

Macroeconomic impacts of applying Rule 15c2-11 to Rule 144A debt issued by private US companies

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Executive summary

This report estimates the macroeconomic impacts of requiring that the financial information of private US companies issuing Rule 144A debt be current and publicly available in order for broker-dealers to be able to freely quote their bonds. These quotations enable qualified institutional buyers (QIBs), which unlike the general public are permitted to participate in the Rule 144A market, to buy and sell corporate bonds. If broker-dealers are not able to freely quote an issuer's bonds, this would increase issuers' borrowing costs via an illiquidity premium. This increase in borrowing costs would lead to job losses and a reduction in US gross domestic product (GDP).

Background

Rule 15c2-11 and Rule 144A

US Securities and Exchange Commission (SEC) Rule 15c2-11 of the Securities Exchange Act of 1934, as amended (Rule 15c2-11), requires broker-dealers to review key issuer information and ensure that such information is current and publicly available prior to publishing quotations for that issuer's securities to the market through quotation mediums. Implemented in 1971, Rule 15c2-11 was designed to deter fraud in the largely retail, over-the-counter (OTC) equity markets.

SEC Rule 144A of the Securities Act of 1933, as amended (Rule 144A), was established in 1990 to provide a safe harbor from registration for resales of securities to QIBs. QIBs are sophisticated financial institutions that manage at least \$100 million of securities from unaffiliated issuers. Rule 144A was designed to improve the liquidity and efficiency of the private placement market by offering more flexibility to sophisticated institutional investors to trade restricted securities. Notably, under Rule 144A, issuers are obligated to make their financial and operational information available to QIBs, if such information is requested.

In September 2020, the SEC amended Rule 15c2-11 to require broker-dealers to verify that issuers' financial information is publicly available before quoting their securities. In September 2021, the SEC's Division of Trading and Markets issued a no-action letter applying Rule 15c2-11 to both equity and fixed income securities, including those offered pursuant to Rule 144A, contrary to the Rule's historical application to only equity securities. In December 2021, the Division issued a second no-action letter indicating that SEC staff would not immediately recommend enforcement action for non-compliance. Specifically, as part of a three-phase implementation timeline, private issuers of Rule 144A bonds would be expected to make their financial information publicly available beginning in January 2023 in order for broker-dealers to be able to freely quote their bonds. In November 2022, however, the Division issued a third no-action letter stating that the staff will not recommend enforcement until January 2025.

Implication

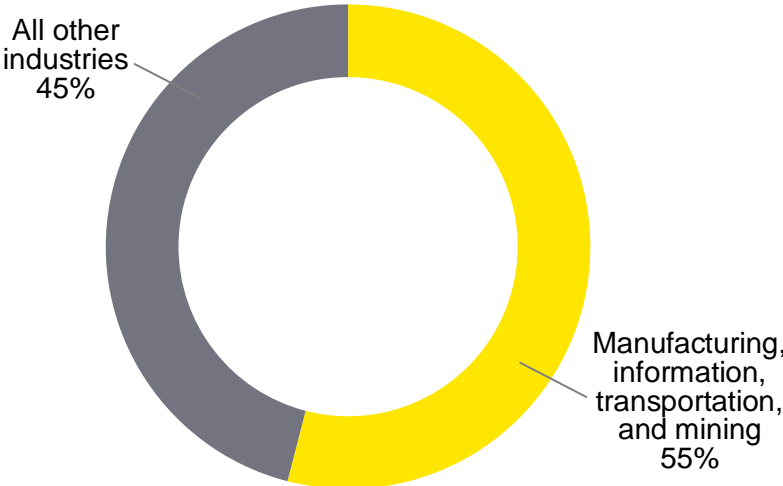
The application of amended Rule 15c2-11 would prevent broker-dealers from being able to freely quote the securities of Rule 144A bond issuers that do not make their financial information available to the general public (which cannot invest in Rule 144A securities). As a result, the bonds issued by companies that do not make their financial information publicly available would become less liquid. The reduced liquidity would diminish the market value of such Rule 144A

bond issuances and result in increased borrowing costs for these issuers. Additionally, current holders of affected Rule 144A bonds would see the value of their investments decline.

The Rule 144A bond market is an important source of financing for many private US companies. Private US companies issued approximately \$178 billion in Rule 144A bonds in 2021, comprising a significant portion of the overall US corporate bond market. The total amount of corporate Rule 144A bonds outstanding exceeds \$4 trillion.

Figure ES-1 displays the industry composition of nonfinancial private US companies issuing Rule 144A bonds. Manufacturing and related industries comprised 55% of nonfinancial private US companies issuing Rule 144A bonds, on average, over the 2015-2021 period.

Figure ES-1. Industry composition of nonfinancial private US companies issuing Rule 144A bonds, share by industry, 2015-2021 average



Note: Figure displays share of amount of issuances. Industry definitions follow the North American Industry Classification System (NAICS). Figures are rounded.
Source: Refinitiv; EY analysis.

The application of amended Rule 15c2-11 would significantly impact private US companies. Companies can face significant costs if they choose to make their financials publicly available. These costs include the erosion of a company’s competitive advantage from the disclosure of proprietary information, as well as the time and resources spent preparing and disseminating the information.ⁱ The application of amended Rule 15c2-11 would increase borrowing costs and decrease liquidity for Rule 144A debt issued by companies that do not make financial and operational information available to the public and their competitors.

ⁱ The body of the report includes a discussion of disclosure costs faced by private US companies. This analysis assumes that private US companies would not publicly disclose their financial information. There is, however, significant uncertainty as a similar market dynamic has not been previously encountered. For a description of the required financial information see 17 CFR § 240.15c2-11.

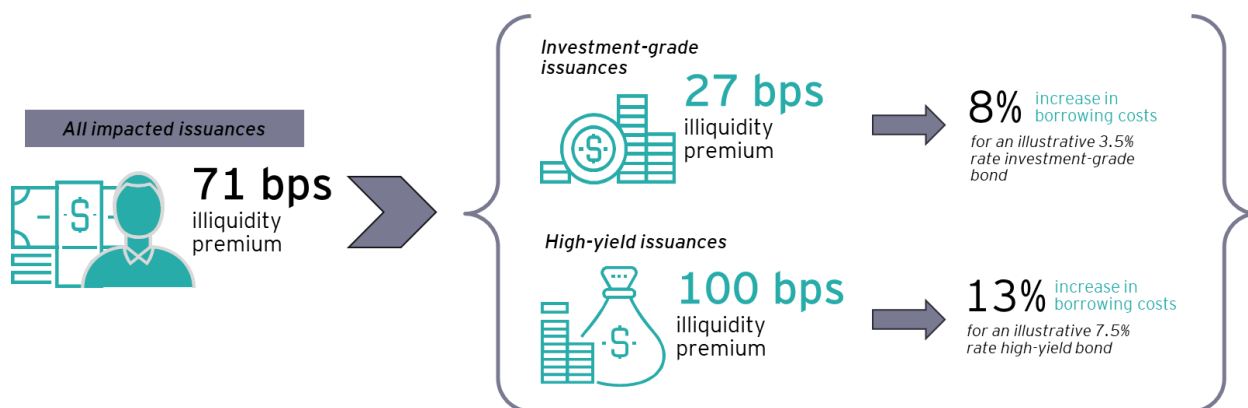
Impact on borrowing costs

To estimate the potential change in borrowing costs for Rule 144A bond issuers that do not make their financial information publicly available, EY surveyed US fixed income market professionals from seven large financial institutions on their expectations for the illiquidity premium such issuers would face.ⁱⁱ The median responses from the respondents, which provided results separately for investment-grade and high-yield bonds, were:

