WORKING PAPER · NO. 2021-33

The Value of Employer-Sponsored Health Insurance

Casey B. Mulligan

MARCH 2021

Becker Friedman Institute

HEALTH ECONOMICS INITIATIVE
Project on Foundational Research in Health Care Markets and Policies

5757 S. University Ave.
Chicago, IL 60637
Main: 773.702.5599
bfi.uchicago.edu

THE VALUE OF EMPLOYER-SPONSORED HEALTH INSURANCE

Casey B. Mulligan

March 2021

I appreciate discussions on this topic with Tom Philipson and Kevin M. Murphy. This project, financially supported by Cigna, uses only publicly available data.

The Value of Employer-Sponsored Health Insurance
Casey B. Mulligan
March 2021
JEL No. D40,D71,H30,I13,J32

ABSTRACT

Based on published estimates of its price elasticity of demand and of tax wedges, as well as the method of revealed preference, I estimate that the annual social value of ESI is about $1.5 trillion beyond what policyholders, their employers, and taxpayers pay for it. The private component of that value, which in some respects is the other side of "job lock," derives in part from group plans, with the group determined by many characteristics other than the demand for healthcare. With voluntary groups formed this way, adverse risk selection is reduced, the groups can be effective at obtaining substantial discounts and rebates for their members, and division of labor employed in shopping for health providers. ESI is also a mechanism for employers to act on their incentives for a healthy and productive workforce. External effects include tax externalities (in both directions), encouraging work, and easing government expenditure obligations by helping to prevent people from going without health insurance.

Casey B. Mulligan
University of Chicago
Department of Economics
1126 East 59th Street
Chicago, IL 60637
and NBER
c-mulligan@uchicago.edu

A data appendix is available at http://www.nber.org/data-appendix/w28590

I. Introduction

Employer-sponsored health insurance (ESI) is over a trillion-dollar market with about 160 million Americans (a majority) participating as plan members, of which about 80 million are policy holders and the remainder family members of policy holders. The policies are valuable not only to employers and employees, but society generally. The purpose of this paper is to estimate the social value of ESI and its components. Value in this paper is relative to a baseline in which ESI does not exist and consumers must instead choose between individual-market plans, existing government plans, and uninsured status.

The social value of ESI is the sum of private value and external value. Private value is the benefit that an individual family obtains from its access to ESI, whereas the external value is the benefit the same family obtains from the access that other Americans have to ESI. External value comes from the effect of ESI on work and thereby tax revenue and business formation, its effect on the number of people insured, and its effect on the number of people on subsidized insurance.

Two basic approaches are used to estimate private value in Section II of this paper. The first approach is revealed preference, which utilizes information on historical changes in the price of ESI and thereby the number of persons that remain on ESI if its price increased to various levels. As long as the underlying data is reliable, revealed preference methods carry a lot of weight in policy evaluation "because revealed preference data are based on actual decisions, where market participants enjoy or suffer the consequences of their decisions" (Office of Management and Budget 2003, p. 24). In other words, revealed preference shows a product to be (privately) valuable only to the extent that the product passes the market test.

The second approach is to separately estimate components of private value. One attractive feature of ESI is that it consists of group plans, with the group determined by many characteristics other than the demand for healthcare. With groups formed this way, adverse risk selection is reduced whereas individual-market plans require compromises to plan design or additional expenditure on administrative costs in order to manage the distribution of risks among the members of the plan. Diverse groups can also be effective at obtaining substantial discounts and rebates for their members. Another advantage of joining an ESI plan is that a single employer can represent multiple employees in shopping for and enrolling in plans, thereby

reducing consumer effort. This is especially valuable for lower-income or lower-skilled workers who would have difficulty navigating the healthcare system on their own.

Employers and employees work together, and employers want employees to be healthy, particularly in the context of diseases that can spread around a workplace. Even beyond infectious diseases, employers have incentives for their workforce to remain healthy and therefore productive.

In taking both of these approaches, this paper assumes that decisions about work and coverage maximize the joint surplus of employers and employees.[1] This means, among other things, that insurance premiums paid by employers on behalf of employees nonetheless reflect the value that employees place on health insurance because the employer could be compensating the employee with additional salary instead of premium payments.[2]

Section II presents the revealed preference estimates of the private value of ESI, finding that it significantly exceeds what employers, employees, and (implicitly) taxpayers pay for it. Section III looks in more detail at components of the private value. Section IV estimates the social value of ESI, which is the sum of the private value and the external value. The external value is about $0.7 trillion annually, putting the total social value at about $1.5 trillion beyond what ESI costs annually.

[1] This is the dominant framework in labor economics, as with Lazear (1979).
[2] The composition of compensation between cash and health insurance has tax consequences, which are part of the analysis in this paper.

II. ESI passes the market test

Because markets allocate goods with prices, the prices reflect valuations and costs by market participants. Specifically, all units sold in the market have values (to buyers) of at least the price paid, otherwise the buyers would not have purchased. If we observe the market two times separately, each time with the same set of buyer valuations, once with a low price and a second time with a high price, then the extra units sold in the former market are those units with valuations between the two prices. The units sold in the latter market are those units valued at least as much as its price (the greater of the two prices). This is the principle of revealed preference.[3]

With enough different price observations, including prices all the way up to the "choke price" where no units are sold, any and all units sold in the market can be valued. Namely, any sale with a buyer value of, say, one, occurs at a price of one (or less) but does not occur at any price greater than one. In terms of a demand curve, we order the units sold in descending order of value and their combined value (to buyers) is the area under the demand curve. The various price observations indicate the position and shape of this demand curve. In practice, we have only a finite number of observations and therefore applications of the principle of revealed preference must interpolate and extrapolate the values corresponding to the unobserved price points. For the purpose of interpolating and extrapolating values, this paper uses two alternative demand curves: linear and logistic.

Both value and the market demand curve refer to an alternative to purchasing the good being valued. For the purposes of revealed preference valuation, both must refer to the same alternative. For this paper, the valuation of interest is the aggregate value of ESI, which means that the demand curve appropriate for revealed preference analysis is the market demand curve for ESI where buyers have the alternatives of individual policies, participating in a government plan, or being uninsured (whichever of the remaining alternatives is "next best").

