

Audit Externalities and Regulation*

by

Jere R. Francis

Foundation for Auditing Research Chair, Maastricht University
and
Emeritus Curators' Distinguished Professor, University of Missouri

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Abstract

What is the economic justification for audit regulation? Good audits have benefits to the broader economy (externalities) that transcend the private benefits to companies that contract for audits. Since companies will only pay for the private benefit of an audit, there is a market failure in which audit quality is underproduced relative to the theoretical social optimum, and this is Pigou's (1932) classic argument for regulation. However, measurement of the social optimum is problematic in Pigou's framework, and regulators should instead focus more concretely on the net benefits of regulations, and not presume regulation is needed because of externalities, per se. Careful and transparent assessment of the costs and benefits of regulatory initiatives is necessary to prevent costly regulations that have potentially harmful consequences for both audit firms and audit clients, and that contribute to increasing Big 4 concentration in audit markets.

Keywords: Audit externalities, spillovers, regulation, Pigou, social welfare, cost-benefit analysis

JEL Classification: H23, M42, M48

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Audit Externalities and Regulation

I. Introduction

Government regulation of auditing began in the United States with the Securities Exchange Act of 1934 which created the Securities and Exchange Commission (SEC), mandated audits for listed companies, and gave the SEC authority to regulate auditors. While the SEC occasionally sanctions auditors and audit firms, for the most part it has not directly involved itself with audit regulation. Prior to the 2002, auditing was largely self-regulated by the profession through the American Institute of Certified Public Accountants. That changed in 2002 with the establishment of the Public Company Accounting Oversight Board (PCAOB). The PCAOB now directly regulates auditing. It registers auditors that are allowed to audit SEC registrants, issues audit standards, monitors audit quality through its inspection program, and takes actions against non-complying audit firms.

Sheifler (2010) and Stiglitz (2009) point out that the wealthiest countries have pervasive government regulation. Government intervention in the private sector occurs for many reasons; for example, safeguarding workers through occupational safety laws, and protecting consumers through food and drug regulation by the Food and Drug Administration. Regulation also occurs to prevent monopoly power through anti-trust laws that limit market concentration and promote competitive markets. Another source of regulation corrects for the perverse effects of externalities (also called spillovers). An externality occurs when there is a cost (or benefit) from economic activity that affects third parties, but is not internalized in the cost of the good or service being produced. Pollution is a good example, where the adverse health and environmental effect of pollution on third parties is not reflected in the price of production (in which pollution is a side effect). Remedies include pollution abatement requirements, and, in extreme cases, prohibitions

on production that generates toxic waste as a by-product. Other examples are annual car inspections, which protect other drivers from unsafe cars on the road, and zoning ordinances that protect property owners from value-reducing property development.

Why is auditing regulated? Regulations that promote high-quality audits provide consumer protection to investors from harmful (misleading) financial information. The economic justification for audit regulation is a market failure, and Sheifler (2005) and Langli and Willekens (2018) note three general causes of market failures. First, a market failure can occur because of information asymmetry problems in which the firm (managers) knows more about the firm than outsiders. In the extreme, when information asymmetries are large, markets may break down altogether and outside parties will not contract with the firm (Akerlof 1970). Second, a market failure occurs when markets are not competitive. Third, a market failure occurs when there are externalities or spillovers to third parties such as pollution that are not internalized in the price of production. Any of these potentially results in the quantity or quality of a good being produced to differ from the socially optimum outcome. Regarding the information asymmetry problem, Watts and Zimmerman (1986) argue firms have incentives to mitigate information asymmetry through private contracting with auditors that gives credibility to the firm's financial information and disclosures. With respect to competition failure, the audit market is concentrated which might suggest a lack of competition and a market failure. However, the large Big 4 firms audit less than 50 percent of U.S. listed firms, and there is intense competition among the Big 4 audit firms for the audits of larger listed firms (Audit Analytics 2023). So it is difficult to make the case for regulation based on uncompetitive markets.