- ▶ Investment-grade issuances: 27 basis points
- ▶ High-yield issuances: 100 basis points
- ▶ Weighted-average Rule 144A issuance: 71 basis points

These premiums represent an 8% increase in borrowing costs for an illustrative 3.5% rate investment-grade bond, and a 13% increase in borrowing costs for an illustrative 7.5% rate high-yield bond.

Figure ES-2. Impact on borrowing costs



Source: EY analysis.

Macroeconomic impacts

Increased borrowing costs raise the cost of investment, which discourages investment and results in less capital formation than would otherwise occur. With less capital available per worker, labor productivity falls. This reduces workers' real wages and, ultimately, the overall productive capacity of the US economy. The impact grows over time as it takes time for changes in investment flows to impact the capital stock.

The macroeconomic impact of applying Rule 15c2-11 to Rule 144A debt issued by private US companies is estimated using the EY Macroeconomic Model, a macroeconomic model similar to

ⁱⁱ Specifically, the survey question asked, "If dealers cannot continue to publish quotations on quotation mediums consistent with current practice, what is the resulting illiquidity premium expected for 1) investment-grade and 2) high-yield 144A-for-life bonds in primary issuances where the issuers of such bonds do not make information publicly available?" Survey responses reflect an estimate of what respondents think will happen in the relevant markets. The actual impact, however, may be significantly different as a similar market dynamic has not been previously encountered.

models used by the Congressional Budget Office, Joint Committee on Taxation, and US Department of the Treasury. The estimated macroeconomic impacts are as follows:

- ▶ **Job losses.** A large portion of the burden of applying Rule 15c2-11 to Rule 144A bond markets would fall on workers through decreased labor productivity, wages, and employment. Applying Rule 15c2-11 to private Rule 144A issuances is estimated to decrease job equivalents relative to the baseline level, resulting in approximately:ⁱⁱⁱ
 - ▶ 30,000 fewer jobs per year in each of the first five years;
 - ▶ 50,000 fewer jobs per year in each of the second five years; and
 - ▶ 100,000 fewer jobs each year thereafter.

- ▶ **Gross domestic product.** The application of Rule 15c2-11 to Rule 144A bond markets is estimated to decrease US GDP relative to the baseline level by:
 - ▶ \$10 billion annually or
 - ▶ \$100 billion over 10 years.

Figure ES-3. Macroeconomic impact



Note: Estimates show change relative to the baseline level. Jobs are jobs equivalents and summarize the impact of both the reduction in hours worked and reduced wages. Impacts are scaled to the size of the 2023 US economy. Figure are rounded.
 Source: EY analysis.

ⁱⁱⁱ Job equivalents summarize the impact of both the reduction in hours worked and reduced wages.

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Macroeconomic impacts of applying Rule 15c2-11 to Rule 144A debt issued by private US companies

I. Introduction

This report estimates the macroeconomic impacts of requiring that the financial information of private US companies issuing Rule 144A debt be current and publicly available in order for broker-dealers to be able to freely quote their bonds. These quotations enable qualified institutional buyers (QIBs), which unlike the general public are permitted to participate the Rule 144A market, to buy and sell corporate bonds. If broker-dealers are not able to freely quote an issuer's bonds, this would increase issuers' borrowing costs via an illiquidity premium. This increase in borrowing costs would lead to job losses and a reduction in US gross domestic product (GDP).

Background

Rules 15c2-11 and 144A

US Securities and Exchange Commission (SEC) Rule 15c2-11 of the Securities Exchange Act of 1934, as amended (Rule 15c2-11), requires broker-dealers to review key issuer information and ensure that such information is current and publicly available prior to publishing quotations for that issuer's securities to the market through quotation mediums. Implemented in 1971, Rule 15c2-11 was designed to deter fraud in the largely retail, over-the-counter (OTC) equity markets.

SEC Rule 144A of the Securities Act of 1933, as amended (Rule 144A), was established in 1990 to provide a safe harbor from registration for resales of securities to QIBs. QIBs are sophisticated financial institutions that manage at least \$100 million of securities from unaffiliated issuers. Rule 144A was designed to improve the liquidity and efficiency of the private placement market by offering more flexibility to sophisticated institutional investors to trade restricted securities. Notably, under Rule 144A, issuers are obligated to make their financial and operational information available to QIBs, if such information is requested.

In September 2020, the SEC amended Rule 15c2-11 to require broker-dealers to verify that issuers' financial information is publicly available before quoting their securities. In September 2021, the SEC's Division of Trading and Markets issued a no-action letter applying Rule 15c2-11 to both equity and fixed income securities, including those offered pursuant to Rule 144A, contrary to the Rule's historical application to only equity securities. In December 2021, the Division issued a second no-action letter indicating that SEC staff would not immediately recommend enforcement action for non-compliance. Specifically, as part of a three-phase implementation timeline, private issuers of Rule 144A bonds would be expected to make their financial information publicly available beginning in January 2023 in order for broker-dealers to be able to freely quote their bonds. In November 2022, however, the Division issued a third no-action letter stating that the staff will not recommend enforcement until January 2025.

Implication

The application of amended Rule 15c2-11 would prevent broker-dealers from being able to freely quote the securities of Rule 144A bond issuers that do not make their financial information available to the general public (which cannot invest in Rule 144A securities). As a result, the

bonds issued by companies that do not make their financial information publicly available would become less liquid. The reduced liquidity would diminish the market value of such Rule 144A bond issuances and result in increased borrowing costs for these issuers. Additionally, current holders of affected Rule 144A bonds would see the value of their investments decline.

The application of amended Rule 15c2-11 would significantly impact private US companies. Companies can face significant costs if they choose to make their financials publicly available. These costs include the erosion of a company's competitive advantage from the disclosure of proprietary information, as well as the time and resources spent preparing and disseminating the information.¹ The application of amended Rule 15c2-11 would increase borrowing costs and decrease liquidity for Rule 144A debt issued by companies that do not make financial and operational information available to the public and their competitors.

