87	10.31	11.59	12.86	10.49	11.67

Utility equals the natural log of income. columns (2) and (3) are based on the same expected income. Income in column (2) is based on the probabilities and payoffs in table 2. Income in column (3) is certain.

of 25 percent for the situation with risk. Thus, the risky venture faces a substantial penalty.

Note: the size of the penalty for risk taking depends on various factors. All else equal, the tax penalty is greater:

- The greater the variation in (income) outcomes.
- The steeper the progressivity.
- The degree to which one's income range spans tax brackets.

While progressive tax schedules discourage risk taking for risk-neutral individuals, the opposite may be true for risk-averse individuals. Progressive taxes involve an implicit insurance component. That is, taxes are a smaller proportion of income if the entrepreneur is unsuccessful and a larger proportion of income when the entrepreneur is successful. For a given expected income, Jensen's inequality implies that expected after-tax income will be lower the greater the risk. However, diminishing marginal utility, associated with risk aversion, means that the utility value placed on a dollar of additional income in good times is less than the utility value placed on a dollar of lost income in bad times. The greater the risk, the greater the insurance value that arises from the combination of diminishing marginal utility of income in conjunction with progressive taxation.

For example, table 4 presents utility measures, based on the same incomes and probabilities used in table 2. If the project is successful, utility equals 12.87 under the flat tax, which is 0.1 percent higher than the utility of 12.86 under the progressive tax. However, when the project fails, utility equals 10.49 under the progressive tax, which is 1.8 percent higher than the utility of 10.31 under the flat tax. Expected utility will always be higher with progressive taxation versus proportional taxation. That is seen here, where expected (after-tax) utility equals 11.67 with the progressive tax and 11.59 with the proportional tax. The degree to which progressive taxation encourages risk taking depends on several factors, including the degree of progressivity of the tax system (imposed on the range of possible outcomes) and the degree of risk aversion. In addition to the assumption of risk aversion, it is important to keep in mind that progressivity only encourages risk-taking when the expected tax liability is held constant across the alternative tax scenarios. For example, if progressivity is achieved by maintaining the tax rate from the example with the proportional tax and then adding to it a new higher tax bracket, all bets are off. When holding expected tax liabilities constant, progressivity serves as partial insurance against risk. If expected tax rates are higher under the progressive tax scenario, then the progressive tax structure includes an insurance component, but also so a surtax on successful outcomes.

One approach to address the unequal treatment of risk is income averaging. With income averaging, taxes would be based on average income over multiple years, as opposed to annual income. This was allowed for personal income in the US until 1986. The Tax Reform Act of 1986 made income averaging less important, since it substantially lowered the degree of progressivity for high-income groups in the US.

Government programs and tax rates

Cullen and Gordon (2006) present several other examples of how the US tax system alters incentives for risk-taking. For example, some programs targeting low-income groups create a convex relationship between after-tax income (y-axis) and pre-tax income (x-axis). These situations increase

incentives for risk-taking. Likewise, the cap on payroll taxes for Social Security may encourage risk-taking. For those near this cap ($118,500 for 2016), Jensen's inequality for convex functions implies that expected after-tax income will be greater when there is more variation in pre-tax income, holding expected pre-tax income constant.

Cullen and Gordon (2006) also point out a non-convexity resulting from payroll taxes.[13] For the self-employed, profits are subject to the payroll tax, but losses are not deductible. Thus, for those with income ranges below the Social Security tax cap, income volatility lowers expected after-tax income. Cullen and Gordon assume that half of the 12.4 percent payroll tax represents a pure tax and the other half can be thought of as contributions that result in increased Social Security benefits. Taxes for Medicare's hospital insurance are 2.9 percent. However, this component of the payroll tax is not related to benefits, so it is treated as a pure tax.[14] This yields an effective payroll tax rate on income of 9.1 percent with zero offset for loss. Thus, Cullen and Gordon note that "taking on extra risk to increase both potential business profits and business losses by $100 implies a drop in expected after-tax income of $4.55" (p. 49).