This leaves externalities as the most plausible economic rationale for regulation, and I examine the case for externalities-driven audit regulation. The remainder of the paper proceeds as

follows. The next section discusses the supply of and demand for audits in an unregulated setting. An important feature of auditing is that audit standards (which themselves are a kind of regulation) do not explicitly define the required level of audit quality. In an unregulated market this means that each firm will contract for the “quantity” of audit assurance (audit quality) where its private marginal benefit is equal to the marginal cost. Section III introduces the argument that there are social spillovers (externalities) in audits, wherein third parties, and the entire economy more broadly, benefit from the production of high-quality audits. The reason is that good audits increase investor confidence, and high-quality audits are part of the institutional infrastructure in a country that protects investors. Thus, the social marginal benefit of an audit is potentially greater than the private marginal benefit. The result is a classic market failure in which the socially optimum level of audit quality is underproduced (Pigou 1932). Section IV critiques the externalities argument as an insufficient justification for regulation, and Sections V and VI discuss a more pragmatic regulatory framework based on the transparent assessment of the costs and benefits of audit regulation. The paper concludes in Section VII.

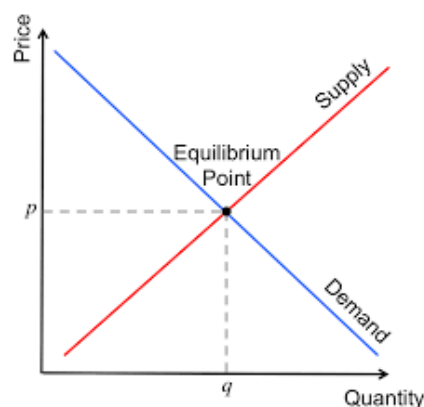
II. Stylized Model of the Audit Market

The Marginal Cost – Marginal Benefit Framework

A standard marginal cost and marginal benefit framework is used in the analysis. In an unregulated market a firm will buy the quantity of assurance in which the marginal benefit (MB) equals the marginal cost (MC). To fit auditing into the marginal analysis framework, I make a stylized analysis which characterizes the buyer of an audit as buying “units” of assurance, where audit quality is increasing in the number of assurance units purchased. As the quantity of assurance increases (i.e., higher quality audits), the marginal price also increases, which gives rise to the classic downward sloping demand curve and upward sloping supply curve depicted in Figure 1.

The market equilibrium is denoted p and q , which is where $MC=MB$. Figure 1 is a simplified representation of an unregulated audit market.¹

Figure 1
Supply and Demands Curves in Unregulated Markets



Audit Quality is Not Defined in Audit Standards

Audit standards are a form of regulation. They give standardized guidance to the conduct of the audit, and in some instances require specific tests to be performed. Overall, though, audit standards are largely principles-based rather than rule-based. Importantly, audit standards do not explicitly specify the “quality” an audit must achieve, i.e., the quantity of assurance in Figure 1. Instead, the standards use the audit risk model to conceptualize audit quality. Audit quality is higher when there is a lower level of audit risk, which is the risk of undetected material misstatements. The standards only stipulate that auditors must manage audit risk to an “acceptable” level, without defining what that means, either quantitatively or qualitatively.²

¹ The demand curve is more likely to be a step function, with discrete rather than continuous levels of audit quality, e.g., local/regional auditors, national (non-Big 4) auditors, Big 4 auditors, and Big 4 industry experts (Francis, Maydew, and Sparks 1999; Reichelt and Wang 2010).

² Causholli and Knechel (2012) argue that audits are credence goods, in which the perceived value of an audit is based on the auditor’s credibility. In the stylized audit market in Figure 1, the quantity of audit assurance on the x-axis could also be conceptualized as increasing levels of auditor credibility.

Thus, it is left to each auditor and client firm to negotiate the price and quantity of assurance. As the quantity of assurance goes up (higher-quality audits) there is less audit risk, but the unit price also increases. In a standard neoclassical framework, a client will buy the quantity of assurance up to the point where the marginal cost of an additional unit of assurance equals the marginal private benefit of the additional unit of assurance.

