Real Effects of Mandatory Disclosure of Proprietary Information

Mary Lee*

ESSEC Business School

July 2024

* I greatly appreciate the guidance and support of my dissertation committee: Marlene Plumlee (chair), Atif Ellahie, Edward Owens, Stephen Stubben, and Elia Ferracuti. I thank Brian Cadman, Chase Potter, Doyeon Kim (discussant), Iman Sheibany, Iny Hwang, Jiacui Li, Jing He (discussant), Jordan Schoenfeld, Lucile Faurel (discussant), Rachel Hayes, Roger Silvers, Steve Monahan, Kristen Valentine, Xiaoxia Peng, Yina Yang and workshop participants at University of Utah, Western AAA Doctoral Student Faculty Exchange, FASB Emerging Scholar Award Committee, Trans-Atlantic Doctoral Conference, CAAA annual meeting, Korean Accounting Association Summer International Conference, BYU Accounting Research Symposium for helpful comments. I am grateful to ESSEC Business School, the David Eccles School of Business at the University of Utah and Monty and Christine Botosan Bridge to Practice award for financial support. All errors are my own.

Email: mary.lee@essec.edu

Real Effects of Mandatory Disclosure of Proprietary Information

ABSTRACT

Firms frequently object to disclosing proprietary information that they believe will harm their competitive positions. At the same time, however, firms value transparency from competitors and peers, as the information disclosed by others allows them to make superior decisions as uncertainty decreases and opportunities for coordination increase. Thus, mandatory disclosure of proprietary information can have a net positive or negative effect on a firm, depending on how the information is used. I study this issue using the mandatory disclosure of capacity utilization in Korea. I find that mandated capacity utilization disclosure is associated with increased firm productivity, especially in firms that do not comply with the regulation and those that face greater demand uncertainty in the pre-period. At the industry level, capacity utilization disclosure is associated with an increase in average productivity and a decrease in productivity dispersion. The productivity improvements are larger for industries with lower international competition and more uncertain demand. Further, the increase in industry productivity is partly attributable to improvements in market coordination. Taken together, my findings suggest that the mandatory disclosure of capacity utilization is an important driver of productivity.

Keywords: Proprietary Information; Capacity Utilization; Mandatory Disclosure; Financial-Reporting Regulation; Market Coordination; Competition

JEL Classification: D24; L51; M48; O41; O47

1. Introduction

This paper examines how mandatory disclosure of proprietary information positively or negatively impacts firm and industry productivity. Much of the prior work on disclosure of proprietary information examines the voluntary disclosure of such information (Verrecchia 1983; Berger 2011), and this work largely considers the costs borne by the disclosing firms. In this paper, I focus on the mandatory disclosure of proprietary information – specifically, capacity utilization –and recognize that each firm is not only a supplier of its own proprietary information but also a user of its peers' proprietary information. When proprietary information is shared across peers through mandatory disclosure, the net impact on each firm and the industry could be positive or negative, depending on how the information is used.

The disclosure of a firm's capacity utilization can be costly, as it reveals proprietary information about how a firm exploits its operating potential by comparing actual output with potential or capacity output. Further, since capacity utilization is a key determinant of firm profitability, revealing this information might impact a firm's ability to compete (Young, Peng, Chien, and Tsai 2014; Ederhof, Nagar, and Rajan 2021). Thus, few firms would voluntarily disclose capacity utilization absent mandated disclosure.

The impact of having access to information about peers' capacity utilization is less clear. On the one hand, this information can enhance firm productivity, for at least two reasons. First, a given firm could make better operating and investment decisions by using information about its peers' capacity utilization to reduce uncertainty about future demand. This could lead to a superior firm-level production decision and improve firm-level productivity. Second, mandated disclosure of capacity utilization has the potential to facilitate the coordination of production across peers.[1]

[1] My discussion centers on a model where firms aim to take actions appropriate to the underlying state, but also engage a zero-sum race to second-guess the actions of other firms, and a firm's "prize" depends on the distance between its

Each firm alters its actions based on the premise that its competitors respond to the information provided. In this setting, the mandated disclosure of capacity utilization serves as an information sharing mechanism that is more credible and less costly than private communication among peers. Consistent with this notion, Shapiro (1986) and Raith (1996) model settings where expectations about aggregate future demand collected from competitors' proprietary information are linked with less variable industry output and increased production efficiency, leading to improved firm and industry productivity.

On the other hand, mandatory disclosure of capacity utilization may have a minimal or even negative impact on productivity. If the mandatory disclosure of capacity utilization facilitates collusion among firms, firms may realize higher profits through collusion (Bourveau, She, and Žaldokas 2020) without any increase in productivity. Alternatively, if competitors use a given firm's capacity utilization disclosure to the expense of that firm and the firm retaliates, then disclosing this information may reduce both firm-level and industry-level productivity. Thus, the mandatory disclosure of capacity utilization may not improve, and may even harm, productivity if it facilitates collusion or induces a competitive war. In sum, understanding the net impact of the mandated disclosure of capacity utilization on productivity is an empirical question.

Beginning in 1994, the Korean government required manufacturing firms to disclose their capacity utilization rates, production capacity, and actual production output. This disclosure reveals a firm's expectations about future demand as well as its responses to those expectations, which has the potential to not only impose proprietary costs on a firm but also significantly benefit peer firms. Using this setting, I conduct two sets of analyses.

First, I examine the impact of the capacity utilization disclosure requirement on *firm-level*

own action and the actions of other firms (Morris and Shin 2002). I define a firm's prize as productivity, which proxies for a firm's payoff. The smaller is the distance, the greater is the prize.

productivity. I begin the analysis by examining changes in firm productivity around the adoption of the mandatory disclosure regime in 1993. The literature suggests that peers' disclosures provide information that helps individual firms better understand economic conditions (Roychowdhury, Shroff, and Verdi 2019). Further, according to mosaic theory, economic agents combine individual pieces of information to form a superior expectation (Pozen 2005; Cheynel and Levine 2020). Likewise, peers' disclosures can improve the precision of private information by providing additional context for evaluating that information. Thus, I predict that firms benefit from the mandated disclosures as they observe the capacity utilization of their competitors and use this information to make superior operating and investment decisions.

To provide support for the impact of capacity utilization disclosure on firm-level productivity, I examine how differences in the extent of the costs and benefits vary with two firm characteristics. First, I consider differences between firms that comply with the disclosure mandate and firms that fail to make the mandated disclosure.[2] While the disclosure of capacity utilization is mandated, not all firms comply. I predict that non-disclosers will realize increased benefits relative to disclosing firms, as non-disclosers do not bear the cost of disclosing proprietary information but reap the benefits of other firms' disclosures. Second, I consider how a firm's uncertainty about its future demand prior to the mandatory disclosure of capacity utilization impacts the relationship between the mandated disclosure and firm-level productivity. Because a firm with greater demand uncertainty has more potential to learn from its peers' public disclosures, I predict that firms with greater pre-disclosure demand uncertainty reap greater benefits following the disclosure.

[2] Firms are required to provide a valid reason for failing to disclose the required information. Firms that do not comply with the regulation are subject to shareholder litigation and reputational losses. Shareholder litigation, however, has been rare in Korea.

My second set of analyses examines the effect of mandatory disclosure of capacity utilization on *industry-level* productivity. Industry productivity increases if individual firms become more productive (i.e., a productivity innovation effect) or if the same aggregate industry inputs are used by more efficient firms (i.e., a resource reallocation effect). I measure industry productivity as the mean and dispersion of firm productivity within an industry and examine how industry productivity changes with the disclosure of firm-level capacity utilization. I expect that the average firm productivity in an industry increases through the productivity innovation effect, and that the dispersion in firm productivity increases through the resource reallocation effect.

I perform several industry-level cross-sectional tests. My first test examines whether the increase in industry productivity is more pronounced for industries in which the benefit of information about capacity utilization is expected to be greater than the cost of disclosure. I contend that the cost of disclosing capacity utilization information will be greater for industries that have more exposure to international trade. Because the mandated disclosure of capacity utilization applies to Korean firms but not to firms that operate in other jurisdictions, Korean firms that operate internationally must disclose this proprietary information to their competitors but do not enjoy the benefit of accessing similar information about their international competitors. Thus, I expect that changes in productivity will be less positive for industries with greater exposure to international markets. I find evidence consistent with this conjecture. Second, I expect that the benefits of capacity utilization information will be greater for industries with greater demand uncertainty, consistent with my expectations at the firm level. Firms in industries with greater demand uncertainty prior to the mandated disclosure of capacity utilization have more room to improve productivity by responding to the new information conveyed by the disclosure.

I find evidence broadly consistent with both my firm-level and industry-level predictions.

At the firm level, I document that productivity increases, on average, following the enactment of the mandatory disclosure policy. Firm that fail to comply with the regulation realize greater increases in productivity than firms that provide the disclosure, consistent with my expectation that the net impact of the disclosure varies with the extent of the benefits and costs. Further, the increase in firm-level productivity is more pronounced for firms under greater demand uncertainty. At the industry level, productivity increases and the dispersion in productivity within an industry decreases following the disclosure. As predicted, I find that industries with lower exposure to international markets and greater demand uncertainty experience greater increases in industry productivity. In addition, I document that the increase in productivity is greater for industries that are more willing to coordinate, consistent with the idea that capacity utilization information facilitates coordination among firms. My results are robust to a difference-in-differences research design using non-manufacturing industries in Korea or manufacturing firms in Japan and Taiwan as a control group. Further, my results are robust to alternative measures of productivity and model specifications.