The conclusions with respect to taxes and risk-taking are more nuanced than with respect to capital accumulation. Proportional taxation does not encourage risk-taking, but it does not discourage it either. A well designed progressive tax system can encourage risk-taking. However, a progressive tax system does tax more heavily those with more volatile incomes. And, when shifting from a proportional to a progressive tax system, those with *a priori* income ranges on the higher end will experience tax increases, while those on the lower end will experi-

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13 That is, the relationship between after-tax income and pre-tax income is convex over an interval that spans the income cap for payroll taxes. In other words, over this interval, a line between points on the budget constraint lies outside of the budget constraint.

14 Medicare benefits are determined by the number of quarters one has paid into the system, independent of how much one has paid. Once the requisite number of quarters is met (usually 40), one is eligible for full benefits at age 65 (or earlier in cases of disability).

ence tax cuts. This will have the unintended effect of disproportionately discouraging economic activity from those with higher incomes—or those whose payoffs, if successful, would put them well beyond the threshold for the top tax bracket.

Additional tax features

Some aspects of the tax system are relevant for risk but involve either strategic tax planning or obscure aspects of the tax code that alter tax burdens while not explicitly altering statutory tax rates. Other features of the tax system are unrelated to risk but may influence entrepreneurial activity nonetheless.

The self-employed
Gentry and Hubbard (2005) empirically test the relationship between tax progressivity and entrepreneurship. While they focus on self-employment, their results do have implications for Schumpeterian entrepreneurship. In contrast to the stylized tax schedules used for tables 2 and 3, Gentry and Hubbard note that, for a given level of true income, effective tax rates are lower for the self-employed because they can more easily shift income outside of the tax base (both legally and illegally). Thus, progressivity aside, an increase in marginal tax rates should: 1) Discourage economic activity more generally, including entry into self-employment; 2) Encourage those who intend to remain employed to shift towards self-employment because the rewards from shifting income outside of the tax base are now greater. Gentry and Hubbard find that the first effect dominates, as higher tax rates result in reduction in entry into self-employment. By contrast, Bruce (2000) reports that a number of other studies find a positive relationship between marginal tax rates and self-employment.

Gentry and Hubbard also examine the effect of tax progressivity. Here too, they report that increased progressivity reduces entry into self-employment. This finding is at odds with the insurance effect associated with progressive taxation. They note that, compared with a proportional tax,

progressivity implies that successful firms are taxed more heavily and un-successful firms more lightly. Despite the insurance component of progressive taxes, the tax rate applying to successful firms may be more important in influencing behavior. It may be that potential entrants systematically overestimate their likelihood of success, and thus the low tax rates for unsuccessful outcomes may have little appeal. Or, it may be that potential entrants vary in their likelihood of success. To the extent that potential entrants are aware of their likelihood of success, progressivity results in higher expected tax rates for those most likely to succeed.

Business income

Furthermore, for business income, increases in progressivity may actually represent a tax increase *ex ante*, even if changes to the tax schedule to do not appear to increase expected tax burdens. This could arise because of the unequal treatment of gains and losses. Gentry and Hubbard note that losses can offset other gains, but that tax liabilities cannot be negative. Even with (limited) loss carryforwards and carrybacks, many firms are never able to take advantage of their losses. The imperfect treatment of losses is an issue even with proportional taxes. But, it is more important when taxes on successful firms are high, either because of high proportional-rate taxes or because successful firms face high tax burdens because of progressive tax schedules. In order to address the issue of innovation, Gentry and Hubbard identify characteristics, based on factors such as occupation, industry, and education, that they posit are correlated with innovation. They then test whether responses to the changing tax parameters vary across these groups more likely to pursue innovation. In general, they find differences in responsiveness between the more and less innovative groups to be negligible.

A positive feature of Gentry and Hubbard is that they go beyond examining self-employment to also assess factors associated with innovation. However, a downside of the study is that it does not measure the economy-wide effects of tax structure on Schumpeterian entrepreneurship because it does not measure changes to these activities in the overall economy, but rather only among the self-employed.

Strategic use of the corporate tax

A possibility raised by Cullen and Gordon (2006) relates to firms' ability to strategically switch between corporate and pass-through status. For example, limited liability companies (LLCs) can choose to be taxed under the corporate income tax, as opposed to the individual income tax. This decision is made once the year has ended, and thus profits and losses for the year should be known. However, once opting for corporate tax treatment, the firm cannot switch back for five years. For larger firms, it is often presumed to be more advantageous for firms to forego the corporate income tax, and instead have firm profits pass through to the owners. This has generally been true since the US Tax Reform Act of 1986, after which many firms switched from subchapter-C corporations to pass-through entities (such as subchapter S).