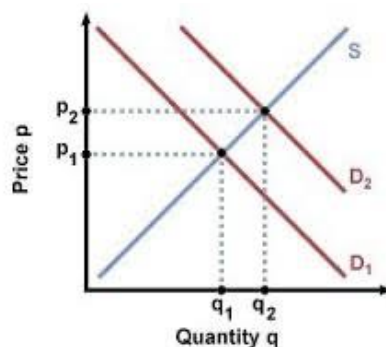
Private Marginal Benefit of Audits

Now assume there are two levels of assurance in the audit market, denoted a “standard” audit and a “premium” audit. For firms buying a standard audit, the equilibrium point is a relatively lower quantity of auditing (at a lower cost). This is depicted by the demand curve D1 in Figure 2 where the equilibrium is p_1 and q_1 . For firms buying a premium audit, the marginal benefit (MB) of an audit is greater, and is illustrated by the demand curve D2 in Figure 2, where the equilibrium is p_2 and q_2 . It is assumed the supply curve (MB) is the same for all auditors.

The idea of a two-tier market for audit quality is supported by a large body empirical research in which Big 4 audits are of higher quality and more costly than non-Big 4 audits (DeFond, Erkens, and Zhang 2016).³ We can think of D1 as the demand curve for a “standard” non-Big 4 audit, and D2 as the demand curve for “premium” Big 4 audits.

³ Research also finds evidence that Big 4 industry leaders are higher quality (and more expensive) auditors than Big 4 firms that are not industry leaders (Reichelt and Wang 2010). For simplicity I focus on a two-tier market structure.

Figure 2
Two-Tier Demand Curves



Large, listed firms have substantial agency costs due to the separation of ownership and management, multiple sources of external debt, and a dispersed ownership structure. These firms have incentives to purchase more units of auditing (higher quality), and their demand curve D2 reflects the need for more credible financial reporting. Other firms have lower agency costs and will benefit less from audits if their ownership is concentrated, e.g., family owned and managed businesses whose MB of an audit is lower, and their demand curve would be more consistent with D1 in Figure 2.⁴

Francis and Wilson (1988) report evidence consistent with an agency theoretic demand for premium audits. The audits of U.S. listed firms also provide empirical evidence consistent with a two-tier market structure (Audit Analytics 2023). The overall Big 4 audit market shares is 45 percent of all SEC registrants (n=6,950), and 51.5 percent if Special Purpose Acquisition Companies (n=707) are excluded. However, for large accelerated filers (n=2,130), the Big 4 audit 89 percent of the market.⁵ For these large firms, the MB of an audit is greater, these firms are more likely to have a premium Big 4 auditor, and their demand curve would be consistent with D2. For

⁴ Not all listed firms choose a premium (Big 4) audit, and not all smaller, closely held firms choose a standard (non-Big 4) audit. Each firm will make its own cost-benefit assessment.

⁵ For 2023, the SEC defines a large accelerated filer as having a market cap of at least \$700 million.

all other SEC registrants the Big 4 market share is much lower, around 30 percent, consistent with these firms having a lower MB from audits and therefore more likely to have a standard (non-Big 4) audit. For these firms, the demand curve looks like D1.

III. Social Benefits of Audits

While each firm buys the quantity of assurance (audit quality) in which the private benefit is maximized ($MB=MC$), audits have a potential spillover value to third parties that do not contract for an audit. This spillover results in a marginal social benefit that may exceed the marginal private benefit of an audit. Why is this the case? From an agency theoretic perspective, a firm contracts with an auditor to buy the quantity of assurance (audit quality) that meets the needs of the firm's creditors and shareholders. But an audit also benefits other parties such as potential future creditors and shareholders. For these potential future investors, there is greater information asymmetry and the need for a high-quality, credible audit. This is exactly what happens in the IPO market when companies switch from a smaller regional auditor to a national (Big 4) auditor when going public to create more credibility (Menon and Williams 1991). More generally, the credibility of an audit has a broader spillover on investor confidence in capital markets. Credible audits increase confidence in the reliability of accounting information, and is part of a country's infrastructure that protects investors and creditors. Financial economics research documents that investor protection has a positive effect on capital markets, investments, and economic growth. See La Porta, Lopez-Silanes, Shefler, and Vishny (2000), Castro, Clementi, and MacDonald (2004), and Maclean, Zhang, and Zhao (2012).