Disclosure costs faced by private US companies

Private US companies are generally not required to publicly disclose financial and operational information and, under current law, they rarely choose to. In a literature review and survey of over 2,000 companies conducted by the University of Chicago and Massachusetts Institute of Technology, Minnis and Shroff (2017) find that companies required to disclose financial statements "overwhelmingly indicate they would not voluntarily file financial statements publicly if the mandate were removed" and the authors conclude that, on net, individual companies find that the costs of public disclosure outweigh the benefits.²

The academic literature finds that one significant reason for private businesses to avoid public financial disclosures is that disclosing proprietary information can reduce a company's competitive advantage. Competitors often take advantage of insights regarding a company's financial limitations (Bernard, 2016; Minnis and Shroff, 2017).³ For example, with public disclosure there is risk of more profitable, dominant entities engaging in behavior such as reducing prices with the intention of pushing companies to exit the market (Bernard, 2016).⁴ Additionally, competitors may leverage information regarding a company's innovative practices and product profitability, potentially adopting peer innovations and disincentivizing smaller companies in particular from innovating (Breuer et al. 2019; Leuz and Wysocki, 2015; Krieger, 2017; Aghamolla and Thakor, 2019).⁵

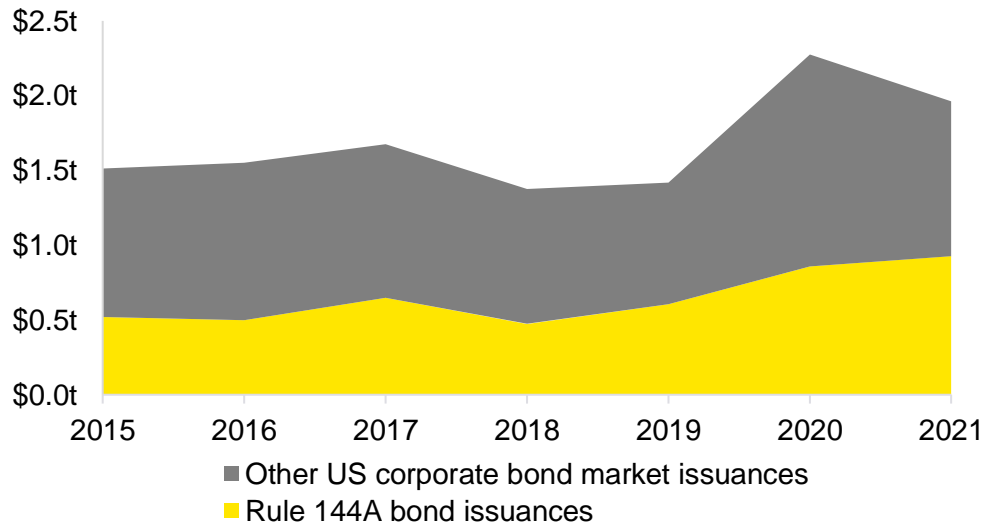
The academic literature also finds that the process of compiling and distributing financial and operational information can require significant time and resources (Coates and Srinivasan, 2014; Leuz and Wysocki, 2015).⁶ In addition, certain costs of disclosure can be particularly burdensome for smaller companies (Coates and Srinivasan, 2014; Leuz and Wysocki, 2015).⁷

Given the significant competitive and compliance costs associated with public disclosure of proprietary financial and operational information, this analysis assumes private US companies would not publicly disclose their financial information. There is, however, significant uncertainty as a similar market dynamic has not been previously encountered.

II. Market composition

Rule 144A issuances comprise a significant share of the overall US corporate bond market. As displayed in Figure 1, Rule 144A bond issuances increased from over \$500 billion in 2015 to over \$900 billion in 2021. In 2021, Rule 144A bond issuances represented nearly 50% of the US corporate bond market.

Figure 1. US corporate bond market issuances, 2015-2021

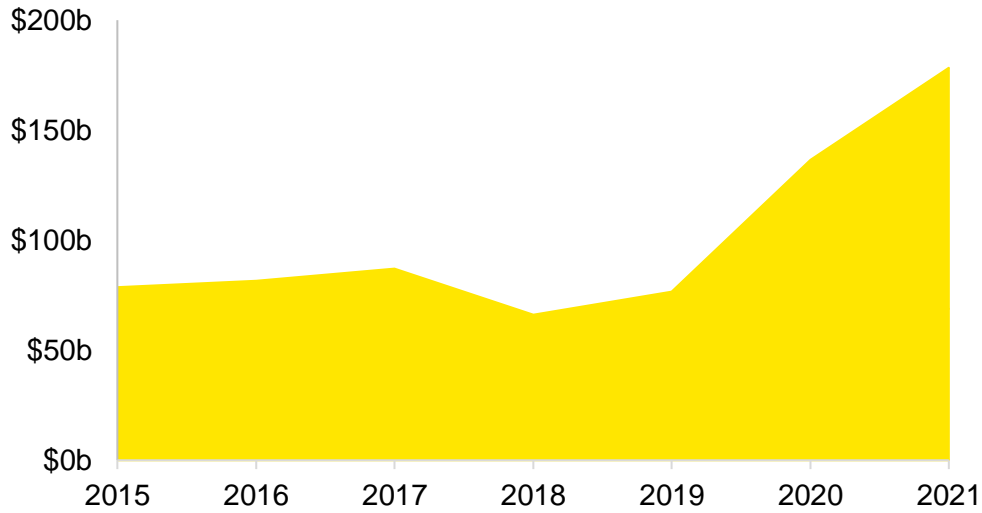


Note: This figure provides an overview of the US corporate bond market. This is comprised of both domestic and foreign companies issuing within the US market. The figure displays the total amount sold within the US market. All issues with maturities of one year or less, as well as CDs, have been excluded.

Source: Refinitiv; EY analysis.