This notwithstanding, for many small businesses, corporate tax treatment may be the more favorable choice. At first glance, the corporate tax does not appear to offer much of an advantage. Prior to 2018, corporate income generally faced a 35 percent tax rate, and then was taxed a second time when it was realized by the individual (as dividends or capital gains, for instance). However, while 35 percent was the usually the stated corporate tax rate for many, the US corporate tax was graduated, with rates beginning at 15 percent for corporations with income under $50,000. In practice, the 15 percent corporate bracket extended well beyond $50,000. As Cullen and Gordon note, "a firm can be divided into multiple corporations, with each filing corporate taxes separately" (p. 50). Starting in 2018, the benefits from this strategy were greatly reduced, if not eliminated. US corporate income now faces a proportional tax rate of 21 percent and tax rates for unincorporated businesses have also been cut substantially. These changes will surely induce those in business to rethink their choice of organizational form. The tax changes will reduce, but not eliminate, the potential benefits from the schemes discussed by Gordon and Cullen.

To see the advantages of the corporate tax, consider a firm that pays 15 percent tax on its income with the remainder eventually realized as

long-term capital gains by the owners. Assuming positive firm income, owners in the 15 percent (or lower) tax bracket owe no additional tax, leaving an overall tax rate of 15 percent. By contrast, if this income were passed through to the owners, it would avoid the corporate tax, but would be subjected to the 15 percent individual income tax rate plus self-employment taxes at an effective rate of 9.1 percent. As noted earlier, self-employment taxes total 15.3 percent, which results in 9.1 percent after adjusting for future benefits tied to the employment taxes. Also, note that half of this 15.3 percent in self-employment taxes are deductible from taxable income. Thus, if one forgoes the corporate tax, the effective tax rate is: $0.15 \, x \left(1 - \dfrac{0.153}{2}\right) + 0.091 = 0.23$, or 23 percent.

Now consider a taxpayer in the 25 percent federal tax bracket. Owners in the 25 to 35 percent regular income tax brackets face a long-term capital gains tax rate of 15 percent.[15] This plus an effective capital gains tax rate of 1.6 percent yields an overall effective tax rate of 16.6 percent. The 1.6 percent effective rate for capital gains is calculated using the same assumptions employed by Cullen and Gordon; namely, 50 percent of capital gains from the sale of small business stock is excluded from taxation, and the benefit from deferral—i.e., from delaying taxation until the asset is sold, as opposed to paying taxes when the gains accrue—lowers the effective capital gains tax rate by 75 percent. Thus, the effective rate on capital gains is $0.5 \, x \, 0.15 \, x \, (1 - 0.75) = 0.01875$. After deducting the 15 percent of profits that were paid in corporate taxes, this becomes $0.01875 \, x \, (1 - 0.15) = 0.016$. Meanwhile, the corresponding effective tax rate for the pass-through option is 32.2 percent. The effective rate for the pass-through case adheres to the same assumptions used for the 15 percent case, only substituting in 25 percent for the tax rate: $\left(1 - \dfrac{0.153}{2}\right) + 0.091 = 0.322$.

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15 Those paying the Alternative Minimum Tax could face effective capital gains rates of 22 percent. And, those in the 39.6 percent regular income-tax bracket face capital gains rates of between 20 and 23.8 percent.

In contrast to firms with profits, for firms with losses, pass-through status is generally preferable, since losses can be subtracted other income sources when calculating personal taxable income. Additionally, losses can be carried forward or backward. For those with higher individual income tax rates, losses are even more valuable. Under the corporate tax, losses are only deductible against firm losses, but can also be carried forward or backward. This may be of no benefit to many firms that never have sufficient income to take advantage of their losses.[16]

Taxes and unproductive entrepreneurship

> A free life cannot acquire many possessions, because this is not easy to do without servility to mobs or monarchs.
> —Epicurus, 341BC–270BC (Epicurus, undated/1957: 43)

> [T]he problem with high-tax societies is not that it is impossible to become rich there, but that it is difficult to do so by way of productive effort in the ordinary production system. (Lindbeck (1988: 27)