Collectively, my study contributes to two branches of the literature. First, it speaks to the literature on market-wide effects of financial reporting regulations. Although there is a need for research that examines the aggregate consequences of regulation (see Leuz and Wysocki 2016), empirical evidence around this issue remains limited and inconclusive. Two exceptions are Breuer (2021), who examines the effect of reporting and auditing mandates in the European Union on industry-wide resource allocation, and Berger, Choi, and Tomar (2020), who examine the impact of disaggregated disclosure on productivity. My study complements and extends findings from these studies by investigating how a specific mandatory disclosure, capacity utilization, affects industry-level productivity.

Second, this paper contributes to the literature on the economic consequences of mandatory disclosure (Cho 2015; Christensen, Floyd, Liu, and Maffett 2017; Jayaraman and Wu 2019; Breuer, Leuz, and Vanhaverbeke 2019; Yang 2020; Glaeser and Omartian 2022). However, there is limited research on firm disclosures about production capacity utilization, which is surprising given that capacity utilization is both a key determinant of firm profitability and a major indicator of macroeconomic performance (Lieberman 1989; Young et al. 2014; Ederhof et al. 2021). I expand our understanding of the real impact of the mandated disclosure of capacity utilization by exploring its net effects on firm-level and industry-wide productivity.

Beyond this, my findings carry important implications for regulators and policymakers. Firms often object to disclosing information, citing its proprietary nature and concerns that disclosing it will erode their competitive advantage. Regulators tend to view the disclosure of proprietary information as benefiting firm stakeholders and other users at the cost of the disclosing firm. Missing from this calculation, however, is the question of whether and how each firm benefits from the information provided by its competitors' and peers' disclosures. Direct evidence of the net impact of broad-based disclosure of such information is lacking. My study seeks to provide this evidence and shows that broad disclosure of proprietary information can benefit a disclosing firm, but the benefit varies across and within industries1. This evidence will be useful to managers and regulators as they consider the costs and benefits of mandating disclosure of proprietary information.

Note that while my findings are based on capacity utilization disclosure, the results can potentially be generalized to other instances where firms are required to disclose proprietary information. Further, my results may be of particular interest to countries where the manufacturing sector plays a key role in their economies, as capacity utilization is particularly useful in

understanding efficiency in this industry.

2. Institutional Background, Literature Review, and Hypotheses Development

2.1 Disclosure Regulation of Capacity Utilization in Korea

Firm-level capacity utilization data are generally hard to obtain, as firms typically view that information as proprietary. Since 1994, however, Korea's Financial Supervisory Service (FSS) has required manufacturing firms listed on the Korea Exchange (KRX) to disclose capacity utilization in their annual reports. More specifically, firms are required to provide production capacity, production performance, and utilization rate for each major product by business division along with the description of how each is calculated. If firms are unable to calculate the information by each major product, they may provide the information aggregated by business unit or plant or for the firm as a whole. Firms are able to opt out of the disclosure but are required to disclosure the reason in their annual reports. For example, Medy-Tox Inc. stated in its 2011 annual report that "we do not disclose capacity and its utilization information as it is a firm's business secret." About 10 percent of the firms in my sample do not disclose capacity and its utilization in their annual reports.

In general, capacity utilization is calculated as the value of actual production divided by the value of maximum production, where maximum production is the potential capacity under normal circumstances. The reported amounts can be expressed as either a quantity, a dollar value, or the facility operating hours of production, depending on the nature of the firms' operations and products. I include an example of the capacity utilization disclosure from Samsung Electronics 20F for 2019 in Appendix B.

According to a discussion by the FSS at a 1993 roundtable on improving financial disclosure hosted by Korea Financial Investment Association, the disclosure of capacity utilization

is expected to reduce information asymmetry, which protects investors and facilitates increased investment.[3] Opponents of the policy, however, argue that "investors are unable to evaluate a firm's ability to generate future profits based on the information in the annual report and that competitors could influence the decision-making of a focal firm's investment" (Lee 1995, pg. 43). Although the decision to mandate capacity utilization disclosures has been in place since 1994, there continues to be a debate around that decision. For example, in 2021 the FSS considered whether to reduce the frequency of this disclosure: to require it in annual reports, but not in quarterly or semi-annual reports.[4] In January of 2022, the decision was made to continue to require the capacity utilization disclosures in quarterly and semi-annual reports.[5]

Manufacturing, the industry that is most affected by this mandate, makes up approximately 25 percent of Korea's economic activity during the early 1990s. In terms of growth rates, the manufacturing industry grew at a slightly faster rate (11.3 percent) than the service industry (10.5 percent), the industry that makes up the largest proportion of the Korean economic activity. Even so, I expect my findings to be generalizable to proprietary information disclosures beyond capacity utilization. In addition, I expect my study to inform firm executives, politicians, and policy makers who debate issues around competitive concerns related to proprietary information. In sum, my study adds to our understanding of the real effects of mandating disclosure of proprietary information, especially if the disclosed information has the potential to impact operating and investment decisions, particularly in competitive industries.

2.2 Literature Review and Hypotheses Development

Industry-level capacity utilization is an important macroeconomic indicator, one frequently

[3] *The Korea Economic Daily* May 21, 1992.
[4] *Financial Supervisory Service* January 14, 2021.
[5] *Financial Supervisory Service* January 21, 2022.

used to measure and predict aggregate economic performance (Lieberman 1989; Corrado and Mattey 1997). In the United States, industry-level capacity utilization is publicly available every month from the Federal Reserve Board, although firm-level capacity utilization is not. Requiring public disclosure of this type of information would enable competitors to exploit the information embedded in capacity utilization such that the disclosing firm bears proprietary costs. In the absence of a mandate to disclose this information, firms are able to avoid incurring these proprietary costs by withholding this information (Bamber and Cheon 1998; Brockman, Khurana, and Martin 2008).

While firms' decisions to withhold capacity utilization shields them from the potential proprietary costs of doing so, the *mandatory* disclosure of capacity utilization by all firms offers at least two benefits.[6] First, evidence suggests that managers learn from external sources and, accordingly, make more informed decisions on pricing (Simmonds 1982), operations (Feng, Li, McVay, and Skaife 2015), investments (Durnev and Mangen 2020; Badertscher, Shroff, and White 2013; Badertscher, Shanthikumar, and Teoh 2019; Bernard, Blackburne, and Thornock 2020), and exports (Yang 2020; Glaeser and Omartian 2022). Similarly, managers may learn from peers' capacity utilization disclosure about expected future demand and production strategies. These disclosures convey information especially useful to firms in the same industry in understanding relevant economic conditions (Foster 1981; Aghion and Howitt 1992; Roychowdhury et al. 2019). In addition, disclosures about a firm's capacity and its utilization can reveal a firm's private information about expected future demand and production strategies. Thus, when *all* firms are required to disclosure capacity utilization, each firm can make more informed decisions about its

[6] There may be capital market benefits of the mandated capacity utilization disclosure to the extent that the disclosure facilitates firms' access to external capital by reducing information asymmetry between the firm and investors. To capture the impact of the disclosure on firm productivity through a financing channel, I control for leverage in my analyses.

operations and investments, leading to improved productivity.

Second, firms may benefit from the mandated disclosure because of the social value of public information. Each firm is expected to choose its actions based on the belief that competitors will also base their actions in part on their proprietary information. Thus, the mandatory disclosure of capacity utilization may lead to market coordination around production and operations within an industry. The capacity utilization disclosures provide firm-level information about aggregate future demand, which leads to lower variability in industry output and increased production efficiency (Shapiro 1986; Raith 1996). In other words, because capacity utilization reduces uncertainty by revealing each firm's private information about future demand and production strategies, all firms in an industry may make better operating and investment decisions through coordination under better aggregate information.

Despite the potential for benefits, the mandated disclosure of capacity utilization may not impact firm-level productivity. Firms may strategically utilize public disclosure to signal a firm's product market strategies (Bloomfield 2021), to communicate information about firms' customers and product pricing (Bourveau et al. 2020), or to reduce uncertainty about competitors' actions (Palepu, Healy, and Bernard 2000). As such, firms may tacitly collude with each other to increase profits. An increase in profits through tacit collusion does not necessarily lead to an increase in productivity, however. On the other extreme, peer firms may take actions against a firm when they observe its capacity utilization. As capacity utilization information is informative about a firm's operating and investment strategies, competitors' hostile actions against the focal firm may dampen its productivity. Therefore, I contend that the net impact of the mandated disclosure of capacity utilization on firm productivity remains an unanswered empirical question.

2.2.1 Firm-level Hypotheses

My first set of analyses focuses on the firm-level impact of the mandated disclosure of capacity utilization. I begin with the premise that individual firms bear proprietary costs when disclosing capacity utilization, and that a firm's productivity might be harmed through competitors' actions against it. In addition, there are potential benefits of the mandated disclosure at the firm level, as a manager may learn information from its peer firms' financial reports that allow the manager to make superior operating decisions (Foster 1980, 1981; Elnathan and Kim 1995; Savor and Wilson 2016; Breuer, Hombach, Müller 2018; Bourveau et al. 2020; Yang 2020; Glaeser and Omartian 2022). For example, a firm's capacity utilization information may reduce its competitors' uncertainty about the focal firm's future actions (Palepu et al. 2000) as well as about the overall economic environment (Foster 1981; Aghion and Howitt 1992; Arruñada 2011; Hope, Thomas, and Vyas 2017; Roychowdhury et al. 2019). In addition, a manager can combine the new individual pieces of information gained about competitor firms to form superior expectations and improve the precision of private his information (Pozen 2005; Cheynel and Levine 2020), again enabling the manager to make superior operating and investment decisions, leading to improved firm-level productivity. Further, mandatory disclosure may serve as a coordination mechanism across firms.[7] More specifically, competitors' proprietary information about expected future demand in aggregate may lead to increased coordination across firms, resulting in less variable industry output and more efficient production (Shapiro 1986; Raith 1996). This leads to my first hypothesis, as follows:

H1: *Firm-level productivity increases following the mandated disclosure*.