The market demand curve corresponding to the valuation question posed by this paper is similar to the price-quantity relationships revealed in a large number of empirical studies of ESI

[3] Koo (1963) pioneered empirical analysis with revealed preference methods, building on theoretical advances dating back to Samuelson (1938) and Houthakker (1950). OMB (2003, p. 20) adds that "there is a large and well-developed literature on revealed preference in the peer-reviewed, applied economics literature." Note that a special case of revealed preference, "hedonic analysis," is also referenced as "revealed preference" but this paper uses the phrase in the broader sense.

using variation across firms in their workers' marginal tax rates. Conforming with the conceptual experiment, the workers populating the empirical studies do not have the alternative to be a policyholder at another employer because they carry their tax rates with them. Their spouses or partners, perhaps working at another employer, would also have similar tax rates (although could be different as to disposition of the payroll tax cap). However, dual-earning couples working for different employers would not experience the full estimated offer elasticity from an aggregate change in tax rates because consumers can switch to joining a spouse's ESI.[4] On the other hand, many of the empirical studies do not attempt to measure the effect of ESI prices on the amount spent by each policyholder, which is another margin by which market participants can substitute away from ESI when it gets more expensive.[5] In summary, the demand curve corresponding to this paper's valuation question has about the same price elasticity, and reflects about the same consumer surplus, as the demand curves estimated in the literature.

A review of more than 80 empirical studies of the price elasticity of the demand for health insurance finds that the local price elasticity of employer offer is about −0.6 (Lui and Chollet 2006). The local price elasticity of ESI demand is the sum of the local elasticity of offer and the local price elasticity of take-up conditional on offer, which the same review finds to be small (typically, closer to zero than −0.1). This paper therefore takes the local price elasticity of ESI demand to be −2/3.

A linear demand curve with a local price elasticity of −2/3 has a choke price that is 150 percent above the price that consumers normally pay net of tax subsidies.[6] In other words, the linear assumption says that a 150 percent increase in price would eliminate all surplus and demand from the market, which arguably understates the values of those ESI members with the highest valuations. This is why the linear demand assumption likely understates the value of ESI.[7] Nevertheless, this assumption says that the private value of ESI is 175 percent of (i.e., 75

[4] They might not experience the full spending elasticity, either, because categories of coverage dropped by the employer could be picked up by a spouse.

[5] Gruber and Lettau (2004) measure the amount spent on ESI by an employer conditional on offering ESI, which reflects the product of the propensity of employees to take up the employer's offer, the share of premiums paid by employer, and the amount spent per policyholder.

[6] For any linear demand curve with local price elasticity $-\eta$, the formula for the choke price is $(1+\eta)/\eta$ times the price normally paid.

[7] The conceptual experiment of eliminating ESI can be understood as the effects of raising the price of ESI so high that the choke point of the ESI demand curve is reached. In contrast, the empirical literature examines more local

percent more than) what is paid for ESI net of tax subsidies. In the aggregate, this is about $0.8 trillion annually. The first column of Table 1 summarizes the results for the linear demand method.

Table 1. Revealed Preference Estimates of the Value of ESI

Functional form	Linear	Log-Logistic
Choke price, as ratio to normal price	2.5	None
Private surplus		
as percentage of consumer spending	75%	84%
$ trillions per year	0.8	0.9
Parameters		
Local price elasticity	-0.67	
Annual consumer spending on ESI, $ trillions		
Before tax subsidy	1.26	
After tax subsidy	1.04	
Share of FT workers with ESI, 2015	0.83	

Sources: Lui and Chollet (2006), 2018 National Health Expenditure Accounts Table 5-6, Actuarial Research Corporation (2017), Carroll and Miller (2018), Long and Marquis (1999), author's calculations from the CPS Merged Outgoing Rotation Groups.

The linear demand model assumes that the value of ESI is uniformly distributed in the population. Because a family's value of ESI is related to its income, willingness to avoid hassle costs, and their value of health, the cross-sectional distribution of ESI values may be shaped more like the earnings distribution, which is approximately log-logistic. Figure 1 graphs both the log-logistic (green) and the linear (blue) demand curves supporting the results from the Table. Both demand curves have the same price elasticity in the neighborhood of normal ESI prices in order to represent the empirical estimates published in the aforementioned literature. More

price changes. As typical in the valuation of goods and services, the demand curve can be extrapolated from the observed data to the choke point by assuming a functional form.

generally, because the demand for ESI is not highly price elastic (demand is significant even at higher prices), there must be a significant consumer surplus from the existence of ESI.[8]

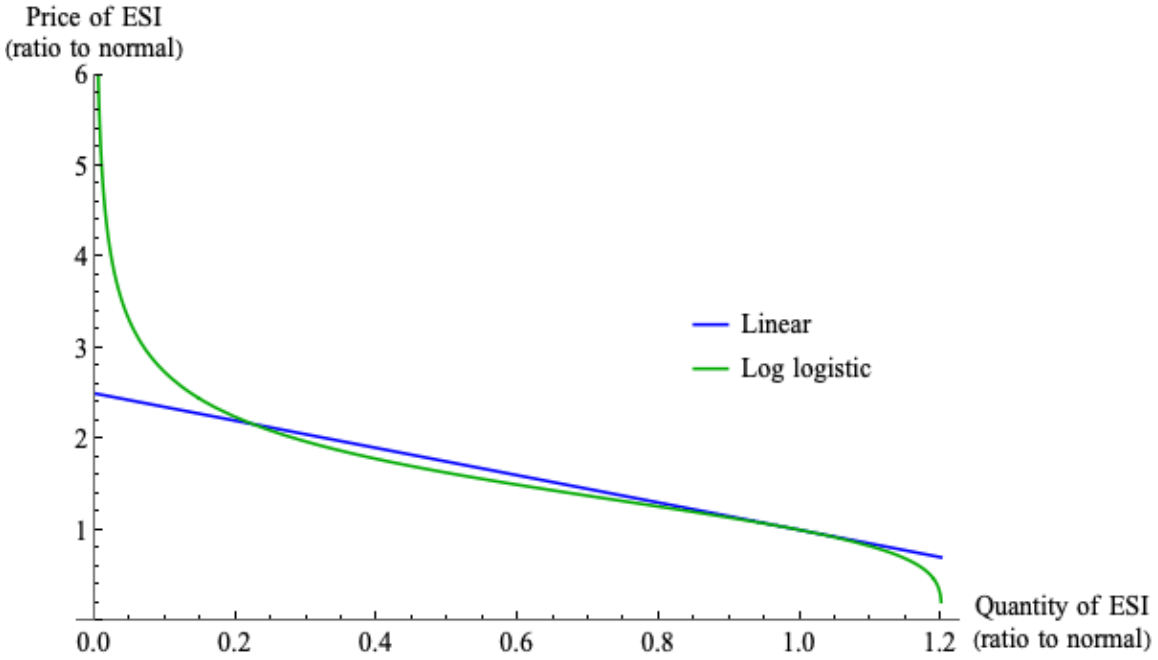

Figure 1 Two demand curves used for revealed preference estimation

The second column of Table 1 shows results for the log-logistic model, calibrated so that at normal prices 83 percent of full-time employees are enrolled in ESI, as has been the case recently. The private value of ESI is 184 percent of (i.e., 84 percent more than) what is paid for ESI net of tax subsidies.[9] In the aggregate, this is almost $1 trillion annually.