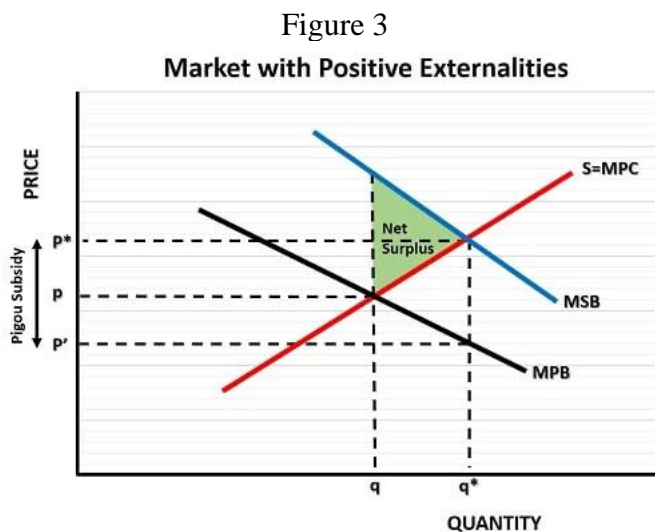
The technical term for the kind of spillovers discussed above is a *positive production externality* (Pigou 1932). A positive production externality occurs when a firm's production increases the well-being of others but the firm is uncompensated for these benefits. Pigou's classic

example is a beekeeper, whose production of honey has a spillover benefit to nearby orchards which are pollinated by the beekeeper's bees.⁶

In auditing, there is a spillover benefit of high-quality assurance to the economy, but the audit firm is not compensated for this incremental social benefit. Since buyers will only pay for the private marginal benefit of an audit, there is a market failure because the quantity of assurance produced is less than the theoretical social equilibrium (Pigou 1932). Even a "premium" audit in an unregulated setting (see Figure 2) may fall short of creating broader economy-wide confidence in the quality of audited information. What an individual firm is willing to buy may simply be insufficient to achieve these wider spillover benefits. In Pigou's (1932) framework the underproduction results in a market failure that warrants government intervention.

The above argument is illustrated in Figure 3. For simplicity, I use a single demand curve, denoted MPB (marginal private benefit). The private equilibrium demand for assurance is denoted as q at a unit price of p . This is the equilibrium of quantity and price, based only on the private demand for assurance. However, with positive externalities the demand curve SMB (social marginal benefits) shifts to the right of the private demand curve PMB (private marginal benefit), and reflects both the private and social benefits of credible audits, and results in the ideal equilibrium of q^* and a price of p^* . The social benefit of assurance is greater than the private benefit, i.e., $q^* > q$. The shaded area in the graph is the social surplus from avoiding underproduction. In Pigou's (1932) analysis, a production subsidy is needed to achieve the socially optimum level. Pigouvian theory identifies the need for audit regulation, and provides a framework for determining the regulation needed to mitigate market failures.

⁶ The economics literature on externalities discusses both positive and negative externalities, but has focused primarily on negative externalities such as pollution.



While good audits have positive spillovers on investor confidence, the corollary is that bad audits have negative spillovers. An example of negative spillovers from bad audits is illustrated by the negative market reaction to the failures of Enron in December 2001 and WorldCom in June 2002, both the result of egregious earnings misstatements and audit failures. By some estimates the stock market dropped nearly 30 percent during this period. Economists at the Brookings Institution estimated the broader economic fallout, beyond losses directly related to the Enron and WorldCom bankruptcies, to be over \$30 billion, or about 0.35 percent of GDP (Brookings Institution, 2002). The collapse of Enron's auditor, Arthur Andersen, in 2002 also caused the stock market to drop by 2 percent on days immediately following its conviction on June 15, 2002, for shredding documents in the Enron case. Andersen clients experienced even sharper price declines, reflecting a contagion effect and loss of confidence in the specific financial statements audited by Andersen (Chaney and Phillipich 2002). The negative market response to the above events suggests the market had over-estimated auditor quality and the quality of audited financial information. The crisis resulted in government inquiries and led to swift passage of the Sarbanes-Oxley Act of 2002 which aimed to ensure high-quality audits as a means of restoring investor confidence.