I also examine two settings where I expect differences in firm-specific factors to impact

[7] Although private communication can substitute for public disclosure, studies suggest that information conveyed by public disclosures are more credible (Skinner 1994, 1997; Kogan, Papanikolaou, Seru, and Stoffman 2017) and less costly (Breuer et al. 2018) than private communication.

the expected net benefit of the mandatory disclosure of capacity utilization. Unlike voluntary disclosures, where firms disclose information if and only if the benefit of doing so outweighs the cost, when disclosure is mandated firms are required to disclose, even if the firm bears a net cost of doing so. Thus, the net impact of the mandatory disclosure can be either positive or negative.

My first cross-sectional firm-level analysis is based on the argument that firms that bear lower disclosure costs, ceteris paribus, experience greater increase in productivity than firms that bear higher disclosure costs. In fact, studies suggest that firms use various techniques to avoid disclosing proprietary information, even when that disclosure is mandated. For example, some firms redact information from mandatory filings (Verrecchia and Weber 2006; Heinle, Samuels, and Taylor 2022), withhold information (Botosan and Stanford 2005), or substitute voluntary disclosure (Glaeser 2018; Noh, So, and Weber 2019; Heinle et al. 2022) to avoid mandated disclosure. In my setting, I find that some firms fail to disclose the mandated information, instead stating their reasons for withholding it. These firms bear the lowest proprietary costs but still benefit from access to their competitors' disclosures. Thus, I predict that non-disclosers will recognize a greater (net) benefit than disclosers.

H2a: *Non-disclosers will recognize a greater increase in productivity than disclosers.*

I next conjecture that the impact of capacity utilization disclosure on firm productivity is conditional on the firms' information environment prior to the disclosure. Firms with a poorer information environment have more opportunities to learn about expected future demand by observing their peer firms' disclosures. I focus on a specific aspect of a firm's information environment – demand uncertainty – prior to the disclosure in my analysis. Firm's capacity utilization reveals firm-level expectations about future demand. For example, when a firm expects increased demand, it increases its production (which increases the firm's capacity utilization) in

the current period. Thus, when a firm observes its competitors' current capacity utilization, it can infer their competitors' demand and use that information to reduce its uncertainty about future demand. Thus, I expect that the benefit of peer learning from the mandated disclosure is greater for firms with greater demand uncertainty prior to the disclosure. This is stated in my hypothesis below:

> **H2b:** *The increase in firm-level productivity is greater for firms with greater pre-disclosure demand uncertainty.*

2.2.2 Industry-level Hypotheses

To evaluate the aggregate effect of the mandated proprietary information disclosure, I analyze both the dispersion in and the level of industry-level productivity. Industry productivity increases either when individual firms become more productive (i.e., productivity innovation effect) or when the same level of aggregate industry inputs are used by more efficient firms (i.e., resource reallocation effect). The former is captured by the average firm productivity within an industry and the latter is captured by the dispersion of firm productivity within an industry. If the mandated disclosure improves coordination across peers and mitigates resource misallocation, I expect that the dispersion in productivity will *decrease* and the level of productivity will *increase*. This leads to my third set of hypotheses:

> **H3a:** *The average firm productivity within an industry increases following the mandated disclosure*.
> **H3b:** *The dispersion in firm productivity within an industry decreases following the mandated disclosure*.

I also examine two industry-level settings where I expect that the impact of the mandated disclosure of capacity utilization to vary by industry. Just as some firms benefit more from the disclosure relative to others, some industries may benefit more than others from the disclosure.

First, I expect that the costs of the disclosure are greater for industries that compete in international markets than industries that do not. Because the mandated disclosure policy affects

only firms in Korea, Korean industries that conduct business internationally disclose their proprietary information to competitors without the potential benefit of having access to their competitors' proprietary information.

Second, I expect that the capacity utilization information is more valuable in industries with greater demand uncertainty. Similar to my firm-level analysis, when there is greater demand uncertainty in an industry, there is relatively more room for improvement than for industries with less demand uncertainty. This leads to my final set of hypotheses:

> **H4a:** *Firms that operate in international markets will have lower expected benefits than firms that do not operate internationally.*
>
> **H4b:** *The increase in industry-level productivity is greater for industries with greater pre-disclosure demand uncertainty.*

3. Research Design

3.1 Firm-level Analyses

To test the firm-level impact of the capacity utilization disclosure (H1), I examine changes in firm-level productivity around the change in regulation. The primary firm-level specification is stated below:

$$Firm\ Productivity_{it} = \beta_1 Post_t + \sum \gamma Controls_{i,t} + \eta_i + \theta_t + \varepsilon_{it} \qquad (1)$$

I employ total factor productivity to proxy for *Firm Productivity* (*Firm_TFP*). I detail the calculation of the dependent variable, *Firm_TFP*, in Section 4.2. The main variable of interest is *Post*: it equals zero for fiscal years 1990 through 1993 (prior to the mandated disclosure) and one for fiscal years 1994 through 1996 (after the mandated disclosure). Thus, *Post* captures the change in firm-level productivity from pre- to post-period. If the mandatory disclosure of capacity utilization increases firm productivity, then the coefficient on *Post* will be positive (i.e., $\beta_1 > 0$).

I include a series of control variables for other factors that are expected to affect firm

productivity. Specifically, I control for a firm's competitive position (*Market Share*) as it might affect productivity (Raith 2003; Holmes and Schmitz Jr. 2010). I control for (1) *Size* as smaller firms tend to be less profitable, (2) *Asset Growth* as investment decisions are based on expectations of future productivity, (3) *Leverage* as capital structure decisions are related to current and expected productivity and profitability (Piotroski 2000; Syverson 2011), and (4) *Sales Growth* and *Neg Earn* as trends in profitability predict subsequent productivity (Hayashi 1982; Syverson 2011). All firm-level variables are defined in Panel A of Appendix A. Finally, I include firm fixed effects to control for unobservable firm factors that might affect firm productivity and cluster the standard errors at the firm level.

To test H2a and H2b, which predict cross-firm variation in the impact of the capacity utilization disclosure, I modify Model (1) above by interacting *Post* with the two firm-level characteristics and estimate Model (1a) below:

$$Firm\ Productivity_{it} = \beta_1 Post_t * FirmChar_i + \sum \gamma Controls_{i,t} + \eta_i + \theta_t + \varepsilon_{it} \qquad (1a)$$

The main variable of interest is the interaction between *Post* and *Non-Discloser* (for H2a) and *FirmUnc* (for H2b). *Non-Discloser* is an indicator variable that equals one if a firm does not disclose capacity utilization from 2001 to 2017, and zero otherwise.[8] *FirmUnc* captures firm-level demand uncertainty; my proxy is the standard deviation of log-change in sales in the pre-regulation period. Again, I include firm fixed effects to control for potential unobservable firm factors that might affect firm productivity and cluster the standard errors at the firm level. All variables are defined in Appendix A.

[8] As capacity utilization data is electronically available since 2001, I assume that firms that have not disclose capacity utilization from 2001 to 2017 did not disclose for the previous years before 2001.

3.2 Industry-level Analyses

At the industry level, my central prediction is that the mandated disclosure increases firm productivity and mitigates resource misallocation across firms, which results in higher industry productivity. To test this prediction, I estimate the following model:

$$Industry\ Productivity_{it} = \beta_1 Post_t + \sum \gamma Controls_{i,t-1} + \eta_i + \varepsilon_{it} \quad (2)$$

Industry Productivity is measured using two proxies – the industry-level total firm productivity (*Ind_TFP*) and the dispersion in the industry-level total firm productivity (*Ind_TFP*$_{DISP}$). The main variable of interest in this model is *Post*, an indicator variable that equals zero for fiscal year 1990 through 1993 (i.e., prior to the mandated disclosure) and one for fiscal years 1994 through 1996 (i.e., post to the mandated disclosure). Thus, *Post* captures the change in industry productivity between pre- and post-regulation period. If the mandatory disclosure of capacity utilization improves industry-level productivity (*Ind_TFP*), then the coefficient on *Post* will be positive (i.e., $\beta_1 > 0$). Likewise, if the disclosure facilitates resource reallocation, then the dispersion in productivity (*Ind_TFP*$_{DISP}$), then the coefficient on *Post* will be negative (i.e., $\beta_1 < 0$).

I include industry-level control variables analogous to those used in the firm-level productivity test. Specifically, I control for means and standard deviations of Size (*Industry Size*, *Size Dispersion*), Asset Growth (*Ind_Invest* and *Investment Dispersion*), Leverage (*Industry Leverage* and *Leverage Dispersion*), Sales Growth (*Industry Sales Growth*, and *Sales Growth Dispersion*). I also include *Ind_Profit*, *Profitability Dispersion*, and *Herfindahl Index* to control for industry-level profitability and competitiveness, which might affect productivity. Calculation of the dependent variables, *Ind_TFP* and *Ind_TFP*$_{DISP}$, is detailed in Section 4.2. I include industry fixed effects to further control for unobservable industry characteristics that might affect productivity and productivity dispersion. Standard errors are clustered at the industry level. All

industry-level variables are defined in Panel A of Appendix A.