The Rule 144A bond market is an important source of financing for many private US companies. As displayed in Figure 2, private US companies issued approximately \$178 billion in Rule 144A bonds in 2021, comprising a significant portion of the overall US corporate bond market.⁸ The total amount of corporate Rule 144A bonds outstanding exceeds \$4 trillion.⁹

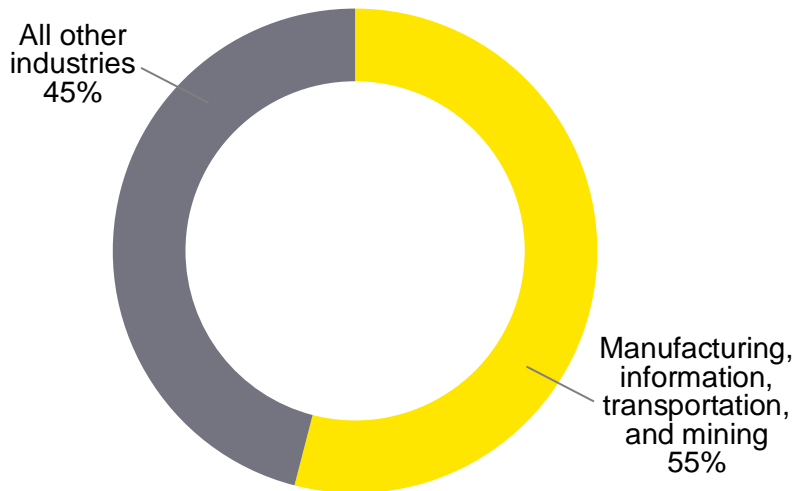
Figure 2. Rule 144A bond issuances by private US companies within the US corporate bond market, 2015-2021



Note: This figure provides an overview of the Rule 144A bonds issued by private US companies. The figure displays the total amount sold within the US corporate bond market. All issues with maturities of one year or less, as well as CDs, have been excluded. Source: Refinitiv; EY analysis.

Figure 3 displays the industry composition of nonfinancial private US companies issuing Rule 144A bonds. Manufacturing and related industries comprised 55% of nonfinancial private US companies issuing Rule 144A bonds, on average, over the 2015-2021 period.

Figure 3. Industry composition of nonfinancial private US companies issuing Rule 144A bonds, share by industry, 2015-2021 average



Note: Figure displays share of amount of issuances. Industry definitions follow the North American Industry Classification System (NAICS). Figures are rounded. Source: Refinitiv; EY analysis.

III. Case study: SteelCo

SteelCo is a privately held, family-owned steel manufacturing company located in the midwestern United States. Initially founded in the 1950s, the company focuses on manufacturing specialty steel. It employs approximately 150 workers and its major clients include car manufacturers and aircraft manufacturers.

Brittany, the family member currently serving as CEO of SteelCo, notices a new market trend of high demand for specialty steel from construction companies, which had historically not been SteelCo's customer base. As one of the few companies noticing this trend, Brittany decides that SteelCo should expand the business by building a new manufacturing facility to produce specialty steel for construction industry customers.

The new manufacturing facility will cost \$10 million. SteelCo does not currently have the cash on hand to fully fund the new facility and decides to fund half of it via a bond issuance. To raise capital, SteelCo plans to issue a high-yield Rule 144A bond at the market interest rate of 7.5%. After working through the project economics, Brittany finds that SteelCo's \$5 million investment combined with \$5 million of debt financing would yield approximately \$350,000 of net income in present value. That is, the project would have a 7.0% rate of return.¹⁰

As Brittany is planning the project and the associated bond issuance, the application of amended Rule 15c2-11 to Rule 144A debt takes effect. Applying amended Rule 15c2-11 to SteelCo, a private US company, would require the company to make its financial and operational information publicly available in order for broker-dealers to be able to freely quote its Rule 144A bonds. As required by Rule 144A, SteelCo already makes this information available to the QIBs that purchase its bonds, but not to the broader public that is prohibited from buying Rule 144A securities.

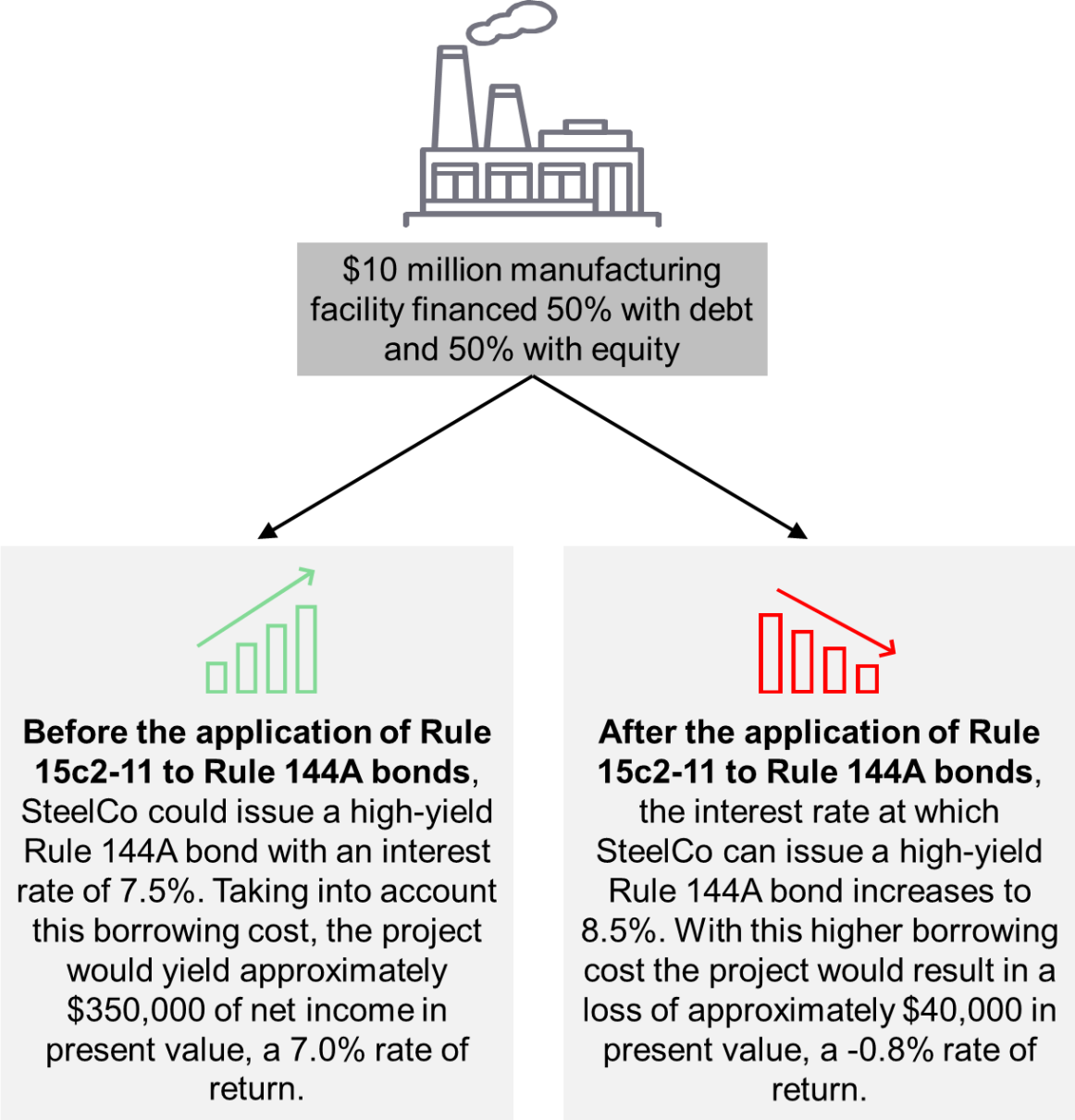
Brittany decides to continue to protect the company's proprietary information from public disclosure so as not to erode SteelCo's competitive advantage in the market. This decision results in broker-dealers not being able to freely quote SteelCo's bonds on the secondary market. This reduction in liquidity reduces the value of any SteelCo bonds currently on the market and raises the borrowing cost for the \$5 million issuance needed to fund SteelCo's new specialty steel manufacturing facility. In short, SteelCo faces a direct increase in borrowing costs as a result of the application of amended Rule 15c2-11 in the form of an illiquidity premium.