IV. Critique of the Externalities Rationale for Regulation

Figure 3 provides a framework for thinking about the role of audit regulation. If there are positive spillover benefits of high-quality audits, there is a market failure in which the socially optimum level of assurance is underproduced. Buyers of audits will not pay for social benefits that exceed private benefits. Theoretically, regulation policies will shift the quantity of assurance produced from private demand (q) closer to the socially optimum level of demand (q^*).

One possible remedy has already occurred, which is to mandate audits for listed companies. When all listed firms are audited, this should positively affect perceived investor protection by establishing a minimum baseline of credible financial statements for all listed firms. This was important because Chow (1982) finds in his study of 368 firms on the New York Stock Exchange, that that only 67% of listed U.S. companies were voluntarily audited in 1927, prior to the Securities and Exchange Act of 1934. However, the audit mandate, by itself, does not specify the level of audit quality, so the potential for a market failure remains.⁷

For Pigou (1932) and later economists (Meade 1952), externalities are a justification for government intervention and the regulation of private markets, either taxes to mitigate the effects of negative externalities such as pollution, or, in the case of auditing, production subsidies to mitigate underproduction of audit quality arising from positive externalities.⁸ The government

⁷ Regulators could mandate a specific level of audit quality (audit risk), but to date have been unwilling to do so.

⁸ Coase (1960) argues that many problems of externalities can be solved by the creation of bargainable private property rights, without the need for the government to directly regulate or tax economic activities. See also Buchanan and Stubblebine (1962). Instead, the government only needs to create clear property rights and let the private parties bargain accordingly, although it is hard to see how this could be work with audit externalities. Hovenkamp (2008) points out that Coase greatly exaggerated the difference between his analysis and Pigouvian economics, and he ignored the fact that Pigou explicitly discusses important elements of the Coase analysis including transaction costs, which he termed the “costs of movement.”

would subsidize the cost of the audit so that the socially optimum equilibrium quantity in Figure 3 is produced.⁹

Following Pigou's (1932) treatise on welfare economics, first published in 1920, there was intense debate among economists about the meaning of social welfare and the possibility of its measurement. The Pigouvian framework was criticized in particular because of its assumption that individual preferences are cardinal measures and therefore that marginal utilities of individuals can be directly compared in deriving optimal social welfare (see Robbins 1935; Kaldor 1939; Hicks 1939). Today the cardinal utility view is rejected by most economists who view marginal utilities as ordinal measures that cannot be directly compared across individuals (Hennipan 1992). See also Arrow (1963). If Pigou's ideal of an optimum social equilibrium cannot be clearly measured, then regulators cannot unambiguously compare the current level of audit quality against the theoretical optimum as the basis for regulation. This is a reason why the narrower concept of Pareto optimality and economic efficiency gained favor among economists and superseded Pigou's broader arguments about maximizing social welfare (Kaldor 1939; Hicks 1939). Theoretically, a Pareto optimal economy is one in which the reallocation of resources (e.g., regulation policies) cannot make one person better off without making another person worse off, and a Pareto improvement only occurs if at least one person is better off with no harm to others.

In a Pigouvian sense, audit regulators may implicitly assume the socially optimum level is greater than the current equilibrium level of assurance, as depicted in Figure 3. Why else would they need to regulate? However, we cannot know this for certain. Further, since auditing is already regulated, it is even possible that the current level of audit quality meets or even exceeds the theoretical social optimum. In a narrow Pareto sense, Stiglitz (2009) argues out that if market

⁹ In extreme cases of market failures arising from the underproduction of the socially optimal level of production, the government may be required to step in. Classic examples are police and fire protection, and national defense.

failures result in a Pareto inefficient economy, it might be possible for regulations to be efficient and achieve a Pareto social optimum. His example is expanded disclosures in the financial sector to reduce information asymmetry, following the 2008 global financial crisis. But, if an economy is already Pareto efficient, regulation cannot improve efficiency, but will only create winners and losers in a zero-sum sense.