To test H4a and H4b, which explores the cross-sectional impacts of the mandated disclosure on industry productivity, I modify Model (2) by interacting *Post* with two industry-level characteristics and estimate Model (2a) below:

$$Industry\ Productivity_{it} = \beta_1 Post_t * IndChar_{it} + \sum \gamma Controls_{i,t-1} + \eta_i + \theta_t + \varepsilon_{it} \quad (2a)$$

The main variable of interest is the interaction between *Post* and *Global* (for H4a) and *IndUnc* (for H4b). *Global* is the quartile rank of the industry-level export market share in the pre-regulation period. Industry-level demand uncertainty (*IndUnc*) is the quartile rank of the standard deviation of log-changes in industry sales in the pre-regulation period. The control variables are defined above. I include industry and year fixed effects and cluster the standard errors at the industry level.

4. Data, Key Variables, and Summary Statistics

4.1 Data and Sample Selection

I employ two public sources, DataGuide and TS2000, to obtain the firm-level data. DataGuide and TS2000 are widely used database for academic research purpose in Korea. DataGuide, operated by FnGuide, provides financial information and market data for firms listed in KRX. Korea Listed Companies Association runs TS2000 database, which provides information on firms' financial reporting. Both databases are accessible to any of its subscribers, including academics. I retrieve firm-specific financial statement items and KRX market data from DataGuide and the disclosed firm-level capacity utilization information from TS2000. My sample period spans 1990 to 1996. I begin my sample period in 1990, three years prior to when the capacity utilization disclosures were mandated (1994). My sample ends in 1996 to avoid any potential impact of the Asian financial crisis that began in July 1997. I limit my analysis to manufacturing firms, for whom capacity utilization is a significant factor, with December 31 year end. To be

included in my sample firms must have non-missing values of the variables of interest. This process yields a final sample of 173 industry-year observations and 1660 firm-year observations. The number of observations used in each regression varies with the cross-sectional variables used. Continuous variables are winsorized at the top and bottom one percent level.

4.2 Key Dependent Variables: Total Factor Productivity

Firm productivity, *Firm_TFP*, measures how efficiently a firm converts inputs into outputs. I assume that the firm's production takes the form of a Cobb-Douglas production function:

$$Y_{it} = A_{it} K_{it}^{\beta_K} L_{it}^{\beta_L} \tag{3}$$

where Y_{it} represents the output of firm *i* in period *t* and K_{it} and L_{it} are inputs of capital and labor, respectively. A_{it} is the total factor productivity. In other words, *Firm_TFP* is the portion of output not explained by the level of inputs used in production. Taking the log transformation of the equation (1) yields the following:

$$\log(Y_{it}) = \beta_0 + \beta_K \log(K_{it}) + \beta_L \log(L_{it}) + \varepsilon_{it} \tag{4}$$

where

$$\log(A_{it}) = \beta_0 + \varepsilon_{it}$$

Thus, β_0 captures the mean efficiency across firms and over time, where ε_{it} is the firm-specific time-variant deviation from that mean. To estimate Model (4), Y_{it} is the firm-year gross profit, K_{it} is the firm-year book value of property, plant, and equipment, and L_{it} is the number of employees reported in the financial statements.[9] *Firm_TFP* is then estimated as the residual from the equation (5):

$$Firm\_TFP_{it} := \log\widehat{(A_{it})} = \log(Y_{it}) - \widehat{\beta_K} \log(K_{it}) - \widehat{\beta_L} \log(L_{it}) \tag{5}$$

[9] Consistent with other studies that measure total factor productivity using Korean data, I use the number of employees as a proxy for input of labor instead of labor hours or staff expense data.

When I perform firm-level analyses, I use total factor productivity (*Firm_TFP*) as a measure of firm productivity.

My two primary proxies for industry-level productivity are *Ind_TFP* (total factor productivity) and Ind_TFP_{DISP} (dispersion in TFP). My first measure, *Ind_TFP*, captures the average productivity of firms within an industry. *Ind_TFP* is measured as the industry average of *Firm_TFP*. [10] My second primary measure of productivity is dispersion in productivity (Ind_TFP_{DISP}) dispersion, based on Syverson (2011), who suggests that productivity dispersion across firms within an industry captures misallocation of resources. If resource misallocation is mitigated through improvements in improvements in coordination across peers due to the mandated disclosure of capacity utilization, dispersion of firm productivity within an industry will decrease. Ind_TFP_{DISP} is measured as the interquartile range of productivity (i.e., *Firm_TFP*) within an industry.

I also employ two alternative measures of productivity, labor productivity (*Firm_LP*), which estimates output per employee and capital productivity (*Firm_KP*) in additional analyses:

$$Firm\_LP_{it} := \log(Y_{it}) - \log(L_{it}) \quad (6)$$

$$Firm\_KP_{it} := \log(Y_{it}) - \log(K_{it}) \quad (7)$$

Gross profit, book value of property, plant, and equipment, and the number of employees are used to proxy for Y_{it}, K_{it}, and L_{it}, respectively. As this measure does not require an assumption about the firm's production function, *Firm_KP* and *Firm_LP* are less subject to the measurement error. *Ind_LP* (industry average of *Firm_LP*) and Ind_LP_{DISP} (interquartile range of *Firm_LP*) are used

[10] My results are robust to measuring *Ind_TFP* using outputs and inputs aggregated at the industry level.

as an alternative measure of industry productivity in additional analyses[11].

4.3 Descriptive Statistics

Table 1 presents descriptive statistics for the variables used in the main analyses. Panel A reports the descriptive statistics of firm-level variables. Mean of *Firm_TFP* is 0.017 and standard deviation is 0.667, which displays considerable productivity dispersion as is the case in many countries (Tybout 2000). Panel B includes descriptive statistics in the pre- and post-regulation period. At the firm level, *Firm_TFP* increases from -0.045 in the pre-regulation period to 0.138 in the post-regulation period, consistent with the change in industry-level productivity. The increase in *Firm_TFP* is statistically significant and the magnitude of the increase is 20 percent (i.e., exp(0.138-(-0.045)), smaller than the increase in industry productivity. This evidence suggests that industry productivity increases more than firm productivity due to the market coordination.

Panels C and D report analogous descriptive statistics for the *industry-level* variables in the pre- and post- regulation period, respectively. The average productivity measured by *Ind_TFP* increases from -0.247 to 0.073, indicating industry productivity increases by 37 percent (i.e., exp(0.073-(-0.247))). In addition, the increase in *Ind_TFP* is statistically different in pre- and post-periods. In the pre-regulation period, the mean value of Ind_TFP_{DISP} is 0.728 – the difference in TFP between the industry's 75th and 25th percentile firms is 2.071 (i.e., exp(0.728)). This range implies that the firms at the 75th percentile of the industry productivity distribution produce 107 percent more output from the same inputs than the firms at the 25th percentile. In the post-regulation period, Ind_TFP_{DISP} decreases to 1.974 (i.e., exp(0.680)), although the decrease is not statistically significant. In general, these findings provide univariate evidence that both firm-level and industry-level productivity increase following the mandated capacity utilization disclosure.

[11] In untabulated test, I use *Ind_KP* (industry average of *Firm_KP*) and Ind_KP_{DISP} (interquartile range of *Firm_KP*) as an alternative measure of industry productivity and my results are unchanged.

Table 2, Panel A presents correlation between the variables in my regression models at the firm level. I document that the correlation between measures of productivity (*Firm_TFP*, *Firm_LP*, *Firm_KP*) are positive and significant. Panel B presents correlations between industry-level variables. I document that both measures of productivity (*Ind_TFP* and *Ind_LP*) are highly positively correlated. The second moments of industry productivity (Ind_TFP_{DISP}, Ind_LP_{DISP}) are also highly positively correlated suggesting that change in Ind_TFP_{DISP} is in part driven by change in Ind_LP_{DISP}.

5. Empirical Results

5.1 Evidence of the Effect of the Capacity Utilization Disclosure on Firm Productivity

5.1.1 Baseline Analysis

Table 3 presents results for analyses on the effect of the mandated proprietary information disclosure on firm-level productivity. I estimate Model (1) with *Firm_TFP*. Compared to the pre-regulation period, total factor productivity (*Firm_TFP*) increases by 21.2 percent in the post-regulation period. The results support the hypothesis that the benefits of the disclosure to an average firm outweigh the costs in addition to the positive externalities at the industry level, leading to increase in firm-level productivity.

I follow the approach described in Oster (2019) to assess the stability of my treatment effects and evaluate the robustness to omitted variable bias. Using the maximum R^2 and delta heuristics (untabulated), unobservable firm-level variables must be more than five times as important as observables, controlled factors to produce no treatment effect (i.e., *Post* = 0). Given that my equation already controls for several firm characteristics and firm-fixed effects, it is

unlikely that my treatment effects are driven by omitted variables.[12]

5.1.2 Cross-sectional Variation in the Effect of the Disclosure at the Firm Level

Table 4 presents the regression results of Model (1a), which examines cross-sectional variation in the impact of the mandated capacity utilization disclosure. Columns (1) and (2) report the differences in the impact of the mandated capacity utilization disclosure between firms that comply with the disclosure mandate and those that do not. The coefficients on the interaction terms between *Post* and *Non-Discloser* represents the difference in the net benefit of the mandated disclosure. The coefficient of the interaction term, β_1, is positive and significant. This implies that the increase in *Firm_TFP* for firms that do not disclose the capacity utilization information is 17.5 percent greater than that for firms that disclose the information in the post-regulation period. The coefficient is stable when year-fixed effects are employed in the regression.