Following the application of amended Rule 15c2-11 taking effect, Brittany finds that the interest rate on the high-yield Rule 144A bond SteelCo plans to issue increases by 100 basis points, from 7.5% to 8.5%. This represents an increase in SteelCo's borrowing costs of more than 13%, directly attributable to the new illiquidity premium. Upon recalculating the project economics, Brittany finds that after the increased interest payments the project would lose approximately \$40,000 in present value. That is, the rate of return would decline from 7.0% to -0.8%.

In short, the project economics no longer support a decision to move forward with the investment. Brittany has little choice but to abandon this plan to expand SteelCo. Applying Rule 15c2-11 to the fixed income markets (and specifically to Rule 144A issuances) thus makes an otherwise profitable investment unprofitable.

Not moving forward with the expansion of SteelCo would have broader economic impacts, including a reduction in the profitability of SteelCo, fewer new job opportunities for the workers SteelCo would have hired to build and operate the new facility, and a reduction in materials available to construction companies in need of the specialty steel SteelCo would have manufactured, among others. These impacts at SteelCo and similarly situated businesses translate to macroeconomic impacts such as the job losses and GDP reductions that are the subject of this report.

Figure 4. Case study: SteelCo



IV. Macroeconomic impacts

This report estimates the macroeconomic impacts of requiring that the financial information of private US companies issuing Rule 144A debt be current and available to the general public in order for broker-dealers to be able to freely quote their bonds to QIBs. These quotations enable market participants to buy and sell corporate bonds. If broker-dealers are not able to freely quote an issuer’s bonds, this would increase borrowing costs via an illiquidity premium. This increase in borrowing costs would lead to job losses and a reduction in US GDP.

Increased borrowing costs raise the cost of investment, which discourages investment and results in less capital formation than would otherwise occur. With less capital available per worker, labor productivity falls. This reduces workers’ real wages and, ultimately, the overall productive capacity of the US economy. The impact grows over time as it takes time for changes in investment flows to impact the capital stock.

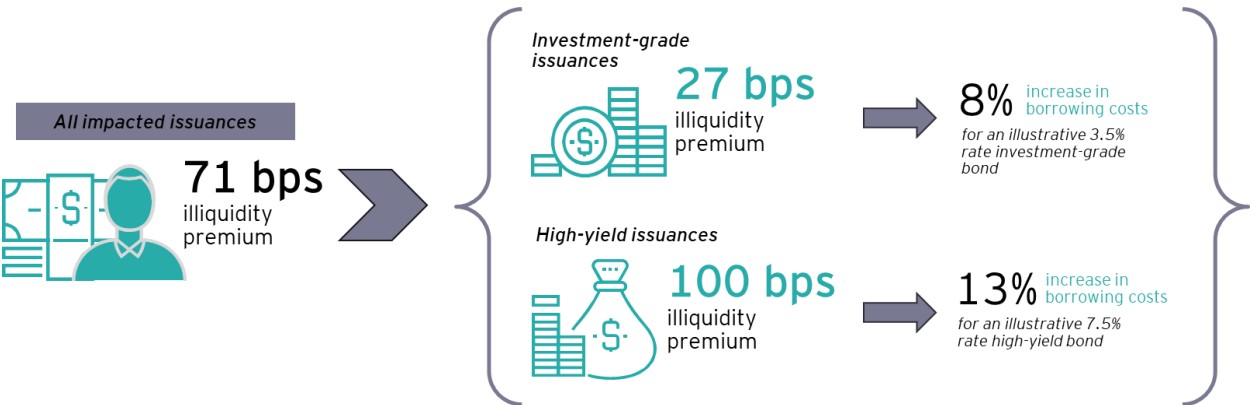
The macroeconomic impacts of applying Rule 15c2-11 to Rule 144A debt issued by private US companies is estimated using the EY Macroeconomic Model, a macroeconomic model similar to models used by the Congressional Budget Office, Joint Committee on Taxation, and US Department of the Treasury. The modeling approach is described in more detail in the appendix. Estimates are presented relative to the size of the US economy in 2023.

Impact on borrowing costs

To estimate the potential change in borrowing costs for Rule 144A bond issuers that do not make their financial information publicly available, EY surveyed US fixed income market professionals from seven large financial institutions on their expectations for the illiquidity premium such issuers would face.¹¹ The median responses from the respondents, which provided results separately for investment-grade and high-yield bonds, were:

- ▶ Investment-grade issuances: 27 basis points
- ▶ High-yield issuances: 100 basis points
- ▶ Weighted-average 144A issuance: 71 basis points¹²

Figure 5. Impact on borrowing costs



Source: EY analysis.

Survey responses reflect an estimate of what respondents think will happen in the relevant markets. The actual impact, however, may be significantly different as a similar market dynamic has not been previously encountered. Additional detail on the range of results for the impact on borrowing costs can be found in the sensitivity analysis section of this report.

Macroeconomic impacts

The estimated macroeconomic impacts are as follows:

- ▶ **Job losses.** A large portion of the burden of applying Rule 15c2-11 to Rule 144A bond markets would fall on workers through decreased labor productivity, wages, and employment. Applying Rule 15c2-11 to private Rule 144A issuances is estimated to decrease job equivalents relative to the baseline level, resulting in approximately:¹³
 - ▶ 30,000 fewer jobs per year in each of the first five years;
 - ▶ 50,000 fewer jobs per year in each of the second five years; and
 - ▶ 100,000 fewer jobs each year thereafter.

- ▶ **Gross domestic product.** The application of Rule 15c2-11 to Rule 144A bond markets is estimated to decrease US GDP relative to the baseline level by:
 - ▶ \$10 billion annually or
 - ▶ \$100 billion over 10 years.