Baumol claims that "entrepreneurs as a group do not just appear or disappear in some primordial ooze. Rather, they… are reallocated by economic conditions… into (or out of) activities that appear not to be entrepreneurial because of the preconception that enterprising activity is necessarily productive" (2002: 10). Baumol contends that for most of human history, institutions were similar to those alluded to by Epicurus some 2,300 years ago, and thus not conducive to productive entrepreneurship. In fact, as Baumol chronicles, there were great innovations over thousands of years. However, institutional and cultural forces were such that there was little private gain from producing or marketing these advances to the masses. Likewise, other innovations had little prospect for advancing the broad-

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16 Cullen and Gordon also point out that capital losses on the sale of small business stock are deductible against ordinary income.

er society. For example, Baumol cites incentives set by rulers during the Hundred Years' War, which diverted creative activity away from socially productive pursuits and towards more lethal techniques for a war whose outcome was chiefly futile for those outside the aristocracy.

While by no means the only factor, Baumol recognized that "tax rules can be used to rechannel entrepreneurial effort" (1990: 917). Much research on taxation and entrepreneurship looks at how taxes could rechannel effort between entrepreneurial and non-entrepreneurial endeavours. However, Baumol contends that taxes could also rechannel effort between productive and unproductive or destructive entrepreneurial activities.

In this section, I discuss three important channels through which taxes can affect (innovative) rent seeking. Rent seeking, as defined by Gordon Tullock, is "the use of resources for the purpose of obtaining rents for people where the rents themselves come from some activity that has negative social value" (Tullock, 2002: 43). Disentangling entrepreneurial and non-entrepreneurial efforts is complicated. This is true of productive entrepreneurship as well as unproductive endeavours. Factors that encourage risk-taking, for example, encourage entrepreneurial activity, along with other risky endeavours, such as using established methods to search for oil or minerals for extraction. Likewise, factors that promote innovations in rent-seeking also promote rent-seeking through traditional, non-innovative, means.

The market for tax avoidance and evasion

John Maynard Keynes purportedly quipped that "The avoidance of taxes is the only intellectual pursuit that still carries any reward" (Mackay, 1991/2002: 140). For high-income British citizens during periods of the twentieth century, this may not have been an exaggeration. During World War II, the UK's income tax rate topped out at 99.25 percent. Post-war, taxes on investment reached as high as 98 percent.

Tax avoidance and evasion are both responses to taxation. The difference between the two terms is that avoidance is legal, whereas evasion is illegal. Both are socially wasteful activities, in that the activities are not costless and do not enlarge the economic pie. In fact, under certain as-

sumptions, the waste per marginal dollar shifted out of the tax base equals the marginal tax rate (Feldstein, 1999). For example, at a 70 percent tax rate, a taxpayer would experience a net gain from incurring costs up to $0.70 to shift one more dollar outside of the tax base.

Not all methods for reducing taxes are innovative. For example, taking out a larger home mortgage or failing to report self-employment income are rather pedestrian. On the other hand, tax accountants, lawyers, and financial planners reap large rewards for developing elaborate and ingenious methods of lowering tax bills. These professionals work to exploit many areas of the tax code. Perhaps the most notorious schemes are in the areas of corporate and estate taxation. With respect to corporate taxation, it is routine for some of the world's richest US firms to pay effective tax rates that are just tiny fraction of US statutory rates. For example, consider Apple Inc., one of the world's most profitable corporations with a market capitalization in the neighborhood of $900 billion. Apple is headquartered in California, where their combined federal plus state statutory corporate tax rate equals more than 43 percent. Apple invests tremendous resources in iPhones, Macs, and is constantly looking to spread into other industries, such as driverless cars. However, Apple also invests heavily in tax planning.

As a result, Apple does not pay 43 percent of its profits in taxes, but rather less than 3 percent! Apple is not alone. Google, Microsoft and many other tech companies also benefit immensely from tax planning. More traditional firms, relying less on intellectual property, are less able to shift profits.