As noted previously, Table 1 and Figure 1 refer to the value of ESI relative to the next best alternative that has been present in the marketplace, which would be a particular individual-market plan, a particular government program, or being uninsured. The next best alternative could be alternating between plans, programs, or uninsured over time. Because the next best alternative itself has value relative to the third best, fourth best, etc., forcing an individual to

[8] The price elasticities estimates cited by Lui and Chollet (2006) are routinely used for policy analysis, e.g., by Congressional Budget Office (2007), Goldman, Jena and Lakdawalla (2010), Gravelle (2017), and Mahoney (2015).
[9] Note that the standard deviation of log ESI values in this calibration of the log-logistic model is 0.14, which is much less than the standard deviation of log earnings. Calibrations of the log-logistic model with greater variability show greater surplus. See also Appendix I.

replace her ESI with a particular individual-market plan or government program than is not next best for her would cost more than indicated in Table 1 and Figure 1.

III. Sources of Value

The significant value of ESI is apparent not only from worker's purchasing decisions, but also characteristics of the product itself. ESI is connected with healthcare and health, which are themselves valuable. ESI and its managers at the employer obtains substantial discounts and rebates and acquires valuable expertise on behalf of their members. A healthy workplace is important to both employers and employees. Moreover, the characteristics of ESI adapt and improve over time as insurers compete for employers who themselves compete for employees. This section provides more details on these ESI characteristics.

III.A. The Value of Health

Tremendous progress has been made on heart disease, infant sickness, and other erstwhile killers, adding tens of trillions of dollars to national wealth (Murphy and Topel 2006). Because a shifting emphasis on the health sector is a natural consequence of economic growth (Hall and Jones 2007), ESI becomes increasingly important over time as a means of financing that sector. This paper does not claim that ESI is synonymous with healthcare or health, because healthcare can alternatively be financed through individual-market plans, government programs, or paying cash directly to providers.[10] At the same time, there is a relationship between the value of ESI and the value of health because ESI is the way that most Americans finance their healthcare. Furthermore, studies have connected ESI with health through, for example, prevention, detection, and management of chronic disease. It should therefore be no surprise that the average worker puts a lot of value on ESI.

Having good workers on the payroll may be the most important action a business can take, given that the majority of value added in the economy comes from labor. As part of attracting and retaining good workers who value ESI participation, employers benefit from offering ESI, especially in a competitive labor market. A 2017 survey of businesses found that 95 percent of employers offering coverage do so either out of "a sense of responsibility towards

[10] Health is not synonymous with healthcare because important elements of health are the efforts of individuals and families, as distinct from health providers.

employees" or "staying competitive with other companies" (Mercatus Center at George Mason University 2017). The businesses also proved to be "knowledgeable about the health plans offered by competitors, about the health plans that current employees had on their previous job, and about the current health plans of former employees" (Gallen and Mulligan 2018).

III.B. Paying Less for Healthcare: the Value of Group Purchasing

ESI is a procompetitive force in healthcare markets, where providers frequently have market power. Some of the provider market power derives from patents, especially in pharmaceuticals. Compliance with Affordable Care Act regulations spawned a rapid pace of hospital acquisitions of physician practices and other hospitals (U.S. Department of Health and Human Services 2018). State regulations such as "certificate of need," "scope of practice," and "network adequacy" requirements limit competition among hospitals, between healthcare occupations, and between states.

There are calls for deregulation to facilitate entry into, and competition between, health provider professions. But until that happens, competition can still be enhanced by group purchasing and negotiated discounts. ESI does exactly that, in some of the same ways that Costco, Sam's Club, and other buyers' clubs obtain manufacturer discounts on behalf of their members.

To further appreciate the social value of group purchasing, it helps to recall how sellers exercise market power: by restricting the quantity that they sell. A seller would like to raise its price – charge more – but cannot do so without restricting quantity. The Organization of Petroleum Exporting Countries (OPEC) is perhaps the most famous sellers' cartel. OPEC exercises its market power by limiting the oil production of each of its members. Healthcare providers do that too, with, for example, hospital regulators using "certificates of need" to restrict the quantity of hospital beds in the market or professional associations limiting the number of spots in certified medical schools (U.S. Department of Health and Human Services 2018). Exercising market power delivers more profits when the sellers face a demand curve that is less price sensitive, so that small reductions in quantity can sustain large price increases.

Buyers' clubs induce sellers to limit their exercise of market power by presenting them with a more price-elastic demand curve (Jaffe, et al. 2019). The members of Costco may not

have a particularly price-elastic demand for particular brands of, say, skateboards. Skateboard manufacturers know this and hike their prices when dealing with consumers individually. But Costco limits the number of manufacturers who can sell to their members to one or two manufacturers pricing the lowest. In effect, each manufacturer bidding to be in Costco faces a very price-elastic demand from the club because a small increase in price will cost her all of her sales through Costco. With a low price of skateboards in the store, Costco members buy more skateboards than they would if there were no buyers' clubs in that market. Quantity discounts obtained by buyers' clubs serve much the same purpose (Murphy, Snyder and Topel 2014). Either way, lower prices and higher quantities are the proof that buyers' clubs are procompetitive.