A less stringent requirement for Pareto improvement is the Kaldor-Hicks criterion for efficiency, formalized by Scitovsky (1941) and based on work of Nicholas Kaldor and John Hicks. Under this condition, the reallocation of resources through regulation improves efficiency if those made better off could *in theory* compensate those made worse off. This is important because it means it would be possible to regulate auditing and achieve Pareto improvement, even though audit regulations create winner and losers. The Kaldor-Hicks compensation principle is the theoretical foundation of applied cost-benefit analysis (CBA), which is widely used in government policy making and legal reasoning (Congressional Research Service 2022; Adler and Posner 1999).

V. Pragmatic Audit Regulation

Few dispute the validity of Pigou's general arguments about externalities and market failure.¹⁰ However, given the problem of measuring social welfare, corrective regulatory interventions are not so straight forward. The Pigouvian framework of externalities is important and provides a guide to regulatory audit policymaking, but it does not automatically justify regulation, nor does it give definitive answers to the type and extent of regulatory interventions.

¹⁰ The Pigouvian framework has been particularly influential in formulating policies to tax the negative externalities of pollution, and the development of carbon trading schemes as way of reducing greenhouse gases. See Economists' Statement on Carbon Dividends (2020) and Huetel (2020).

Instead, the best we can achieve is efficient audit regulation in the Kaldor-Hicks sense, which requires careful cost-benefit assessments. This puts a special burden on audit regulators in adopting policies that lead to the production of more costly audits. How is audit quality improved by regulation, and how is the quality of the improvement assessed? Who gains, and how is this benefit monetized? What is the compliance cost, and who pays, clients or auditors? These are very challenging questions for regulators. Steven Harris, a PCAOB board member states that the PCAOB uses economic analysis as part of its decision making framework, “. . . including the benefits and costs – both quantitative and qualitative – of the proposed action.” (Harris 2014). While this may be true, the PCAOB needs to be more transparent about the details of its cost-benefit assessments so their policymaking can be better understood and critiqued. Absent careful, defensible, and transparent cost-benefit analyses, it would be easy to over-regulate.

Even if the Pigouvian ideal of social optimum audit quality is problematic, in a more modest sense we can think of audit regulations as incrementally “nudging” audit quality higher, hopefully toward (but not beyond) the theoretical social equilibrium value of q^* in Figure 3. This kind of regulatory behavior can be seen in the actions of audit oversight bodies such as the SEC and PCAOB in the U.S., the Financial Reporting Council in the UK, and the Authority for Financial Markets (AFM) in the Netherlands.¹¹ I call this the “nudge” strategy because auditors are compelled (or nudged) to provide a higher level of assurance than is strictly necessary to comply with audit standards, and which probably exceeds the private marginal benefits for most clients.

An example of the nudge strategy is the introduction of audit inspections by audit oversight bodies. DeFond and Lennox (2011) document that 600 smaller U.S. audit firms opted out of the

¹¹ In 2019, the British government proposed replacing the Financial Reporting Council with a new organization, the Audit Reporting and Governance Authority. However, to date, this has not been implemented.

audit market for listed firms in response to the adoption of audit inspections by the PCAOB in 2004. Presumably these smaller audit firms were not capable of nudging up the quality of their audits, or at least the marginal benefits of doing so exceeded their marginal costs. This can be seen as pushing the quantity of audit assurance to the right in Figure 3, as the firms that lost their auditor would have to hire an auditor willing to meet PCAOB inspection standards, with an implicitly higher-quality and more costly audit.

In the UK, the Financial Reporting Council is using the nudge strategy with its auditor quality indicators project (Financial Reporting Council 2020). In requiring disclosure of a wide range of audit quality metrics, the presumption is that such disclosures will incentivize auditors to make changes in their operations that will improve the metrics, which in turn will have the effect of improving audit quality.

The audit firm culture initiative of the Dutch regulator, Authority for Financial Markets (AFM), is another example of the nudge strategy. Since 2014, AFM has pushed the 10 largest Dutch audit firms to improve their internal culture to better support the production of consistent, high-quality audits. Each year AFM prepares a report that assesses the progress audit firms are making in changing their internal cultures (AFM 2018). Not surprisingly, the smaller non-Big 4 firms are struggling more than the Big 4 firms to achieve these changes. This is analogous to smaller auditors dropping out of the U.S. market when inspections were first introduced. Audit quality initiatives are expensive to implement, and smaller firms have fewer resources to meet the goals of these initiatives.