According to a 2013 congressional hearing,

> Apple Inc. has created three offshore corporations, entities that receive tens of billions of dollars in income, but which have no tax residence— not in Ireland, where they are incorporated, and not in the United States, where the Apple executives who run them are located. Apple has arranged matters so that it can claim that these ghost companies, for tax purposes, exist nowhere. One has paid no corporate income tax to any nation for the last 5 years; another pays tax to Ireland equivalent to a tiny fraction of 1 percent of its total income. (United States Senate, 2013: 3)

This innovation employed by Apple and many others has been dubbed the "Double Irish with a Dutch sandwich." The technique involves a US headquartered firm setting up an Irish subsidiary, which is headquartered in a tax haven, such as Bermuda. This holding company sets ups two additional subsidiaries, an operating company in Ireland and a holding company in the Netherlands. The US firm's intellectual property licenses are then distributed and royalty rates set across the subsidiaries in order to minimize tax liability. Such techniques result in what is sometimes called "stateless income." More precisely, this income is not escaping taxation, but rather deferring taxation until firms repatriate profits to the US parent company. In practice, however, firms often leave this money outside of the US for seemingly in perpetuity, or until penalties for repatriation are lowered.

The Double Irish with a Dutch sandwich has many variants. This is just one of a panoply of sophisticated techniques used to reduce corporate tax burdens. In fact, a major focus of the Organization for Economic Cooperation and Development (OECD) in recent years has been exploring ways to reduce base erosion and profit shifting (BEPS).

The estate tax is another area that fosters sophisticated innovations. Tax professionals have been quite successful in developing methods for exploiting ambiguities or oversights in the tax code. The methods for avoiding estate taxation are constantly changing, with court rulings, legislative responses, and the development of new techniques. Techniques vary depending on the size of the estates. For the very wealthy, a popular approach involves Grantor Retained Annuity Trusts (GRATs), which can involve the creation of a series of rolling GRATs that courts have ruled can be used to transfer wealth to heirs without triggering estate or gift taxes.

Bargaining and executive compensation

The efficiency and social welfare implications from altering top tax rates depends heavily on both the responsiveness of top incomes to taxes *and* to the avenues by which they respond. In recent years, several scholars, most notably Thomas Piketty and Emmanuel Saez, have emphasized that executives respond to lower tax rates by increasing their efforts in bargain-

ing for higher compensation. While large behavioral responses to taxation generally imply greater inefficiency and lend support for lower marginal tax rates, the authors focus on a response where the opposite is the case. This leads them to support top individual income tax rates in the neighborhood of 80 percent.

In a 2014 paper, Piketty and Saez, along with Stantcheva**,** examine three avenues by which top income groups may respond to taxes. One avenue is simply reducing work hours or effort. A second response involves shifting resources away from productive activity towards tax avoidance efforts—for example, by shifting income towards tax-exempt fringe benefits or exploiting numerous loopholes for reducing taxation. Their third avenue focuses on the relationship between top tax rates and bargaining or exerting influence to secure a larger share of firm revenues for themselves.

Piketty, Saez, and Stantcheva argue that if traditional effort responses are substantial, then we should have observed stronger relationships between economic growth and top tax rates over the second half of the twentieth century—a period over which top tax rates varied greatly, both within and across countries. They then argue that tax avoidance responses are important, but can be curbed by closing loopholes and improving tax administration. They conclude that the residual in high income responses to taxation takes the form of bargaining by executives, a form of rent seeking.

Executives can bolster their incomes by increasing firm profits or by taking advantage of principal-agent information asymmetries (or ineffective corporate governance) to secure a greater share of firm revenues. High tax rates discourage this form of rent-seeking, since they lower the after-tax return from bargaining within the firm. Of course, high tax rates also discourage socially productive efforts and encourage socially unproductive tax avoidance strategies. However, if, as Piketty et al. conclude, effort and avoidance responses are either very small or can be curbed by other means, while bargaining responses are large, there can be net gains to society from higher top tax rates. In their paper, they employ an optimal-tax model, which is an abstract mathematical model used to compute tax rates (and levels of redistribution) that maximize an assumed mathematical function of social welfare. They report that accounting for bargaining responses

raises their optimal top tax rate calculation by 26 percentage points (from 57 to 83 percent). Piketty, Saez, and Stantcheva's finding that executive compensation practices are inefficient is by no means a settled issue. In a critical review of this literature, Edmans and Gabaix (2016) conclude that "Whether observed contracts result from efficiency or rent extraction is still an open question" (2014: 1277).