Columns (3) and (4) report the results of estimating Model (1a), where I consider cross-sectional variation in the impact of the mandated disclosure by firm characteristics (*FirmUnc*). The main variable of interest is the interaction between *Post* and *FirmUnc,* which captures the difference in the change in productivity by firm-level demand uncertainty. I find that the coefficient on the interaction variable (*Post*FirmUnc*) is positive and significant. Specifically, firms experience an increase of 6.66 percent (=0.089*0.748) in *Firm_TFP*, compared to firms with one standard deviation lower demand uncertainty. Collectively, these results are consistent with my hypothesis that (1) firms that do not comply with the disclosure and (2) firms under greater demand uncertainty benefit more from the disclosure.

[12] My results are robust to a difference-in-differences research design using manufacturing firms in Japan and Taiwan as a control group (discussed in section 6).

5.2 Evidence of the Effect of the Capacity Utilization Disclosure on Industry Productivity

5.2.1 Baseline Analysis

Table 5 reports the results of estimating Model (2), which provides evidence related to Hypothesis 3. Specifically, Column (1) of Panel A documents that the *level* of industry productivity measured by *Ind_TFP* increases in the post period. This result is economically significant in that aggregate TFP increases by 27.1 percent. Column (2) documents that productivity dispersion (Ind_TFP_{DISP}) decreases in the post period by 0.236, which represents a 33 percent reduction (=0.236/0.707) in average productivity *dispersion* in the pre-regulation period. Taken together, the industry productivity improves (i.e., the level of productivity increases and the dispersion decreases) in the post-regulation period. These findings suggest an increase in productivity and a reduction in resource misallocation subsequent to the mandated disclosure.

Figure 1 shows the estimated coefficient of industry productivity (*Ind_TFP*) by year. The coefficients of the pre-period (i.e., 1990, 1991, 1992) are not statistically different from zero, suggesting that there are no pre-existing trends in the data. In contrast, the coefficient β_1 of the post-period (i.e., 1994, 1995, 1996) which estimates the effects of the disclosure of capacity utilization after the enactment, is positive. These results validate my interpretation that the estimate of the change in industry productivity is due to the introduction of the mandatory disclosure of capacity utilization rather than to preexisting trends.

5.2.2 Cross-sectional Variation in the Effect of the Disclosure at the Industry Level

Table 6 reports results of estimating Model (2a), which provides evidence of the cross-sectional variation in the impact of the mandated capacity utilization disclosure. Columns (1) and (2) reports the role of globalization on explaining the impact of mandated disclosure. When I include *Global*, which captures whether an industry competes firms outside of Korea, and interact

Global with *Post*, the coefficient of *Post*Global* is positive and significant for *Ind_TFP*. This finding documents that productivity decreases in the post period for industries that operate more in international markets, relative to Korean industries that operate primarily in domestic markets. This difference between industries that are required to disclose capacity utilization to its competitors but do not gain access to corresponding information from its competitors, and industries that both disclose the information and gain access to its competitors information support the notion that mandated disclosure provides a net benefit across *all firms* within an industry.

Columns (3) and (4) report the results of estimating Model (2a) where I capture cross-sectional variation on the impact of mandated disclosure by industry-level demand uncertainty. The main variable of interest, *Post*IndUnc* is significantly positive; industries with greater demand uncertainty in the pre-regulation period experience 7.8 percent point larger increase in *Ind_TFP* in the post period, consistent with my expectations.

5.2.3 Potential Mechanism: Coordination among Firms

In this study, I document that the mandated capacity utilization disclosure leads to an increase in firm and industry productivity. I contend that the underlying process that drives this link is that the mandated capacity utilization disclosure facilitates (1) information flow that each firm uses to make more informed decisions and (2) coordination across peers within an industry. To provide support for the coordination mechanism, I examine the role of coordination on the impact of the disclosure on industry productivity. I argue that, if coordination among industry peers drives this link between mandated disclosure and, the impact of the mandated disclosure would be greater for industries more willing to coordinate than for industries less willing to do. I use competition among peers as an inverse measure of willingness to coordinate. Since competition and cooperation are contradictory activities (Bengtsson and Kock 2000), firms in industries with

more intense competition are less likely to coordinate with other firms in the same industry. Therefore, the impact of the mandated disclosure on industry productivity is expected to be greater for industries with lower competition than for those with intense competition.

I use *Price-Cost Margin*, measured as the ratio of industry sales to industry operating costs, to measure a firm's willingness to coordinate. High *Price-Cost Margin* is the negative reciprocal of the price elasticity of demand, capturing product substitutability in an industry. Specifically, a high price-cost margin is reflective of a low level of product substitutability, which, in turn, implies less competition in the product market. As such, a higher price-cost margin is associated with greater willingness to coordinate within an industry. Therefore, I expect that the increase in the industry productivity following the mandated disclosure is greater for industries with a higher price-cost margin (lower competitiveness) than for industries with a lower price-cost margin if the increase in industry productivity is in part through improvements in coordination across peers. The results of this analysis are reported on Table 7.

I find that main variable of interest, *Post*Price-Cost Margin*, is significantly positive. This suggests that industries with less competition (i.e., more willing to coordinate) benefit more from the disclosure than industries with less intense competition (i.e., less willing to coordinate). Collectively, in addition to the firm-level benefits of the disclosure, industries may benefit from the disclosure through coordination across peers.

6. Additional Analyses

6.1 Mitigating the Influence of Firm-/Industry-level Time-varying Factors

An identification challenge to my research design is that I am unable to observe the counterfactual, i.e., the impact on productivity after 1993 if there would be no capacity utilization

disclosure. To allay the concern that unobservable firm-/industry-level time-varying factors may confound my results, I conduct two additional tests.

First, I use non-manufacturing industries as a control group at the industry-level. Although manufacturing and non-manufacturing industries are inherently different and the number of observations for non-manufacturing industries is small compared to that of manufacturing industries, difference-in-differences design can mitigate general time trends in productivity. I employ Model (1a) with *MfactInd*, an indicator variable that equals to one if an industry is in manufacturing sectors and zero otherwise. The main variable of interest is *Post*MfactInd*, which captures the changes in industry productivity of manufacturing industries relative to non-manufacturing industries.

Panel A of Table 8 reports the univariate changes in industry productivity for manufacturing and non-manufacturing industries. While I find that industry productivity increases for both manufacturing and non-manufacturing industries, the increase is statistically about 7 percent (=exp(0.067)-1) greater for manufacturing industries than non-manufacturing industries. This difference is statistically significant at 1 percent level. As further evidence, Panel B reports multivariate results based on estimating Model (1a). The main variable of interest, *Post*MfactInd*, is positive and significant, which shows that the productivity of manufacturing industries is greater than that of non-manufacturing industries.

Second, I use manufacturing firms in other countries (i.e., Japan and Taiwan) as a control group at the firm-level. I select Japanese and Taiwanese firms as a control group because their successful industrial growth the twentieth century share many features, including an emphasis on manufacturing and export promotion, and newly established governments that actively supported structural change (Perkins and Tang 2017). However, it should be noted that manufacturing firms

in Korea, Japan and Taiwan may have different production structure and expose to different financial markets. I employ Model (1a) with *KoreanFirm*, an indicator variable that equals to one if a firm is listed on Korean Exchange and zero otherwise. The main variable of interest is *Post* KoreanFirm*, which captures the changes in firm productivity of firms in Korea relative to those in Japan and Taiwan. The data is retrieved from Bureau van Dijk's Osiris database and all variables in domestic currencies are converted to US dollars using the currency exchange rate. Due to the small sample size and lack of precise industry classification code data, the analysis is performed at the firm level. Table 9 reports the estimation results. The main variable of interest, *Post*KoreanFirm*, is positive and significant at the 1 percent level, indicating the productivity of Korean manufacturing firms increases in the post-regulation period relative to that of Japanese and Taiwanese manufacturing firms. Collectively, reinforcing my earlier evidence, the increase in productivity in the post-regulation period is likely attributable to the mandated capacity utilization disclosure, rather than any pre-existing trends.

6.2 Alternative Model Specification

The specification of productivity measure in my main industry-level analysis is the level of *Ind_TFP*. To rule out the possibility of autocorrelation in an error term, I estimate Model (2) with the change of *Ind_TFP* (Δ*Ind_TFP*) instead of the level of *Ind_TFP* as a dependent variable. All control variables are specified as change rather than level. The estimation results are in column (1) of Table 10. The main variable of interest, *Post*, is positive and significant at the 10 percent level. Further, I replace *Post* in the regression with indicator variables for each year (i.e., *y1992*, *y1993*, *y1994*, *y1995*, and *y1996*) to capture the dynamics of the effect of the mandated capacity utilization disclosure. The change in industry productivity from 1990 to 1991 serves as a benchmark. Column (2) reports the estimation results. The coefficients of *y1992* and *y1993* are

insignificant. This suggests that there is no preexisting trend in industry productivity prior to the mandated capacity utilization disclosure, consistent with the main findings. In addition, the coefficient of *y1994* is significant while the coefficients of *y1995* and *y1996* are insignificant, implying that the change in industry productivity is attributable to the change in the mandated disclosure, and the impact of the disclosure is concentrated on the first year of the enactment of the mandated disclosure. Untabulated results show that the results are qualitatively consistent when the change of *Firm_TFP* is used instead of the level of *Firm_TFP*. Collectively, my results are robust to the use of the alternative model specification.