Sheer size of a buyers' club can also push prices lower, but the sheer size effect is anticompetitive because a buyers' club dominating the market restricts the amount that it purchases in order to squeeze a lower price out of the sellers. Lower prices and lower quantities are proof that the practices of a dominant buyer are anticompetitive.[11] This "monopsony" approach to purchasing healthcare is taken by "single-payer" countries, which restrict the quantity of healthcare by withholding treatments from particular demographic groups or having a narrower range of available drugs (Council of Economic Advisers March 2019). Results of monopsony in healthcare markets include shorter survival times for cancer, and fewer intensive beds available during the COVID-19 pandemic.[12]

In much the same way that Costco excludes skateboard manufacturers and restaurants exclude soda vendors, ESI plans exclude health providers in order to get their members a greater quantity of healthcare at a lower price. "Narrow networks" are one way this is done: the plan encourages its members with low coinsurance rates to use a select list of hospitals and doctors that have negotiated especially low rates with the plan.[13] As an article in the *New England Journal of Medicine* explained, "providers that do not face the threat of exclusion [from the plan

[11] Restaurant purchases of soda are an example of how buyers' clubs can be effective even on a small scale. Restaurants, any one of which has purchases that are a tiny fraction of the overall soda market, typically tell Coca-Cola and PepsiCo that only one of the companies' products will be served in the restaurant, to be determined by which offers the lowest price (Klein and Murphy 2008). The result is sometimes a discount that is so significant that the restaurant provides consumers "free refills" (i.e., a large quantity of soda).

[12] See Philipson et al (2012) on cancer survival times. Rhodes et al (2012) measures per-capita intensive care beds around the world. The lowest four are all single-payer countries. Another difference between single-payer (or other large government programs) and ESI is that each workplace can have different ESI, tailored to their specific needs and circumstances.

[13] The narrow networks used by plans for purchases of pharmaceuticals are known as "drug formularies."

network] have little reason to temper their demands for higher prices" (Howard 2014, p. 592). The article further notes that the consumer benefit from narrow networks is greatest when providers have market power to exercise, "as providers consolidate into large health systems, exclusive networks will provide insurers with their only recourse for limiting increases in payment rates."

Just as Costco membership has little relation to skateboard-brand preference, or restaurant choice little relation with soda-brand preference, working for a business has at most a weak relation with the demand for health insurance and its attributes. The diversity of the group is what allows the group purchasing to deliver so much value. If all of the patrons of a restaurant strongly preference Coke, Coke would have little reason to offer the restaurant a discount for an exclusive position on its menu knowing that customer demand alone would sustain that position.[14]

The value created by group purchasing in healthcare has been significant. In 2011, private insurers (which are primarily ESI) obtained hospital discounts of at least 40 percent (Cooper, et al. 2019). Rebates of 12 percent were negotiated from prescription-drug manufacturers on behalf of private insurers.[15] These observations suggest that the total amount of rebates and discounts obtained by ESI plans likely exceeds $100 billion annually. These amounts are not entirely benefits for consumers because, as explained previously, they are obtained by increasing the purchases from particular healthcare providers and reducing purchases from others (with an overall net increase).[16] Nevertheless the amounts are good proxies for the combined value of group purchasing to plans and providers (Jaffe, et al. 2019).

III.C. Health in the Workplace

As the Centers for Disease Control and Prevention (CDC) explains, the "workplace is an important setting for health protection, health promotion, and disease prevention programs. On

[14] In the context of health insurance, a diverse group also helps reduce the costs of "adverse risk selection," which in extreme circumstances can leave a large fraction of the population uninsured (Hackmann, Kolstad and Kowalski 2015, Bundorf, Levin and Mahoney 2012).
[15] The available data is for 2016, from Roehrig (2018).
[16] Employers often give employees a choice of plans, some of which have narrower networks and lower premiums and others broader networks and higher premiums. An employee choosing a plan with narrower networks is trading the additional discounts and rebates (reflected in plan premiums) against the additional provider choice in the broader network.

average, Americans working full-time spend more than one-third of their day, five days per week at the workplace." (Centers for Disease Control and Prevention 2016). The World Health Organization adds that "occupational safety and health can contribute to improving the employability of workers…" (World Health Organization 2020). The CDC and others cite workplace health strategies such as tobacco-free campuses and coverage for preventative screenings that ESI plans promote and offer (Black 2017, Centers for Disease Control and Prevention 2018a).

Data collected by the CDC (2018a) indicate how employers help prevent, detect, and manage chronic disease, especially among large employers where ESI is nearly ubiquitous. Smoking cessation programs are particularly common prevention programs sponsored by employers. In terms of detection, conditions screened through employer programs can include blood pressure, blood cholesterol, diabetes, obesity, breast and other cancers, musculoskeletal disorders, and depression. Employers have multiple incentives to help reduce chronic disease in their workforce, including attracting and retaining employees who value such efforts and reducing health claims that translate into premiums paid by employers and their employees. In some occupations, such as trucking where goods need to be moved safely over road, poor health among the employees will create regulatory challenges for the employer and a substandard product for the consumer (Centers for Disease Control and Prevention 2018b).

The workplace may be the best place for controlling the spread of contagious diseases because employers and their insurers have incentives and can marshal necessary resources. During the COVID-19 pandemic, Cigna (a provider of ESI) waived cost-sharing and co-pays for "office visits, testing, and treatment…" as well as COVID-19 testing (Cigna 2020). They also provided information and advice to clients as to how to safely open their workplaces.

Although the COVID-19 pandemic is temporary, it has motivated changes in healthcare that may enhance the value beyond what this paper estimates on the basis of historical data. Most notable is adoption of telehealth by many health providers, which allows patients to receive some of their healthcare "services from their doctors without having to travel to a healthcare facility" (Centers for Medicare & Medicaid Services 2020). Mehrotra, et al. (2020) find that telehealth visits peaked in April 2020 at fourteen percent of all provider visits, from 0.1 percent before March. That percentage remained above seven even in the most recent data (end of July). As a cost of healthcare beyond payments to providers, travel to and from providers can be a

significant barrier to receiving care (Leminen, Tykkyläinen and Laatikainen 2018, Nesbitt, et al. 2000). Reducing the travel costs thereby increases the value of insurance coverage that would help pay providers.

III.D. Division of Labor and the Delegation of Insurance Decisions

Psychology and economics studies have documented how many individuals can be overwhelmed by information and the range of choices in many markets. Moreover, the costs may not merely be psychic but also result in suboptimal decisions (Thaler and Sunstein 2009, Kahneman 2011).

At the same time, markets offer opportunities for specialization and division of labor. Specific employees in a business, or its agents, can specialize in acquiring and processing information about health providers as well as providing the administration for group purchasing activities. Specialists can monitor employee experiences with specific providers and be watchful for new providers and products. ESI is an especially common framework for engaging this kind of specialization.