VI. Who Benefits and Who Pays?

An OECD report examines regulatory policymaking in OECD countries, and concludes that regulations generally fail to quantify the social benefits of regulation, and only do a limited analysis

of costs (Parker and Kirkpatrick 2012). This is a damning assessment given the importance of rigorous cost-benefit assessments in justifying regulations. The picture in audit regulation is much the same. For example, the Sarbanes Oxley Act of 2002 mandated audit partner rotation every five years, with no assessments of the costs or benefits of doing so. Further, the research to date finds little evidence it has done more than increase the cost audits (e.g., Kuang, Li, Sherwood, and Whited 2020; Sharma, Tanyi, and Litt 2017). Another example is the 2014 mandate by the European Commission to rotate audit firms every 10 years for public interest entities (which includes listed companies). In making this requirement, the Commission willfully ignored a large body of research evidence that finds little harm from long audit tenure, and little benefit from voluntary auditor changes.

Sarbanes-Oxley has probably been the most researched topic in audit regulation, and the results are mixed on the costs and benefits. Cohen, Dey and Lys (2008) find the quality of audited earnings improved post-SOX, but that firms also engaged in more real earnings management which can be value destroying. Kalelkar and Nwaeze (2011) report mixed evidence on the market valuation of earnings post-SOX, with no effect for firms with institutional ownership. On the cost side, the combined effects of Sarbanes-Oxley and the introduction of PCAOB inspections in the early 2000s caused audit fees of U.S. listed firms to increase by 121 percent between 2002 and 2005 (Audit Analytics, 2020). Ahmed, McAnally, Rasmussen, and Weaver (2010) find that SOX reduced corporate cash flows and profitability, and Iliev (2010) estimated that SOX Section 404 compliance reduced the market value of smaller firms..

Who pays for the increased cost of audits from regulatory initiatives? This is important because costs are arguably more easily assessed than the benefits of regulation. There are three possibilities. First, auditors can pass on the costs to clients, even though clients do not contract for

this quantity of assurance. Second, auditors can absorb the increased production costs. The third option is for the government to subsidize the cost of the increased production, which is the classic solution in Pigou (1932) to a market failure arising from positive production externalities.

Passing on Costs to Clients

Under current contracting arrangements, audit firms might be able pass on the increased production costs to clients. However, this is a de facto tax on clients which makes audits more expensive.¹² A consequence is that some clients might opt out by going private (de-listing) where they can negotiate lower audit fees. This is a concern because the point of listing on a stock exchange is to raise the capital needed for growth. This negative scenario is more likely to affect smaller clients for whom the audit fee is a relatively large expenditure. Smaller companies are known to be the engine of economic growth in an economy, so policies that incentivize smaller companies to de-list (or to not list at all) are detrimental to the economy.

Empirical evidence on audit fees is instructive. I analyzed the 2021 audit fees for all U.S. listed firms on the Audit Analytics database (n=6500), excluding financial institutions. I calculated the ratio of audit fees to sales for each firm, and then examined the average level of fees for each decile of company size based on revenues. For the very largest listed firms, deciles 8, 9 and 10, audit fees are 0.1 percent or less of sales (1/10th of one percent). In contrast, for the smallest decile of firms, audit fees averaged 7.1 percent of sales, or 7.1 cents per dollar of sales. The economic impact of fees on smaller firms is enormous given that net profit margins average around 10 cents of profit per dollar of sales. For the 3rd decile of firms, audit fees are still nearly one percent of revenues (0.9 percent), and even for the median U.S. firm (50th percentile), audit fees are 4/10th of

¹² Another concern is that PCAOB charges listed firms a tax that is used to support PCAOB operations. This tax also implicitly increases the cost of an audit, over and above the other effects of audit regulations.

one percent of sales. The point is that very large firms can probably absorb higher audit fees from increased regulation costs, but this may not be true for perhaps as much as half of the population of U.S. listed firms.