Figure 6. Macroeconomic impact



Note: Estimates show change relative to the baseline level. Jobs are jobs equivalents and summarize the impact of both the reduction in hours worked and reduced wages. Impacts are scaled to the size of the 2023 US economy. Figure are rounded.
 Source: EY analysis.

A discussion of the macroeconomic impacts is included in the appendix.

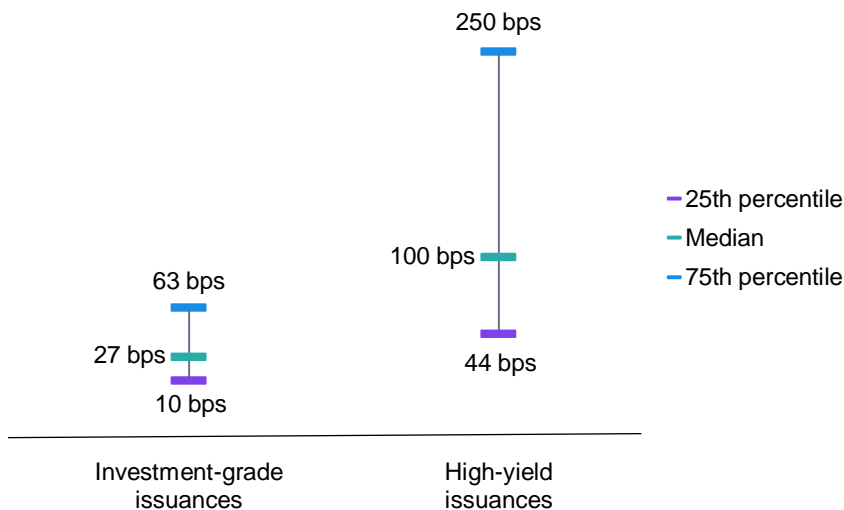
V. Sensitivity analysis

To estimate the potential change in borrowing costs for Rule 144A bond issuers that do not make their financial information publicly available, EY surveyed US fixed income market professionals from seven large financial institutions on their expectations for the illiquidity premium such issuers would face. Survey responses reflect an estimate of what respondents think will happen in the relevant markets. The actual impact, however, may be significantly different as a similar market dynamic has not been previously encountered.

Figure 7 displays information on the range of results from respondents, who provided results separately for investment-grade and high-yield bonds. The median response was that investment-grade issuances would face an illiquidity premium of 27 basis points and that high-yield issuances would face an illiquidity premium of 100 basis points. These median responses were used to produce the macroeconomic impacts in this report.

As seen in the figure, however, survey results suggest the impact on borrowing costs could be significantly larger or somewhat smaller.¹⁴ Specifically, for investment-grade issuances the 25th percentile was 10 basis points and the 75th percentile was 63 basis points. This contrasts to the median response of 27 basis points. Moreover, for high-yield issuances the 25th percentile was 44 basis points and the 75th percentile was 250 basis points. This contrasts to the median response of 100 basis points. Using significant larger or somewhat smaller impacts on borrowing costs would make the estimated macroeconomic impacts significantly larger or somewhat smaller than those estimated in this report.¹⁵

Figure 7. Potential change in borrowing costs for Rule 144A bond issuers that do not make their financial information publicly available
Illiquidity premium in basis points



Note: The 25th percentile means 25% of responses are equal to or lower than this value, the median means 50% of responses are equal to or lower than this value, and the 75th percentile means 75% of responses are equal to or lower than this value.

Source: EY analysis.

VI. Caveats and limitations

Any modeling effort is only an approximate depiction of the economic forces it seeks to represent, and the economic model developed for this analysis is no exception. Although various limitations and caveats might be listed, noteworthy limitations include:

- ▶ **Estimated macroeconomic impacts limited by calibration.** This model is calibrated to represent the US economy and then forecast forward. However, because any particular year may reflect unique events and also may not represent the economy in the future, no particular baseline year is completely generalizable.
- ▶ **Estimates are limited by available public information.** The analysis relies on publicly available data (primarily from Refinitiv and the US Bureau of Economic Analysis). The analysis did not attempt to verify or validate this information using sources other than those described in this report.
- ▶ **Full employment model.** The EY Macroeconomic Model, like many general equilibrium models, focuses on the longer-term incentive effects of policy changes. It also assumes that all resources throughout the economy are fully employed; that is, there is no slackness in the economy (i.e., a full employment assumption with no involuntary unemployment). Any decrease in labor supply is a voluntary response to a change in income or the return to labor that makes households choose to substitute between consumption and leisure. To provide a high-level measure of the potential employment impacts, a job-equivalents measure has been estimated. Job-equivalent impacts are defined as the change in total labor income divided by the baseline average labor income per job.
- ▶ **Impact on borrowing costs is uncertain.** To estimate the potential change in borrowing costs for 144A bond issuers that do not make their financial information publicly available, this analysis surveyed US fixed income market professionals from seven large financial institutions on their expectations for the illiquidity premium such issuers would face. Survey responses reflect an estimate of what respondents think will happen in the relevant markets. The actual impact, however, may be significantly different as a similar market dynamic has not been previously encountered.
- ▶ **This analysis assumes that private US companies would not publicly disclose their financial information.** Private US companies would face costs from publicly disclosing financial and operational information. Accordingly, this analysis assumes that private US companies would not publicly disclose their financial information. There is, however, significant uncertainty as a similar market dynamic has not been previously encountered.
- ▶ **Short-run macroeconomic conditions are uncertain.** Short-run macroeconomic conditions (e.g., the rate of US economic growth and the level of interest rates) are highly uncertain and could impact the results of this analysis. To abstract from short-run macroeconomic conditions and focus on the macroeconomic impacts of applying Rule 15c2-11 to Rule 144A debt issued by private US companies, this analysis estimates the macroeconomic impacts relative to the US economy under “normal” market conditions. That is, it does not reflect any potential impacts of the short-term macroeconomic uncertainty.

Appendix. EY Macroeconomic Model

The EY Macroeconomic Model used for this analysis is similar to those used by the Congressional Budget Office, Joint Committee on Taxation, and US Treasury Department.¹⁶ In this model, changes in policy affect the incentives to work, save and invest, and to allocate capital and labor among competing uses. Representative individuals and firms incorporate the after-tax return from work, savings, and investment, into their decisions on how much to produce, save, and work.

The general equilibrium methodology accounts for changes in equilibrium prices in factor (i.e., capital and labor) and goods markets and simultaneously accounts for the behavioral responses of individuals and businesses to changes in taxation (or other policies). Behavioral changes are estimated in an overlapping generations (OLG) framework, whereby representative individuals with perfect foresight incorporate changes in current and future prices when deciding how much to consume and save in each period of their lives.