Specialization in healthcare decisions has proven benefits. Kling et al (2008) find that individuals make better choices about plans when relevant information has been acquired and presented to them. Absent the specialization, Abaluck and Gruber (2011) find that choice errors add 27 percent to insurance costs. In the context of health insurance for working-aged people, that would be savings of almost $2,000 per covered life year. Those funds could be saved by delegating information gathering and elements of decision-making to specialists motivated to advance the interests of the insured.

III.E. Innovation and Competition

It is easy to take the above sources of value for granted but, as in any market, valuable goods and services are the result of innovation. Moreover, products are not static but evolve over time as market participants attempt to improve them. ESI is a large and competitive market in which employers (the buyers) seek the insurer that offers the most value to them and employees. Employers themselves are competing for employees and ESI is an important part of

that competition. Unfortunately, competition is largely ignored in many of the health insurance "microsimulation" models used to evaluate health policy: "the employers in the microsimulation models update their insurance offering without regard for what their competitors are doing." In reality, "the evidence shows that employers offer fringe benefits on the basis of their understanding of their competition, and not just characteristics of their current payroll."[17]

IV. The Social Value of ESI

The benefits of ESI include an important external component that accrues outside the factory gate. ESI is connected to work, which is not only important to working families, but also society generally because of the tax revenue and business formation it creates. ESI also helps prevent people from being without health insurance, which eases obligations on governments. The social value of ESI is the sum of private value (Sections II and III) and external value.

IV.A. The Value of Work

ESI, and the value it delivers to plan members, is connected to work. A person cannot participate in ESI without working or having a family member who works.[18] Eliminating ESI would therefore reduce work by eliminating an important advantage of working.[19] The average worker losing ESI cannot just take his money to purchase something else with the same value because, by definition, the worker leaves the ESI surplus behind. That is what it means for Figure 1's demand curves to be above one: each dollar spent on ESI is worth more than the value that the dollar would purchase elsewhere.

---

[17] Both quotes are from Gallen and Mulligan (2018, p. 78), referring to the Congressional Budget Office's Health Insurance Simulation Model, RAND's Comprehensive Assessment of Reform Efforts, and other microsimulation models reviewed by Remler, Zivin, and Glied (2004) and Buchmueller, Carey, and Levy (2013).

[18] Former employees sometimes participate in ESI after they retire or otherwise separate from their employer. For example, 34 percent of non-elderly household heads and spouses unemployed in March 2012 were covered by their former employer's plan (Mulligan 2015, Table 4.2). Opportunity to participate in ESI after an employment tenure (spell), which for many workers is guaranteed by the Consolidated Omnibus Budget Reconciliation Act and other statutes, further adds to the value of the tenure. The guaranteed opportunities for continuation coverage are sometimes forgotten by labor market commentators asserting that losing health insurance coverage is a consequence of unemployment (Economic Policy Institute 2020).

[19] Many studies have documented effects of ESI on work. Mulligan (2015) reviews the studies, and provides the example of "Mike Smith, who was working long hours in California as a district manager for a national auto parts dealer. Despite wanting to help care for his grandchild and elderly in-laws, Mr. Smith kept his manager job into his 60s because he and his wife wanted the health insurance that came with it."

The magnitudes of the work incentives are large. As shown in Table 2, if purchasing coverage and paying out-of-pocket costs for self and a family member at the national average, the median-wage worker spends about 30 percent of her compensation (which includes employer payments of premium) on ESI. Reducing or eliminating her surplus from ESI would therefore reduce the value of employment by a sizeable percentage. The ESI advantage of work is disproportionate for the lower-middle class because ESI is a greater fraction of their compensation: over 60 percent at half the median wage.

Table 2. ESI Expenditure Shares at Various Points of the Wage Distribution
Each worker is assumed to cover herself and one family member at the average cost per ESI life year

Worker with:	Expenditure Share
Wage at half the median	0.61
Wage at the median	0.30
Wage at double the median	0.15

Note: The median refers to the population of workers at employers offering ESI, which was about $22 per hour in 2016.

Source: Mulligan (2015, Chapter 4)

Work is not only important to working families, but also society generally. Scholars ranging from Michael Sandel to Charles Murray have documented the harm to families and communities that comes from a lack of work. Sandel (2018) cautions against a "transition to a world without work" for the erstwhile working class because it misses "the meaning of work and its place in a good life." Murray (2013) links joblessness to reductions in civic engagement and other forms of social capital. Case and Deaton (2017, pp. 428f) attribute higher rates of suicide and fatal drug overdose in working class communities to their declining rates of employment and marriage.

Work directly generates about 80 percent of the tax revenue funding federal, state and local governments. Work indirectly generates even more tax revenue and creates additional business formation because few businesses can earn a profit or pay profits taxes without finding the right personnel to join their workforce. The tax revenues from work help fund government

programs and to keep tax rates lower. If ESI were eliminated, that would reduce work and thereby the aforementioned social benefits.

The tax- and profit-related external benefits from ESI are easiest to quantify because eliminating ESI is analogous to putting a new tax on work. By reducing work, such a new tax reduces profits and other tax revenues. The amount of the reduction per dollar of new tax is known as the "marginal excess tax burden" (METB) (Dahlby 2008). The METB is widely used in academic policy analysis and is recommended by the White House Office of Management and Budget (1992, 2003) for regulatory impact analysis.[20] Because the external effect of new tax revenue is the product of the METB and the dollar amount of that revenue, this method suggests that the external effect (in terms of profits and other tax revenues) of eliminating ESI is the product of the METB and the private surplus from ESI ($0.8 to $0.9 trillion annually). Using a METB of 0.5 in order to reflect the various markups and implicit taxes in the economy (CEA 2020), that puts the external effect of ESI at $0.4 trillion. This is net of the implicit tax subsidy for ESI and does not count any value of the social capital effects of work that occur because ESI is available.[21] See Table 3.

[20] OMB (2019) recommends that more federal regulatory impact analyses use the METB.

[21] In other words, ESI annually creates about $0.6 trillion in profits and other tax revenues but at the same time, for given amounts and composition of national income, reduces payroll and income tax revenues by about $0.2 trillion because ESI premiums are excluded from the tax bases (U.S. Department of Treasury, Office of Tax Analysis 2018). The $0.4 trillion cited in the text is the net of these two effects.