It should be noted that optimal tax theory has yielded a large literature and vast range of optimal tax rates, depending on model assumptions. See Mankiw, Weinzierl, and Yagan (2009). Furthermore, the importance of bargaining, as noted earlier, is generally inferred from subtracting other tax responses from the overall elasticity, and assuming the avoidance response can be reduced to close to 0 through other policy changes. Also, our understanding of the relationship between top tax rates and economic growth is nebulous. While Piketty, Saez and Stantcheva find no relationship, the broader literature includes papers that find that tax rates may be important for growth, while also includes others suggesting that they are not so important.

The market for tax preferences

While high tax rates provide a deterrent to bargaining over compensation within the firm, they also provide an incentive to appeal to government for tax preferences. In this respect, higher marginal tax rates increase rent seeking, since the benefits from exemptions, deductions, etc., increase with the tax rate. Uncertainty surrounding policy increases rent seeking further. As a case in point, consider the events leading to the passage of the Tax Reform Act of 1986. In *Showdown at Gucci Gulch*, Murray and Birnbaum chronicle the efforts of lobbyists to prevent or steer the reform. They write that

> The amount of time, money, and effort expended on tax lobbying throughout 1985 and 1986 was enough to overwhelm even the most cynical congressional observer. With billions of dollars of tax breaks on the line, major corporations, trade associations, and pressure groups hired the biggest names in Washington to protect

> themselves… Some wags began to refer to the bill as the "Lobbyists' Relief Act of 1986. (Murray and Birnbaum, 1988: 177)

Giertz and Feldman (2013) argue that policy uncertainty, and tax policy uncertainty in particular, is one of Baumol's institutional features that fosters unproductive entrepreneurship. They view uncertainty as a signal that politicians are receptive to policy changes. With little policy uncertainty, higher returns may be sought from investing in productive activities. However, when government is receptive to policy changes, the returns from rent seeking (through lobbying, Political Action Committees, etc.) may be more appealing. When policy uncertainty does not otherwise exist, politicians manufacture it. For example, legislators have devised "milker bills." These bills are not intended to actually become law, but rather to extort or "milk" rents from interested parties in exchange for killing the proposal. Thus, even a period with stable policies may contain substantial policy uncertainty and concomitant losses to the economy from this type of unproductive entrepreneurship.

There is good reason to believe that tax policy continues to be an important factor in rent seeking. Consider tax expenditures. Estimates for tax expenditures for 2012 amount to $1.3 trillion (Marron, 2012) and over the next ten years tax expenditures are projected to equal 5.8 percent of GDP (CBO, 2012, February 3). Tax expenditures are often akin to government spending and represent tax revenues foregone because of things like tax credits, exclusions, and deductions. Each tax preference has a constituency that supports and lobbies for it. Real estate groups argue for maintaining or expanding the mortgage interest deduction and the exclusion from taxation capital gains income on the sale of owner-occupied housing. Charitable organizations lobby for higher marginal tax rates to spur giving. Businesses lobby for more generous depreciation allowances, etc. On top of this, a hodgepodge of 80 or so tax extenders is enacted for a short period of time (often for one year) and thus is a continual sources of uncertainty. CBO (relying on analysis from Joint Committee on Taxation projects that a 10-year extension of these tax extenders would lower revenues by $839 billion, excluding additional debt service (CBO, 2012, January: 21).

While not focusing explicitly on taxation, Murphy, Shleifer, and Vishny (1991) report evidence supporting Baumol's conception of unproductive entrepreneurship. They look at career decisions across different countries. They argue that occupational choice is influenced by the relative returns in different sectors of the economy. In environments where rent seeking is dominant, they posit that relatively more individuals will be drawn into law. In societies where the dominant path to wealth is through the marketplace, fields such as engineering will be relatively more attractive. Indeed, they find that nations with more law students grow more slowly than nations with more engineering students. They suggest that the slowdown in economic growth over the past 40 years in the US may be in part due to a shift in the allocation of human capital towards disciplines that are more likely to be involved in rent seeking or other nonproductive activities.