High-level description of model's structure

Production

Firm production is modeled with the constant elasticity of substitution (CES) functional form, in which firms choose the optimal level of capital and labor subject to the gross-of-tax cost of capital and gross-of-tax wage. The model includes industry-specific detail through use of differing costs of capital, factor intensities, and production function scale parameters. Such a specification accounts for differential use of capital and labor between industries as well as distortions in factor prices introduced by the tax system. The cost of capital measure models the extent to which the tax code discriminates by asset type, organizational form, and source of finance.

The industry detail included in this model corresponds approximately with three-digit North American Industry Classification System (NAICS) codes and is calibrated to a stylized version of the US economy. Each of 36 industries has a corporate and pass-through sector except for owner-occupied housing and government production. Because industry outputs are typically a combination of value added (i.e., the capital and labor of an industry) and the finished production of other industries (i.e., intermediate inputs), each industry's output is modeled as a fixed proportion of an industry's value added and intermediate inputs to capture inter-industry linkages. These industry outputs are then bundled together into consumption goods that consumers purchase.

Consumption

Consumer behavior is modeled through use of an OLG framework that includes 55 generational cohorts (representing adults aged 21 to 75). Thus, in any one year, the model includes a representative individual optimizing lifetime consumption and savings decisions for each cohort aged 21 through 75 (i.e., 55 representative individuals) with perfect foresight. The model also distinguishes between two types of representative individuals: those that have access to capital markets (savers) and those that do not (non-savers or rule-of-thumb agents).

Non-savers and savers face different optimization problems over different time horizons. Each period non-savers must choose the amount of labor they supply and the amount of goods they

consume. Savers face the same tradeoffs in a given period, but they must also balance consumption today with the choice of investing in capital or bonds. The model assumes 50% of US households are permanently non-savers and 50% are permanently savers across all age cohorts.

The utility of representative individuals is modeled as a CES function, allocating a composite commodity consisting of consumption goods and leisure over their lifetimes. Representative individuals optimize their lifetime utility through their decisions of how much to consume, save, and work in each period subject to their preferences, access to capital markets, and the after-tax returns from work and savings in each period. Representative individuals respond to the after-tax return to labor, as well as their overall income levels, in determining how much to work and thereby earn income that is used to purchase consumption goods or to consume leisure by not working. In this model the endowment of human capital changes with age — growing early in life and declining later in life — following the estimate of Altig et al. (2001).¹⁷

Government

The model includes a simple characterization of both federal and state and local governments. Government spending is assumed to be used for either: (1) transfer payments to representative individuals, or (2) the provision of public goods. Transfer payments are assumed to be either Social Security payments or other transfer payments. Social Security payments are calculated in the model based on the 35 years in which a representative individual earns the most labor income. Other transfer payments are distributed on a per capita basis. Public goods are assumed to be provided by the government in fixed quantities through the purchase of industry outputs as specified in a Leontief function.

Government spending in the model can be financed by collecting taxes or borrowing. Borrowing, however, cannot continue indefinitely in this model. Eventually, the debt-to-GDP ratio must stabilize so that the government's fiscal policy is sustainable. The model allows government transfers, government provision of public goods, or government tax policy to be used to achieve a selected debt-to-GDP ratio after a selected number of years. This selected debt-to-GDP ratio could be, for example, the initial debt-to-GDP ratio or the debt-to-GDP ratio a selected number of years after policy enactment.

Modeling the United States as a large open economy

The model is an open economy model that includes both capital and trade flows between the United States and the rest of the world. International capital flows are modeled through the constant portfolio elasticity approach of Gravelle and Smetters (2006).¹⁸ This approach assumes that international capital flows are responsive to the difference in after-tax rates of return in the United States and the rest of the world through a constant portfolio elasticity expression. Trade is modeled through use of the Armington assumption, wherein products made in the United States versus the rest of the world are imperfect substitutes.

Table A-1. Key model parameters

Intertemporal substitution elasticity	0.4
Intratemporal substitution elasticity	0.6
Leisure share of time endowment	0.4
International capital flow elasticity	3.0
Capital-labor substitution elasticity	0.8
Adjustment costs	2.0

Source: Key model parameters are generally from Joint Committee on Taxation, *Macroeconomic Analysis of the Conference Agreement for H.R. 1, The 'Tax Cuts and Jobs Act,'* December 22, 2017 (JCX-69-17) and Jane Gravelle and Kent Smetters, "Does the Open Economy Assumption Really Mean that Labor Bears the Burden of a Capital Income Tax?" *Advances in Economic Analysis and Policy*, 6(1) (2006): Article 3.

Discussion of macroeconomic impacts

A large portion of the burden of applying Rule 15c2-11 to Rule 144A bond markets is estimated to fall on workers through decreased labor productivity, wages, and employment. Hours worked are estimated to decline, on average, 0.02% in each of the first five years, 0.02% in each of the second five years, and 0.01% each year after the first 10 years (i.e., in the long run) relative to the level that otherwise would have occurred. Moreover, the wage rate is estimated to decline, on average, less than 0.005% in each year over the first five years, 0.02% in each year over the second five years, and 0.05% each year after the first 10 years relative to the level in the baseline.

These two labor market impacts – a decline in hours worked plus a decline in the wage rate – are summarized in the estimate of the decrease in job equivalents. This measure represents the equivalent change in jobs, holding the average wage rate constant. When scaled to the size of the 2023 US economy, job equivalents are estimated to decline by 30,000 jobs (0.02%) in each of the first five years, 50,000 jobs in each of the second five years (0.03%), and 100,000 jobs each year after 10 years (0.06%) relative to the level in the baseline.

Requiring that the financial information of private US companies issuing Rule 144A debt be current and publicly available in order for broker-dealers to be able to freely quote their bonds is estimated to decrease the level of GDP relative to the baseline by, on average, 0.02% in each of the first five years, 0.03% in each of the second five years, and 0.04% each year after the first 10 years. After 10 years denotes the long run, which is when the US economy would fully adjust to the change. When scaled to the US economy in 2023, this amounts to a \$10 billion annual decline in the level of GDP in each of the first 10 years relative to what it otherwise would have been in the baseline. These GDP losses represent an approximately \$100 billion decline over 10 years.

The impact grows over time as it takes time for changes in investment flows to impact the capital stock. Specifically, relative to the baseline level, the capital stock is, on average, 0.02% lower in each of the first five years, 0.04% lower in each of the second five years, and 0.09% lower each year after the first 10 years. This growing impact reflects both that there are adjustment costs to altering the size and composition of the capital stock and that it takes time for the annual flow of investment to impact the overall capital stock.

Endnotes

¹ This analysis assumes that private US companies would not publicly disclose their financial information. There is, however, significant uncertainty as a similar market dynamic has not been previously encountered.