Table 3. The Social Value of ESI
$ trillions per year, unless otherwise noted

Functional form	Linear	Log-Logistic
Private surplus (Table 1)	0.8	0.9
Positive effects on other tax revenues and profits		
Tax expenditure on ESI	-0.2	-0.2
Increased taxable factor supplies	0.6	0.7
Reduced healthcare subsidies		
Uncompensated care	0.04	0.04
Individual-market subsidies	0.2	0.2
TOTAL = Social Surplus of ESI		
$ trillions per year	**1.4**	**1.6**
$ per year per insured life	**$9,124**	**$10,000**

Parameters	
Marginal Excess Tax Burden, rate	0.50
Millions insured by ESI	157
Share of ESI that would be uninsured	0.27
Per capita annual external cost of uncompensated care	$989
Per capita annual subsidy for individual market	$1,900

Sources: CEA (2019a), CBO (2018), Avalere (2018), Kaiser Family Foundation (2020)

The role of ESI in encouraging work has been pejoratively described as "job lock." As economist Ed Dolan (2018) laments, "people with [ESI] are less likely to change jobs, become self-employed, retire early, or reduce hours of work." These behaviors are just the other side of the coin of ESI's tremendous value: workers sometimes give up other things of value in order to have ESI. These are the workers represented by the parts of Figure 1's demand curve near a price of one. What the job lock literature ignores is that workers giving up leisure time or early

retirement in order to retain ESI are conferring a positive externality through the payment of additional taxes and the other channels noted in Table 3.[22]

IV.B. Getting People Covered

An important goal of the 2010 Affordable Care Act was to "increase the number and share of Americans who are insured" (Section 10106). Even if eliminating ESI had no effect on work, it would remove the number one health insurance option, leaving those erstwhile covered either uninsured, on a government plan, or on an individual-market plan. Each of these three would create additional expenses for federal, state, and local government budgets. Based on previous studies of the effect of expanding ESI on the enrollment status of the U.S. population, I assume that 27 percent of those on ESI would become uninsured and 73 percent join individual-market or government plans.[23] If uncompensated care costs $989 per uninsured per year, this component of the external cost of ESI totals $0.04 trillion annually.

The average annual subsidy in the individual market (plans compliant with the Affordable Care Act requirements) is currently about $3,800 (Council of Economic Advisers February 2019). Conservatively assuming half that subsidy for the average person taking up individual-market or government plans as the result of the elimination of ESI, those additional individual-market subsidies would be about $0.2 trillion annually.[24] Including the private surplus, the aggregate annual social value of ESI is between $1.4 trillion and $1.6 trillion beyond what workers and taxpayers pay for it.[25] Per covered life, the aggregate annual social value is between $9,000 and $10,000.

[22] Note that the question posed in this paper – the costs of eliminating ESI – is different from the questions posed in the "job lock" literature such the effects of subsidizing specific segments of the private insurance market. As noted previously in this paper, a significant number of workers retain their ESI after leaving employment.
[23] Council of Economic Advisers (February 2019), Congressional Budget Office (2018), and Avalere (2018).
[24] This amount would be much greater to the extent that a large number of persons were moved to Medicaid, where the average annual spending per non-elderly person enrolled is about $4,400 by the federal government plus additional subsidies from states (Congressional Budget Office 2017).
[25] Recall from Table 1 that about $1.3 trillion is spent annually on ESI, including premiums, implicit tax subsidies, and out-of-pocket payments.

V. Conclusions

It has been said that employer-sponsored health insurance (ESI) is a persistent anachronism from World War II that needs to be phased out because it costs more than it is worth (A. E. Carroll 2017, Dolan 2018). But this ignores how easily ESI passes the market test. Its demand is strong even when it becomes more expensive. Revealed preference estimates suggest that workers value ESI 75 to 84 percent more than employers and employees together pay for it. This private surplus from ESI significantly exceeds the tax subsidy for ESI implicit in the exclusion of premiums from taxable income. The value of ESI is no surprise once we recognize the values of health, group purchasing, and strategies for improving health in the workplace.

Moreover, ESI has significant external value that likely more than justifies its implicit tax subsidy. It strongly encourages work in an economy where the large majority of value and tax revenue is created by work. It helps maintain a healthy population. ESI is a procompetitive force in healthcare markets that have become increasingly consolidated on the provider side. The alternatives to ESI – individual plans, government plans, and uninsured status – often involve more public subsidies than ESI does. These are reasons why the annual social value of ESI (net of its tax subsidy) per covered life may exceed $10,000 beyond what it costs employers, employees, and taxpayers. In the aggregate, that is an annual surplus of at least $1.6 trillion.

VI. Appendix: Inferring Consumer Surplus from the Local Price Elasticity of Demand

The purpose of this appendix is to provide the detailed calculus used to obtain the value private estimates shown in Table 1. Let q denote the aggregate quantity of ESI, p the price (net of subsidies), and $u(q)$ denote the aggregate value to all q consumers. Consumer surplus is $u(q) - pq$. The inverse market demand (a.k.a. marginal value) curve is $p = u'(q)$. I normalize the baseline price, quantity, and expenditure to one, which means that $u(1) - 1$ is baseline consumer surplus. Let $\eta = -\frac{u'(1)}{u''(1)}$ denote the local baseline magnitude of the price elasticity of demand.

Two surplus functions, and therefore two demand functions, are used to calculate Table 1. The first "linear" case is:

$$u(q) = q\frac{2(1+\eta)-q}{2\eta}, \qquad u(1)-1 = \frac{1}{2\eta}$$
$$u'(q) = \frac{1+\eta-q}{\eta}$$
$$-\frac{u'(q)}{qu''(q)} = \eta\frac{u'(q)}{q}$$

In this case the baseline surplus (as a ratio to baseline expenditure) is readily calculated from any empirical estimate of η by inverting it and dividing by two.