Certainly, much rent seeking, while unproductive, is not especially innovative. However, innovation is important. Sometimes innovation can focus on carrying out illegal acts without getting caught. Other times, entrepreneurial rent seeking may involve devising a legal scheme for carrying out what otherwise would be illegal. In this respect, Robert Moses, the great, and now largely reviled, builder and power broker, was an entrepreneur. According to biographer Robert Caro,

> What Moses had succeeded in doing, really, was to replace graft with benefits that could be derived with legality from a public works project… Corruption before Moses had been unorganized, based on a multitude of selfish, private ends. Moses' genius for organizing it and focusing it at a central source gave it a new force, a force so powerful that it bent the entire city government off the democratic bias. (1974: 18–19)

Like other entrepreneurs, Moses did not develop his innovations from scratch. He borrowed from others, in particular from his protégé, former New York Governor, Al Smith. As Caro recounts,

> Strolling through a law-school library one day, the Governor noticed a student poring intently over his books. "There," he said with a smile, "is a young man studying how to take a bribe and call it a fee." By the Twenties, most honest graft was being worked through "fees," mostly through legal fees (more politicians belong to the legal than any other profession), but also through the real estate brokers' fees called "commissions," the insurance brokers' fees called "premiums" and the public relations fees called "retainers"… In the post-La Guardia era, there was no more "Tin Box" Brigade. It was the Retainer Regiment now. (1974: 713)

Conclusion

Schumpeterian entrepreneurship is essential for robust economic growth. This is doubly true for developed countries, where the ability to grow from adopting existing technology is limited. Taxes generally inhibit productive entrepreneurship, while encouraging the unproductive variety. Nevertheless, tax systems can be structured so as to attenuate these negative consequences. To this end, this chapter emphasized three major features of tax policy that are important for entrepreneurship.

First, capital accumulation and access to capital is essential for innovation to have a big impact. Despite this, tax systems generally tax savings more heavily than consumption. While countries often lessen this double taxation with preferences for some types of savings, the approaches are often clumsy, tending to distort incentives by type of investment and sources of financing. It is possible for countries to maintain desired revenue levels, while applying neutral tax treatment to savings and consumption. For example, consider the Bradford X-Tax (Carroll and Viard, 2012).

Second, the tax treatment of risk affects incentives for entrepreneurship, since entrepreneurship tends to entail high risk. When risk is substantial, the shape of the tax schedule affects incentives for entrepreneurship. Greater progressivity (over a taxpayer's range of potential pre-tax income) results in heavier expected (*ex ante*) tax burdens the higher the

standard deviation of earnings. However, risk aversion implies that, for a given expected tax burden, greater progressivity encourages risk taking. This is because, again holding the expected tax burden constant, progressivity acts as insurance against bad outcomes. That is, greater progressivity implies lower tax burdens when income is low and thus the marginal utility of income high; and, tax burdens are heavier when income is high and the marginal utility of income low. This notwithstanding, progressivity can sometimes discourage entrepreneurship. This is because tax systems do not afford full offsets for losses, making progressivity effectively a tax increase. Furthermore, entrepreneurs may overestimate their likelihood of success, which implies that they will pay more attention to the high tax rates associated with successful endeavours.

In sum, with respect to risk, research suggests that some progressivity is reasonable and may even encourage entrepreneurship. Note again, progressivity holding expected tax burdens constant can encourage risk-taking. This is likely not the case when progressivity entails increasing expected tax burdens. With respect to imperfect offsets for losses, a solution is to liberalize rules for carrying losses across time, possibly allowing income averaging, or allowing negative taxes for those with losses. In one sense, negative taxes for losses is ideal. In another sense, actually paying firms with losses poses problems. Some firms would surely abuse the system, claiming losses that exceed expenses incurred for phony businesses designed to generate negative taxes.

Third, tax policy can lead entrepreneurial activity to shift from productive toward unproductive or destructive aims. Productive entrepreneurship tends to flourish when the route to great wealth is achieved primarily through private markets subject to competition, and where capital is plentiful, and whose access arises from relatively unfettered private markets. High taxes reduce the rewards from productive entrepreneurship. All too often, smart, talented, and innovative people are drawn out of socially productive endeavours and into unproductive ones because the private returns from devising an innovative tax scheme—or lobbying government for special tax preferences—are greater than those for building the proverbial better mousetrap.

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