6.3 Alternative Measure of Productivity

The economics literature discusses the difficulties and challenges associated with measuring and interpreting productivity. One limitation of measuring productivity with *TFP* is that *TFP* assumes a specific production function. To ensure the robustness of my results, I use an alternative measure of productivity – labor productivity, *LP* – in my analysis. *LP* is the natural logarithm of gross margin per employee. The benefit of using *LP* instead of *TFP* to measure productivity is that *LP* does not require an assumption about firms' production functions, and, as such, is less subject to the measurement error.

Panel A of Table 11 reports the results of estimating firm-level analysis (Model (1)) with *Firm_LP* and *Firm_KP* as the dependent variable alternative to *Firm_TFP*. Consistent with my earlier findings, I document that the coefficient of *Post* is positive and significant, suggesting that firm labor productivity and capital productivity increase following the disclosure. Firm labor productivity (Firm capital productivity) increases by 32.6 (12.1) percent, which is comparable to 21.2 percent increase in firm total factor productivity (*Firm_TFP*). Panel B presents the results of estimating my models with *Ind_LP* and Ind_LP_{DISP} as the dependent variable instead of *Ind_TFP*

and *Ind_TFP*$_{DISP}$. The coefficient on *Post* is significant in using *Ind_LP* (Column 1) and *Ind_LP*$_{DISP}$ (Column 2). *Ind_LP* increases by 30.6 percent and *Ind_LP*$_{DISP}$ decreases by 35.0 (=0.285/0.814) percent. Collectively, my results are robust to alternative measure of firm and industry productivity.

7. Conclusion

Mandated disclosure of proprietary information provides both costs and benefits to firms and industries and the net impact depends on how the information is used by a disclosing firm and its competitors. Although disclosing proprietary information may be costly for a single firm, if all firms disclose common proprietary information, the net effect may be either positive or negative because of the social value of the information. I study this issue using the mandated disclosure of capacity utilization by Korean firms.

My empirical results suggest that, on average, firms benefit from capacity utilization disclosures. Firm productivity increases following the requirement that firms disclose capacity utilization information in their annual reports, and the net benefit of the disclosure varies across firms. Firms that fail to comply with the disclosure benefit more from the disclosure. Further, firms under greater demand uncertainty experience a greater increase in productivity following the disclosure.

At the industry level, industry productivity increases and productivity dispersion decreases following the capacity utilization disclosure. I also document that the net benefits of this mandated disclosure vary across industries. Industries that are less exposed to international markets and have greater demand uncertainty enjoy greater net benefits from the disclosure. I also provide evidence that the increase in industry productivity is in part attributable to the effect of the mandated disclosure in improving market coordination.

Difference-in-differences research design using non-manufacturing industries in Korea or manufacturing firms in other countries as a control group and dynamic regressions support my findings that the results are not driven by omitted variables nor pre-existing trends. Further, my results are robust to alternative measures of productivity or model specifications.

This paper contributes to the literature on the real effects of disclosure by showing that mandatory disclosure plays a role in learning and facilitating coordination across peers, increasing firm and industry productivity and the efficiency of firms' operating and investment decisions. More broadly, my findings have important implications for regulators and policymakers. Although regulators may elect to not required disclosure of specific information as firms contend that such disclosures will harm them, regulators should also consider the benefit derived from having access to the proprietary information of other firms. By evaluating the net impact of the mandatory disclosure of proprietary information for a firm and industry, I highlight the potential benefits of mandatory disclosure of proprietary information.

References

Aghion, P., Howitt, P., 1992. A model of growth through creative destruction. *Econometrica* 60 (2): 323. https://doi.org/10.2307/2951599.

Arruñada, B., 2011. Mandatory accounting disclosure by small private companies. *European Journal of Law and Economics* 32 (3): 377–413. https://doi.org/10.1007/s10657-010-9145-3.

Badertscher, B., Shroff, N., White, H.D., 2013. Externalities of public firm presence: Evidence from private firms' investment decisions. *Journal of Financial Economics* 109 (3): 682–706. https://doi.org/10.1016/j.jfineco.2013.03.012.

Badertscher, B.A., Shanthikumar, D.M., Teoh, S.H., 2019. Private firm investment and public peer misvaluation. *The Accounting Review* 94 (6): 31–60. https://doi.org/10.2308/accr-52369.

Bamber, L.S., Cheon, Y.S., 1998. Discretionary management earnings forecast disclosures: Antecedents and outcomes associated with forecast venue and forecast specificity choices. *Journal of Accounting Research* 36 (2): 67–190. https://doi.org/2491473.

Bengtsson, M., Kock, S., 2000. "Coopetition" in business networks-to cooperate and compete simultaneously. *Industrial Marketing Management* 29(5): 411-426. https://doi.org/10.1016/S0019-8501(99)00067-X.

Berger, P.G., 2011. Challenges and opportunities in disclosure research—A discussion of 'the financial reporting environment: Review of the recent literature'. *Journal of Accounting and Economics* 51 (1-2): 204–218. https://doi.org/10.1016/j.jacceco.2011.01.001.

Berger, P.G., Choi, J.H., Tomar, S., 2020. Breaking it down: Competitive costs of cost disclosures. Working paper. https://doi.org/10.2139/ssrn.3358435.

Bernard, D., Blackburne, T., Thornock, J., 2020. Information flows among rivals and corporate investment. *Journal of Financial Economics* 136 (3): 760–79. https://doi.org/10.1016/j.jfineco.2019.11.008.

Bloomfield, M.J., 2021. Compensation disclosures and strategic commitment: Evidence from revenue-based pay. *Journal of Financial Economics*. https://doi.org/10.1016/j.jfineco.2021.04.006.

Botosan, C.A., Stanford, M., 2005. Managers' motives to withhold segment disclosures and the effect of SFAS No. 131 on analysts' information environment. *The Accounting Review* 80 (3): 751–71. https://doi.org/10.2308/accr.2005.80.3.751.

Bourveau, T., She, G., Žaldokas, A., 2020. Corporate disclosure as a tacit coordination mechanism: Evidence from cartel enforcement regulations. *Journal of Accounting Research* 58 (2): 295–332. https://doi.org/10.1111/1475-679X.12301.

Breuer, M., 2021. How does financial-reporting regulation affect industry-wide resource allocation? *Journal of Accounting Research* 59 (1): 59-110. https://doi.org/10.1111/1475-679X.12345.

Breuer, M., Hombach, K., Müller, M.A., 2018. How does financial reporting regulation affect firms' banking? *Review of Financial Studies* 31 (4): 1265–97. https://doi.org/10.1093/rfs/hhx123.

Breuer, M., Leuz, C., Vanhaverbeke, S., 2019. Mandated financial reporting and corporate innovation. NBER working paper no.26291.

Brockman, P., Khurana, I.K., Martin, X., 2008. Voluntary disclosures around share repurchases. *Journal of Financial Economics* 89 (1): 175–91. https://doi.org/10.1016/j.jfineco.2007.08.004.

Cheynel, E., Levine, C.B., 2020. Public disclosures and information asymmetry: A theory of the mosaic. *The Accounting Review* 95 (1): 79-99. https://doi.org/10.2308/accr-52447.

Cho, Y.J., 2015. Segment disclosure transparency and internal capital market efficiency: Evidence from SFAS No. 131. *Journal of Accounting Research* 53 (4): 669–723. https://doi.org/10.1111/1475-679X.12089

Corrado, C., Mattey, J., 1997. Capacity utilization. *Journal of Economic Perspectives* 11 (1): 151-167. https://doi.org/10.1257/jep.11.1.151.

Christensen, H.B., Floyd, E., Liu, L.Y., Maffett, M., 2017. The real effects of mandated information on social responsibility in financial reports: Evidence from mine-safety records. *Journal of Accounting*