Auditors Absorb Increased Production Costs

The second possibility is that auditors absorb the increased production costs rather than pass them on to clients, and this is most likely to happen for smaller U.S. listed firms where audit fees are already problematically high (in relative terms). However, this strategy will have the effect of reducing auditor profitability and is not a sustainable long-term strategy. There is some evidence that audit profitability has been in a long-term decline (Frecka, Griffin, and Stevens 2018). In addition, some auditors might voluntarily withdraw from the audit market for listed firms. For example, in the Netherlands, Grant Thornton announced it would no longer audit public-interest entities (which includes listed companies). Doing so removes the firm from pressure to comply with the audit regulatory body (AFM).

Production Subsidies

Pigou's (1932) classic solution to a market failure from underproduction of goods with positive production externalities is for the government to pay for the incremental cost of producing the optimum quantity (Figure 3). A recent example was the production subsidy for COVID-19 vaccinations. There are positive externalities to being vaccinated. Not only do individuals gain protection, but by being vaccinated they are less likely to infect others (social benefit). If vaccines are produced in a private market setting, some individuals may choose not to be vaccinated ($MB < MC$), which results in underproduction and puts the entire society at greater risk of illness. The optimal solution is to subsidize their production, and make them available at little or no cost to individuals. As argued above, a case can be made for subsidizing the cost of audits for smaller

firms. That said, the administration of production subsidies would not be an easy task. Who would qualify for subsidies? How much would the subsidy be? Who would monitor subsidies and determine if the auditor delivers the expected level of audit quality? At the conceptual level, Pigou subsidies make sense, but their implementation would be challenging and costly and the benefits might not exceed the costs.

VII. Discussion and Conclusions

Audit externalities provide an economic rationale for regulation, but the theoretical social optimum in Pigou's (1932) framework cannot be measured and therefore cannot guide regulation policies. Pareto efficient regulation in the Kaldor-Hicks sense is possible, but requires a careful cost-benefit assessment as regulation policies creates winners and losers. Who benefits, and who pays? Regulators cannot assume that the increased production costs can be passed on to audit clients, especially smaller companies for whom audit costs are already at quite high levels. Nor can regulators assume that auditors can absorb the production costs, as audit firms are already experiencing declining profitability and may be facing an existential crisis. For these reasons, a case can be made for Pigou (1932) type subsidies to auditors for the production of high-quality audits, especially for smaller listed companies, although the cost of the administrative machinery for doing this might exceed the benefits, so careful analysis is needed before going down this path. An alternative to subsidies might be a financial statement insurance scheme for smaller companies of the type advocated by Ronen (2010).

An additional problem with the cost-benefit framework is that it may not fully incorporate the negative consequences on smaller firms. As noted before, the cost of an audit is disproportionately greater for smaller firms, and high fees may discourage smaller listed firms from staying listed, and deter smaller private firms from going public altogether. If smaller firms are

shut out of the equity market because of high audit fees, this has negative economic consequences because smaller firms are generally viewed as more innovative and the drivers of economic growth. Again, there is a case for Pigou (1932) subsidies in the production of audits for smaller firms.

The regulation of audit quality also has a spillover on the structure of the audit market. Regulations that aim to increase audit quality will inevitably favor large audit firms, especially the Big 4. These large firms have the resources needed to implement quality-increasing regulations, while smaller firms may not, which will lead to further market concentration. Recall the exit of smaller firms in the audit market for listed firms when PCAOB inspections were introduced. Regulators around the world are concerned with ever-increasing levels of audit market concentration by the large Big 4 firms. Therefore, in assessing the net benefits of audit regulation on audit quality, there also needs to be an awareness by regulators of how regulations can also cause spillovers and adversely affect the structure of audit market and result in less competition.

To conclude, there may a case for audit regulation to achieve higher-quality audits, based on careful cost-benefit assessments, but audit externalities by themselves do not give regulators a mandate to regulate ever increasingly costly and higher levels of audit quality. Given the considerable challenges in measuring the costs and benefits of regulations, a guiding principle of restraint in regulation would be appropriate.

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