The second "log-logistic" case is

$$u(q) = {}_2F_1\left(-\frac{1-s}{\eta}, \frac{s+\eta-1}{\eta}, 2-\frac{1-s}{\eta}, sq\right) q^{\frac{s+\eta-1}{\eta}} (1-s)^{-\frac{1-s}{\eta}} \frac{\eta}{s+\eta-1}$$
$$u'(q) = \left(\frac{1}{s\,q}-1\right)^{\frac{1-s}{\eta}} \left(\frac{s}{1-s}\right)^{\frac{1-s}{\eta}}$$
$$-\frac{u'(q)}{qu''(q)} = \eta\frac{1-sq}{1-s}$$

where ${}_2F_1$ is the Gaussian hypergeometric function and the parameter s satisfies $s \in (1-\eta,1)$. The marginal value curve $u'(q)$ derived from the Gaussian hypergeometric function is a log-logistic demand curve, which does not have a choke point but it has a satiation point $1/s$. Therefore, the baseline quantity is the fraction s of the maximum possible quantity. For this

reason, I calibrate s as the fraction of full-time employees that are covered by ESI.[26] Both the linear and log-logistic versions of the ESI demand curve $u'(q)$ are graphed in Figure 1 for a value of $\eta = 2/3$.

[26] Based on Carrol and Miller (2018), Long and Marquis (1999), and my own calculations from the CPS Merged Outgoing Rotation Groups, I estimate $s = 0.833$. Note that logistic demand curves are often interpreted as representing a market with consumer preferences distributed logistic, which is of interest in its own right and also as close approximation to the normal distribution.

Bibliography

Abaluck, Jason, and Jonathan Gruber. "Choice inconsistencies among the elderly: evidence from plan choice in the Medicare Part D program." *American Economic Review* 101 (2011): 1180–1210.

Avalare. *Association Health Plans: Projecting the Impact of the Proposed Rule.* Washington, DC: Avalare, 2018.

Besedeš, Tibor, Cary Deck, Sudipta Sarangi, and Mikhael Shor. "Reducing choice overload without reducing choices." *Review of Economics and Statistics* 97 (2015): 793–802.

Black, Alexandra. "Five Reasons Employee Wellness Is Worth the Investment." *health.gov.* May 17, 2017. https://health.gov/news-archive/blog/2017/05/five-reasons-employee-wellness-is-worth-the-investment/index.html.

Buchmueller, Thomas, Colleen Carey, and Helen G. Levy. "Will Employers Drop Health Insurance Coverage Because Of The Affordable Care Act?" *Health Affairs* 32, no. 9 (September 2013): 1522-30.

Bundorf, M. Kate, Jonathan Levin, and Neale Mahoney. "Pricing and welfare in health plan choice." *American Economic Review* 102 (2012): 3214–48.

Carroll, Aaron E. "The Real Reason the U.S. Has Employer-Sponsored Health Insurance." *New York Times*, September 7, 2017.

Carroll, William A., and G. Edward Miller. *Differences in Health Insurance Coverage between Part-Time and Full-Time Private-Sector Workers, 2005 and 2015.* Washington, DC: Agency for Healthcare Research and Quality, 2018.

Case, Anne, and Angus Deaton. "Mortality and morbidity in the 21st century." *Brookings papers on economic activity* 2017 (2017): 397–476.

Centers for Disease Control and Prevention. "Long-Haul Truck Drivers." *cdc.gov.* 2018b. https://www.cdc.gov/niosh/topics/truck/health.html.

—. "Workplace Health in America 2017." *cdc.gov.* 2018a. https://www.cdc.gov/workplacehealthpromotion/data-surveillance/docs/2017-Workplace-Health-in-America-Summary-Report-FINAL-updated-508.pdf.

—. "Workplace Health Model." *cdc.gov.* May 13, 2016. https://www.cdc.gov/workplacehealthpromotion/model/index.html (accessed August 2020).

Centers for Medicare & Medicaid Services. "Medicare Telemedicine Health Care Provider Fact Sheet." *cms.gov.* March 17, 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet.

Cigna. "cigna.com." *Coronavirus (COVID-19) Information for Employers and Brokers.* August 11, 2020. https://www.cigna.com/coronavirus/employers (accessed August 2020).

Congressional Budget Office. "CBO's Health Insurance Simulation Model: A Technical Description." *CBO Background Paper*, October 2007.

—. "Federal Subsidies for Health Insurance Coverage for People Under Age 65: 2018 to 2028." *Congressional Budget Office.* May 23, 2018. https://www.cbo.gov/publication/53826.

Congressional Budget Office. *Health Insurance Subsidies in 2017 for People Under Age 65.* Washington, DC: Congressional Budget Office, 2017.

Cooper, Zack, Stuart V. Craig, Martin Gaynor, and John Van Reenen. "The price ain't right? Hospital prices and health spending on the privately insured." *The Quarterly Journal of Economics* 134 (2019): 51–107.

Council of Economic Advisers. *Deregulating Health Insurance Markets: Value to Market Participants.* Executive Office of the President, February 2019.

Council of Economic Advisers. *Economic Report of the President.* Executive Office of the President, February 2020.

Council of Economic Advisers. *Economic Report of the President.* Executive Office of the President, March 2019.

Dahlby, Bev. *The marginal cost of public funds: Theory and applications.* Cambridge, MA: MIT press, 2008.

Dolan, Ed. "What's Wrong with Employer Sponsored Health Insurance." *niskanencenter.org.* November 6, 2018. https://www.niskanencenter.org/whats-wrong-with-employer-sponsored-health-insurance/ (accessed August 2020).

Economic Policy Institute. "12 million people have likely lost employer-sponsored health insurance since February." *epi.org.* August 26, 2020. https://www.epi.org/press/12-million-people-have-likely-lost-employer-sponsored-health-insurance-since-february-policymakers-should-work-to-delink-jobs-and-access-to-insurance-coverage-by-expanding-public-options/.

Gallen, Trevor S., and Casey B. Mulligan. "Wedges, Labor Market Behavior, and Health Insurance Coverage." *National Tax Journal* 71, no. 1 (March 2018): 75-120.

Goldman, Dana P., Anupam B. Jena, Darius N. Lakdawalla, Jennifer L. Malin, Jesse D. Malkin, and Eric Sun. "The value of specialty oncology drugs." *Health services research* 45 (2010): 115–132.

Gravelle, Jane. *The Excise Tax on High-Cost Employer-Sponsored Health Insurance: Estimated Economic and Market Effects.* Washington, DC: Congressional Research Service, 2017.

Gruber, Jonathan, and Michael Lettau. "How elastic is the firm's demand for health insurance?" *Journal of Public Economics* 88 (2004): 1273–1293.

Hackmann, Martin B., Jonathan T. Kolstad, and Amanda E. Kowalski. "Adverse selection and an individual mandate: When theory meets practice." *American Economic Review* 105 (2015): 1030–66.