and Economics 64(2-3): 284-304. https://doi.org/10.1016/j.jacceco.2017.08.001.
Durnev, A., Mangen, C., 2020. The spillover effects of MD&A disclosures for real investment: The role of industry competition. *Journal of Accounting and Economics* 70 (1): 101299. https://doi.org/10.1016/j.jacceco.2020.101299.
Ederhof, M., Nagar, V., Rajan, M., 2021. How economically significant are unused capacity costs? A large-scale empirical analysis. *Management Science* 67(3): 1956-1974. https://doi.org/10.1287/mnsc.2019.3502.
Elnathan, D., Kim, O., 1995. Partner selection and group formation in cooperative benchmarking. *Journal of Accounting and Economics* 19 (2–3): 345–64. https://doi.org/10.1016/0165-4101(94)00387-K.
Feng, M., Li, C., McVay, S.E., Skaife, H., 2015. Does ineffective internal control over financial reporting affect a firm's operations? Evidence from firms' inventory management. *The Accounting Review* 90 (2): 529–57. https://doi.org/10.2308/accr-50909.
Financial Supervisory Service. (2021, January 14). Improvement suggestions on corporate disclosure[Press Release].
Financial Supervisory Service. (2022, January 21). Revisions for annual report codification[Press Release].
Foster, G., 1980. Externalities and financial reporting. *The Journal of Finance* 35 (2): 521. https://doi.org/10.2307/2327412.
———., 1981. Intra-industry information transfers associated with earnings releases. *Journal of Accounting and Economics* 3 (3): 201–32. https://doi.org/10.1016/0165-4101(81)90003-3.
Glaeser, S., 2018. The effects of proprietary information on corporate disclosure and transparency: Evidence from trade secrets. *Journal of Accounting and Economics* 66 (1): 163–93. https://doi.org/10.1016/j.jacceco.2018.04.002.
Glaeser, S., Omartian, J.D., 2022. Public firm presence, financial reporting, and the decline of U.S. manufacturing. *Journal of Accounting Research*. https://doi.org/10.1111/1475-679X.12411.
Hayashi, F., 1982. Tobin's marginal q and average q: A neoclassical interpretation. *Econometrica* 50 (1): 213–224. https://doi.org/10.2307/1912538.
Heinle, M.S., Samuels, D., Taylor, D., 2022. Disclosure substitution. Management Science 0 (0). https://doi.org/10.1287/mnsc.2022.4549.
Holmes, T.J., Schmitz Jr., J.A., 2010. Competition and productivity: A review of evidence. *Annual Review of Economics* 2 (1): 619-642. https://doi.org/10.1146/annurev.economics.102308.124407.
Hope, O.K., Thomas, W.B., Vyas, D., 2017. Stakeholder demand for accounting quality and economic usefulness of accounting in U.S. private firms. *Journal of Accounting and Public Policy* 36 (1): 1–13. https://doi.org/10.1016/j.jaccpubpol.2016.11.004.
Jayaraman, S., Wu, J.S., 2019. Is silence golden? Real effects of mandatory disclosure. *Review of Financial Studies* 32(6): 2225-2259. https://doi.org/10.1093/rfs/hhy088.
Kogan, L., Papanikolaou, D., Seru, A., Stoffman, N., 2017. Technological innovation, resource allocation, and growth. *The Quarterly Journal of Economics* 132 (2): 665-712. https://doi.org/10.1093/qje/qjw040.
Korea Economic Daily. (1992, May 21). Summary of the discussion on the improvement of corporate disclosure.
Lee, H., 1995. A study on the corporate disclosure system. *Keimyung University (Unpublished Working Paper)*.
Leuz, C., Wysocki, P.D., 2016. The economics of disclosure and financial reporting regulation: Evidence and suggestions for future research. *Journal of Accounting Research* 54 (2): 525–622. https://doi.org/10.1111/1475-679X.12115.
Li, Y., Lin, Y., Zhang, L., 2018. Trade secrets law and corporate disclosure: Causal evidence on the proprietary cost hypothesis. *Journal of Accounting Research* 56 (1): 265-308. https://doi.org/10.1111/1475-679X.12187.
Lieberman, M. B., 1989. Capacity utilization: Theoretical models and empirical tests. *European Journal of Operational Research* 40(2): 155-168. https://doi.org/10.1016/0377-2217(89)90327-5.

Morris, S., Shin, H.S., 2002. Social value of public information. *American Economic Review* 92(5): 1521-1534. https://doi.org/10.1257/000282802762024610.
Noh, S., So, E.C., Weber, J.P., 2019. Voluntary and mandatory disclosures: Do managers view them as substitutes? *Journal of Accounting and Economics* 68 (1): 101243. https://doi.org/10.1016/j.jacceco.2019.101243.
Oster, E., 2019. Unobservable selection and coefficient stability: Theory and evidence. *Journal of Business and Economic Statistics* 37(2): 187-204.
Palepu, K.G., Healy, P.M., Bernard, V., 2000. Business Analysis and Valuation. South-Western College Publishing, Ohio.
Perkins, D.H., Tang, J.P., 2017. East Asian industrial pioneers, in: O'Rourke, K.H., Williamson, J.G. (Eds.), The spread of modern industry to the periphery since 1871. Oxford University Press, New York, pp. 169.
Piotroski, J.D., 2000. Value investing: The use of historical financial statement information to separate winners from losers. *Journal of Accounting Research* 38 (2000): 1–41. https://doi.org/10.2307/2672906.
Pozen, D.E., .2005. The mosaic theory, national security, and the freedom of information act. *The Yale Law Journal* 115: 628-679.
Raith, M., 1996. A general model of information sharing in oligopoly. *Journal of Economic Theory* 71 (1): 260–88. https://doi.org/10.1006/jeth.1996.0117.
Raith, M., 2003. Competition , risk , and managerial incentives. *The American Economic Review* 93 (4): 1425-1436. https://doi.org/10.1257/000282803769206395.
Roychowdhury, S., Shroff, N., Verdi, R.S., 2019. The effects of financial reporting and disclosure on corporate investment: A review. *Journal of Accounting and Economics* 68 (2–3). https://doi.org/10.1016/j.jacceco.2019.101246.
Savor, P., Wilson, M., 2016. Earnings announcements and systematic risk. *Journal of Finance* 71 (1): 83–138. https://doi.org/10.1111/jofi.12361.
Shapiro, C., 1986. Exchange of cost information in oligopoly. *The Review of Economic Studies* 53 (3): 433–446. https://doi.org/10.2307/2297638.
Simmonds, K., 1982. Strategic management accounting for pricing: A case example. *Accounting and Business Research* 12 (47): 206–14. https://doi.org/10.1080/00014788.1982.9728809.
Skinner, D.J., 1994. Why firms voluntarily disclose bad news. *Journal of Accounting Research* 32 (1): 38-60. https://doi.org/10.2307/2491386.
Skinner, D.J., 1997. Earnings disclosures and stockholder lawsuits. *Journal of Accounting and Economics* 23 (3): 249-282. https://doi.org/10.1016/S0165-4101(97)00010-4.
Syverson, C., 2011. What determines productivity. *Journal of Economic Literature* 49 (2): 326–65. https://doi.org/10.1257/jel.49.2.326.
Tybout, J.R., 2000. Manufacturing firms in developing countries: How well do they do, and why?. *Journal of Economic Literature* 38 (1): 11-44. https://doi.org/10.1257/jel.38.1.11.
Verrecchia, R.E., 1983. Discretionary disclosure. *Journal of Accounting and Economics* 5:179–194. https://doi.org/10.1016/0165-4101(83)90011-3.
Verrecchia, R.E., Weber, J., 2006. Redacted disclosure. *Journal of Accounting Research* 44 (4): 791–814. https://doi.org/10.1111/j.1475-679X.2006.00216.x.
Yang, Y., 2020. Real effects of disclosure regulation: Evidence from U.S. import competition. Working paper. https://doi.org/10.2139/ssrn.3456743.
Young, C., Peng C., Chien C., Tsai, L., 2014. Does SFAS No. 151 trigger more overproduction?. Journal of Management Accounting Research 26(1): 121-143. https://doi.org/10.2308/jmar-50652.

APPENDIX A: Variable Definitions

Panel A. Firm-level Variables

Variable	Description
Firm_TFP	The residual from regressing log(gross margin) on log(PP&E) and log(the number of employees). Gross margin and PP&E are deflated by the Producer Price Index. The PPI is provided by Bank of Korea (https://index.go.kr/potal/stts/idxMain/selectDoSttsldkSearch.do?idx_cd=1061).
Firm_LP	The natural logarithm of gross margin per employee. Gross margin is deflated by the Producer Price Index (PPI).
Firm_KP	The natural logarithm of gross margin per PP&E. Gross margin and PP&E are deflated by the Producer Price Index (PPI).
Post	One for the fiscal years 1994-1996 and zero for the fiscal years 1990-1993.
Non-Discloser	One for firms who do not comply with the disclosure regulation and zero otherwise. As capacity utilization data is electronically available since 2001, I assume that firms that have not disclose capacity utilization from 2001 to 2017 did not disclose for the previous years before 2001.
FirmUnc	Standard deviation of log-changes in sales in the pre-regulation period (1990-1993).
Control Variables:	
Market Share	Sales divided by total industry sales.
Size	The natural logarithm of market capitalization.
Asset Growth	Total assets divided by lagged total assets minus one.
Leverage	Book value of total debt divided by book value of total equity
Sales Growth	Sales divided by lagged sales minus one.
Neg Earn	One if lagged earnings is negative, and zero otherwise.

Panel B. Industry-level Variables

Variable	Description
Ind_TFP	Industry average of *Firm_TFP*. *Firm_TFP* is the residual from regressing log(gross profit) on log(PP&E) and log(the number of employees). Gross profit and PP&E are deflated by the Producer Price Index.
Ind_TFP_{DISP}	The 75^{th}-25^{th} percentile difference in *Firm_TFP*.
Ind_LP	Industry average of *Firm_LP*. *Firm_LP* is the natural logarithm of gross profit divide by the number of employees. Gross profit is deflated by the Producer Price Index.
Ind_LP_{DISP}	The 75^{th}-25^{th} percentile difference in *Firm_LP*.
Post	An indicator variable that equals zero for fiscal years 1990 through 1993 (prior to the mandated disclosure) and one for fiscal years 1994 through 1996 (post mandate).
Global	The quartile rank of the industry-level export market share in the pre-regulation period. Data is downloaded from WITS (World Integrated Trade Solutions) provided by WorldBank (https://wits.worldbank.org/module/ALL/sub-module/ALL/reporter/ALL/year/ALL/tradeflow/ALL/pagesize/50/page/1).
IndUnc	The quartile rank of the standard deviation of log-changes in sales in the pre-regulation period.
Price-Cost Margin	Industry sales divided by industry operating cost. Industry operating cost is equal to gross industry property, plant, and equipment, following Li et al. (2018)
MfactInd	An indicator variable that equals to one if an industry is in manufacturing sectors and zero otherwise.
Control Variables:	
Herfindahl Index	The sum of squares of each firm's market share in an industry.
Ind_Profit	Industry average of gross profit divided by sales.
Ind_Invest	Industry average of asset growth.
Industry Size	Industry average of log market capitalization.
Industry Leverage	Industry average of book value of total debt divided by book value of total equity.
Industry Sales Growth	Industry average of sales growth.
Profitability Dispersion	Standard deviation of profitability of firms within an industry.
Investment Dispersion	Standard deviation of asset growth of firms within an industry.
Size Dispersion	Standard deviation of log market capitalization within an industry.
Leverage Dispersion	Standard deviation of book value of total debt divided by book value of total equity within an industry.
Sales Growth Dispersion	Standard deviation of sales growth within an industry.