² See Minnis, Michael and Shroff, Nemit, “Why Regulate Private Firm Disclosure and Auditing?”, March 2017. Accounting and Business Research, Vol 47, No. 5, 2017.

³ D. Bernard, “Is the risk of product market predation a cost of disclosure?”, November – December 2016. J. Account. Econ., 62, pp. 305-325; See Minnis, Michael and Shroff, Nemit, “Why Regulate Private Firm Disclosure and Auditing?”, March 2017. Accounting and Business Research, Vol 47, No. 5, 2017.

⁴ D. Bernard, “Is the risk of product market predation a cost of disclosure?”, November – December 2016. J. Account. Econ., 62, pp. 305-325.

⁵ Breuer et al., “Reporting regulation and corporate innovation”, March 2022. National Bureau of Economic Research, Working Paper 26291; Leuz, Christian and Wysocki, Peter D., “The Economics of Disclosure and Financial Reporting Regulation: Evidence and Suggestions for Future Research”, December 2015. European Corporate Governance Institute (ECGI) - Law Working Paper No. 306/2016, Chicago Booth Research Paper No.16-03; Joshua L. Krieger, “Trials and Terminations: Learning from Competitors’ R&D failures”, June 2020. Harvard Business School, Working Paper 18-043; Aghamolla, Cyrus and Thakor, Richard T., “Do Mandatory Disclosure Requirements for Private Firms Increase the Propensity of Going Public?”, April 2019. Journal of Accounting Research, Vol. 60, No. 3, 2022.

In Aghamolla and Thakor (2019), researchers from the University of Minnesota studied the impact of the Food and Drug Administration Amendment Act in 2007 that requires all US biopharma companies, public or private, to disclose information about clinical trials. The research found that the required disclosure worked to the detriment of the disclosing firm and imposed substantial proprietary costs on private firms that didn’t need to disclose such information previously, as competitors start to adopt the innovations or use the disclosed information to advance their own projects.

⁶ See Coates and Srinivasan, “SOX after ten years: a multidisciplinary review”, May 2014. Harvard Law and Economics Discussion Paper No.758; Leuz, Christian and Wysocki, Peter D., “The Economics of Disclosure and Financial Reporting Regulation: Evidence and Suggestions for Future Research”, December 2015. European Corporate Governance Institute (ECGI) - Law Working Paper No. 306/2016, Chicago Booth Research Paper No.16-03.

⁷ Coates and Srinivasan, “SOX after ten years: a multidisciplinary review”, May 2014. Harvard Law and Economics Discussion Paper No.758; Leuz, Christian and Wysocki, Peter D., “The Economics of Disclosure and Financial Reporting Regulation: Evidence and Suggestions for Future Research”, December 2015. European Corporate Governance Institute (ECGI) - Law Working Paper No. 306/2016, Chicago Booth Research Paper No.16-03

⁸ Sourced from Refinitiv, these data display the total amount of Rule 144A bonds issued by private US companies within the US corporate bond market. This was calculated as follows: all bond issuances within the US marketplace from 2015-2021 were considered, excluding all issues with maturities of one year or less, as well as CDs. These data reflecting the US corporate bond market were then limited to the Rule 144A market. The data displaying the Rule 144A market within the broader US corporate bond market was split into that of public issuers and private issuers, by total amount sold within the US market.

In order to categorize the entities as either public or private, the ultimate parent public status was referenced as a guideline. This is because this analysis was concerned with whether each entity's financials were likely to be released publicly. That is, a private entity with a public ultimate parent would be categorized as public. Notably, Refinitiv's public status designation reflects the entity's status at the time of the issue date. Additionally, Refinitiv's public status designation includes further classifications in addition to public and private (subsidiary, government, mutual, and joint venture); these apply to both the entity itself as well as the ultimate parents (with the exception of the joint venture designation, which only applies to the entities themselves). For entities that were categorized as such and also had ultimate parents that were simply public or private, the ultimate parent public status was used. Any entities with an ultimate parent public status of subsidiary (a data vendor error), government, or mutual were manually reclassified. Entities with government ultimate parents were typically either state owned enterprises or government entities and were accordingly classified as public under the assumption that these entities would generally release financial

reports. Entities with the ultimate parent public status designation of mutual were primarily private life insurance companies and were accordingly grouped within the private category. Because the initial data describing the US corporate bond market included both domestic and foreign companies issuing within the US marketplace, this resulting data limited to private companies was further limited to reflect only US-based companies.

⁹ See SIFMA, “The Collision of Rule 15c2-11 and Rule 144A,” 2022.

¹⁰ This case study assumes that the manufacturing facility produces \$57,000 in net income each year for 10 years. With a discount rate of 10% the present value of this stream of income is approximately \$350,000. This is an illustrative example and impacts will differ based on any particular company’s facts and circumstances.

¹¹ Specifically, the survey question asked, “If dealers cannot continue to publish quotations on quotation mediums consistent with current practice, what is the resulting illiquidity premium expected for 1) investment grade and 2) high-yield 144A-for-life bonds in primary issuances where the issuers of such bonds do not make information publicly available?”

¹² The weighted-average Rule 144A issuance result was calculated by this analysis using the composition of high-yield versus investment-grade issuances by private US companies.

¹³ Job equivalents summarize the impact of both the reduction in hours worked and reduced wages.

¹⁴ Additionally, some respondents expressed concerns about constrained market capacity after the application of Rule 15c2-11 to Rule 144A debt.

¹⁵ These larger or smaller estimated macroeconomic impacts would broadly be proportional in order of magnitude. That is, the results would not be exactly proportional.

¹⁶ See, for example, Shinichi Nishiyama, “Fiscal Policy Effects in a Heterogeneous-Agent Overlapping-Generations Economy With an Aging Population,” Congressional Budget Office, Working Paper 2013-07, December 2013; Joint Committee on Taxation (JCT), *Macroeconomic Analysis of the ‘Tax Reform Act of 2014,’* February 2014 (JCX-22-14); JCT, *Macroeconomic Analysis of Various Proposals to Provide \$500 Billion in Tax Relief*, March 2005 (JCX-4-05); and, US Department of the Treasury, *The President’s Advisory Panel on Federal Tax Reform, Simple, Fair, & Pro-Growth: Proposals to Fix America’s Tax System*, November 2005.

¹⁷ See David Altig, Alan Auerbach, Laurence Koltikoff, Kent Smetters, and Jan Walliser, “Simulating Fundamental Tax Reform in the United States,” *American Economic Review*, 91(3) (2001): 574-595.

¹⁸ See Jane Gravelle and Kent Smetters, “Does the Open Economy Assumption Really Mean That Labor Bears the Burden of a Capital Income Tax?” *Advances in Economic Analysis and Policy*, 6(1) (2006): 1-42.