Hall, Robert E., and Charles I. Jones. "The value of life and the rise in health spending." *The Quarterly Journal of Economics* (MIT Press) 122 (2007): 39–72.

Henry J. Kaiser Family Foundation. "Health Insurance Coverage of the Total Population." *kff.org.* 2020. https://www.kff.org/other/state-indicator/total-population/?dataView=1&currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D (accessed August 2020).

Houthakker, H. S. "Revealed preference and the utility function." *Economica* 17 (May 1950): 159-174.

Howard, David H. "Adverse effects of prohibiting narrow provider networks." *N Engl J Med* 371 (2014): 591–593.

Jaffe, Sonia, Robert Minton, Casey B. Mulligan, and Kevin M. Murphy. *Chicago Price Theory.* Princeton University Press (ChicagoPriceTheory.com), 2019.

Kahneman, Daniel. *Thinking, fast and slow.* Macmillan, 2011.

Klein, Benjamin, and Kevin M. Murphy. "Exclusive dealing intensifies competition for distribution." *Antitrust LJ* 75 (2008): 433.

Kling, Jeffrey R., Sendhil Mullainathan, Eldar Shafir, Lee Vermeulen, and Marian V. Wrobel. "Misperception in choosing Medicare drug plans." *Unpublished manuscript*, 2008.

Koo, Anthony Y. C. "An empirical test of revealed preference theory." *Econometrica: Journal of the Econometric Society*, 1963: 646–664.

Lazear, Edward P. "Why is there mandatory retirement?" *Journal of political economy* 87 (1979): 1261–1284.

Leminen, Aapeli, Markku Tykkyläinen, and Tiina Laatikainen. "Self-monitoring induced savings on type 2 diabetes patients' travel and healthcare costs." *International journal of medical informatics* 115 (2018): 120–127.

Long, Stephen H., and M. Susan Marquis. "Comparing Employee Health Benefits In The Public And Private Sectors, 1997: The benefits of government workers stack up well against those in the private sector, and government workers are more likely to be offered health insurance at work." *Health Affairs* 18 (1999): 183–193.

Lui, Su, and Deborah Chollet. *Price and Income Elasticity of the Demand for Health Insurance and Health Care Services: A Critical Review of the Literature.* Washington, DC: Mathematica Policy Research, Inc., 2006.

Mahoney, Neale. "Bankruptcy as implicit health insurance." *American Economic Review* 105 (2015): 710–46.

Mehrotra, Ateev, Michael Chernew, David Linetsky, Hilary Hatch, David Cutler, and Eric C. Schneider. "The Impact of the COVID-19 Pandemic on Outpatient Visits: Changing Patterns of Care in the Newest COVID-19 Hot Spots." *commonwealthfund.org.* August 13, 2020. https://www.commonwealthfund.org/publications/2020/aug/impact-covid-19-pandemic-outpatient-visits-changing-patterns-care-newest.

Mercatus Center at George Mason University. "Summary of Interesting Findings in the ACA Small Business Survey." *mercatus.org.* June 2017. https://www.mercatus.org/system/files/mercatus-summary-findings-aca-survey-v1.pdf (accessed June 28, 2017).

Mulligan, Casey B. *Side Effects and Complications: The Economic Consequences of Health-care Reform.* Chicago: University of Chicago Press, 2015.

Murphy, Kevin M., and Robert H. Topel. "The value of health and longevity." *Journal of political Economy* (The University of Chicago Press) 114 (2006): 871–904.

Murphy, Kevin M., Edward A. Snyder, and Robert H. Topel. "Competitive discounts and antitrust policy." *The Oxford Handbook of International Antitrust Economics, Volume 2*, 2014: 89.

Murray, Charles. *Coming Apart: The State of White America, 1960-2010.* New York: Crown Publishing Group, 2012.

Nesbitt, Thomas S., Donald M. Hilty, Christina A. Kuenneth, and Allan Siefkin. "Development of a telemedicine program: a review of 1,000 videoconferencing consultations." *Western Journal of Medicine* 173 (2000): 169.

Office of Management and Budget. "Circular A-4: Regulatory Analysis." (OMB, Office of Information and Regulatory Affairs) 2003.

Office of Management and Budget. "Circular A-94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs." (OMB, Office of Information and Regulatory Affairs) 1992.

—. "Marginal Excess Tax Burden as a Potential Cost Under E.O. 13771." *regulations.gov.* 2019. https://www.regulations.gov/document?D=OMB-2017-0002-0055.

Philipson, Tomas, Michael Eber, Darius N. Lakdawalla, Mitra Corral, Rena Conti, and Dana P. Goldman. "An analysis of whether higher health care spending in the United States versus Europe is 'worth it'in the case of cancer." *Health Affairs* 31 (2012): 667–675.

Remler, Dahlia K., Joshua Graff Zivin, and Sherry A. Glied. "Modeling Health Insurance Expansions: Effects of Alternate Approaches." *Journal of Policy Analysis and Management* 23, no. 2 (January 2004): 291-313.

Rhodes, Andrew, Patrick Ferdinande, Hans Flaatten, Bertrand Guidet, Philipp G. Metnitz, and Robert P. Moreno. "The variability of critical care bed numbers in Europe." *Intensive care medicine* (Springer) 38 (2012): 1647–1653.

Roehrig, Charles. *The impact of prescription drug rebates on health plans and consumers.* Washington: Altarum, 2018.

Samuelson, Paul A. "A Note on the Pure Theory of Consumer's Behavior." *Economica* 5, no. 17 (February 1938): 61-71.

Sandel, Michael J. "Populism, liberalism, and democracy." *Philosophy & Social Criticism* (SAGE Publications Sage UK: London, England) 44 (2018): 353–359.

Thaler, Richard H., and Cass R. Sunstein. *Nudge: Improving decisions about health, wealth, and happiness.* Penguin, 2009.

"The Patient Protection and Affordable Care Act." Public Law 148, March 23, 2010.

U.S. Department of Health and Human Services. "Reforming America's Healthcare System Through Choice and Competition." *hhs.gov.* 2018. https://www.hhs.gov/sites/default/files/Reforming-Americas-Healthcare-System-Through-Choice-and-Competition.pdf.

U.S. Department of Treasury, Office of Tax Analysis. "Tax Expenditures, Fiscal Year 2020." October 2018.

World Health Organization. "Workplace health promotion." *who.int.* 2020. https://www.who.int/occupational_health/topics/workplace/en/index1.html (accessed August 2020).