APPENDIX B: Example of Capacity Utilization Disclosure in Annual Report

4. Production and facilities

A. Production capacity, output, utilization rate

(Capacity) (1,000 units)

Division	Item	Capacity		
		2019	2018	2017
CE	TV	41,425	40,158	44,639
IM	HHP	346,960	397,497	415,200
DS	Memory	988,104,000	711,023,000	530,590,000
	Display panel	8,236	9,167	8,723
Harman	Head units	7,921	5,238	5,483

Note: Production capacity for major product categories on a consolidated basis.
Financial information for Harman is consolidated after the date of acquisition in 2017.

The CE and IM Divisions' production capacity, by major product, is calculated as follows:
the average number of lines (x) the average output per hour (x) the average operation hours per day (x) the days of operation

Memory production capacity for the DS Division is calculated as follows:
converted output (1GB equivalent) ÷ the utilization rate

Display panel production capacity is calculated as follows:
The total producible panel surface area ÷ the dimensions of eighth generation glass (2200x2500mm)

Harman's production capacity for Head units is calculated as follows:
the number of production (assembly and test) cells for each customer/product (x) the average production capacity per hour by production cell (x) the average operation hours per day (x) the days of operation

(Output) (1,000 units)

Division	Item	Output		
		2019	2018	2017
CE	TV	40,389	37,217	39,450
IM	HHP	318,635	346,605	393,693
DS	Memory	988,104,000	711,023,000	530,590,000
	Display panel	6,567	7,599	7,798
Harman	Head units	6,459	3,906	4,221

Note: Global output for major product categories.
Financial information for Harman is consolidated after the date of acquisition in 2017.

In 2019, the CE Division's output of TVs was 40,389 thousand units (major production sites: China, Mexico, Brazil, and Hungary). The IM Division's output of HHPs was 318,635 thousand units (major production sites: Korea, Vietnam, and Brazil). The DS Division's memory output (1GB equivalent) was 988,104 million (major production sites: Korea and China). The DS Division's output of display panels was 6,567 thousand units (major production sites: Korea, China). The Harman Division's head unit output was 6,459 thousand units.

(Utilization rate)

(1,000 units)

Division	Item	2019		Utilization rate
		Production capacity	Output	
CE	TV	41,425	40,389	97.5%
IM	HHP	346,960	318,635	91.8%

In 2019, CE and IM utilization rates were calculated as actual output relative to production capacity. The utilization rates were 97.5% for TVs and 91.8% for HHPs.

(Hours)

Division	Item	2019		Utilization rate
		Potential production time	Actual production time	
DS	Memory	70,080	70,080	100.0%
	Display Panel	70,080	70,080	100.0%

The DS Division operates memory and display panel production in three shifts (24 hours a day). Cumulative operating days in 2019 including holidays were 365 days. The utilization rate was calculated as actual hours [365 days (x) number of production lines (x) 24 hours] relative to production capacity.

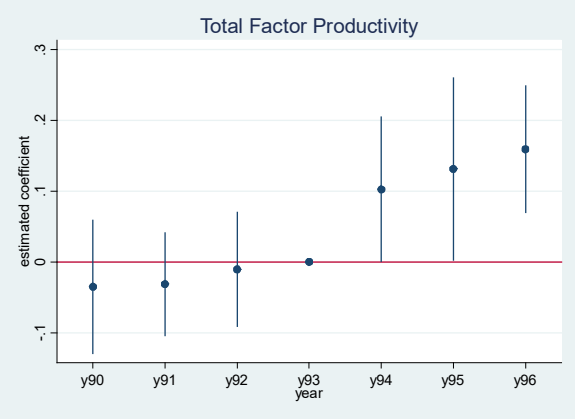
(1,000 units)

Division	Item	2019		Utilization rate
		Production capacity	Output	
Harman	Head units	7,921	6,459	81.5%

In 2019, Harman's utilization rate was 81.5% and was calculated as actual output relative to production capacity.

FIGURE 1: Trends in Total Factor Productivity by Year

This figure demonstrates the estimated impact of the mandated disclosure of capacity utilization on industry-level total factor productivity (*Ind_TFP*) for years before and after the mandated disclosure. The coefficient of the year 1993, a year before the enactment of the regulation, is set to zero.



Ind_TFP is industry total factor productivity, measured as the industry average of *Firm_TFP*. *Firm_TFP* is the residual from regressing log of value added (i.e., gross margin) on log of capital (i.e., PP&E) and log of labor (i.e., the number of employees). The coefficients are estimated from the equation (1) with control variables. All other variables are defined in Appendix A.

TABLE 1: Descriptive Statistics

Panel A of this table reports firm-level descriptive statistics for the sample period. Panel B reports firm-level pre-regulation period (1990-1993) and the post-regulation period (1994-1996). Panels C and D report industry-level descriptive statistics for the variables during the pre-regulation period and during the post-regulation period, respectively. Each industry has a minimum of 5 firm-year observations.

Panel A. Firm-level variables

	N	Mean	STD	P25	Median	P75
Firm_TFP	1585	0.017	0.667	-0.410	0.032	0.504
Firm_LP	1585	10.033	0.749	9.571	10.116	10.555
Firm_KP	1585	-0.749	0.896	-1.319	-0.780	-0.166
Post	1585	0.449	0.498	0.000	0.000	1.000
FirmUnc	1585	0.117	0.089	0.062	0.091	0.146
Market Share	1585	0.146	0.230	0.019	0.050	0.151
Size	1585	10.557	1.109	9.745	10.427	11.220
Asset Growth	1585	0.196	0.213	0.062	0.152	0.271
Leverage	1585	2.517	7.689	1.125	1.825	2.729
Sales Growth	1585	0.144	0.180	0.042	0.118	0.218
Neg Earn	1585	0.094	0.292	0.000	0.000	0.000

Panel B. Firm-level Pre- vs. Post-Regulation Period

	Pre-Regulation Period	Post-Regulation Period	Difference
Firm_TFP	-0.045	0.138	**0.183**
Firm_LP	9.889	10.206	**0.317**
Firm_KP	-0.782	-0.710	**0.073**
Market Share	0.143	0.135	-0.008
Size	10.330	10.901	**0.571**
Asset Growth	0.222	0.171	**-0.051**
Leverage	2.165	2.687	**0.522**
Sales Growth	0.138	0.161	**0.023**
Neg Earn	0.061	0.126	**0.065**

Panel C. Industry-level Variables: Pre-Regulation Period

	N	Mean	STD	P25	Median	P75
Ind_TFP	174	-0.111	0.492	-0.450	-0.159	0.171
Ind_TFP$_{DISP}$	174	0.707	0.465	0.412	0.605	0.903
Ind_LP	174	10.044	0.564	9.617	10.012	10.415
Ind_LP$_{DISP}$	174	0.759	0.504	0.445	0.653	0.893
Post	174	0.425	0.496	0.000	0.000	1.000
IndUnc	174	0.181	0.046	0.159	0.181	0.213
Global	167	0.037	0.035	0.011	0.027	0.046
Price-Cost Margin	174	2.776	1.625	1.762	2.551	3.358
Herfindahl Index	174	0.212	0.184	0.081	0.181	0.270
Ind_Profit	174	0.202	0.085	0.152	0.176	0.234
Ind_Invest	174	0.234	0.127	0.147	0.218	0.292
Industry Size	174	10.501	0.577	10.108	10.501	10.935
Industry Leverage	174	2.868	4.382	1.853	2.267	2.983
Industry Sales Growth	174	0.179	0.107	0.099	0.169	0.230
Profitability Dispersion	174	0.081	0.037	0.054	0.072	0.096
Investment Dispersion	174	0.235	0.175	0.146	0.199	0.277
Size Dispersion	174	1.011	0.464	0.682	1.037	1.262
Leverage Dispersion	174	3.816	9.560	1.084	1.695	2.998
Sales Growth Dispersion	174	0.206	0.167	0.118	0.163	0.232

Panel D. Industry-level Pre- vs. Post-Regulation Period

	Pre-Regulation Period	Post-Regulation Period	Difference
Ind_TFP	-0.247	0.073	**0.319**
Ind_TFP$_{DISP}$	0.728	0.680	-0.048
Ind_LP	9.878	10.268	**0.390**
Ind_LP$_{DISP}$	0.796	0.708	-0.088
Herfindahl Index	0.225	0.195	-0.030
Ind_Profit	0.203	0.200	-0.003
Ind_Invest	0.266	0.190	**-0.076**
Industry Size	10.277	10.804	**0.527**
Industry Leverage	2.633	3.185	0.552
Industry Sales Growth	0.174	0.186	0.012
Profitability Dispersion	0.080	0.082	0.002
Investment Dispersion	0.258	0.205	**-0.054**
Size Dispersion	1.019	1.000	-0.019
Leverage Dispersion	2.960	4.973	2.013
Sales Growth Dispersion	0.223	0.183	-0.040

Firm_TFP is total factor productivity, measured as the residual from regressing log of value added (i.e., gross margin) on log of capital (i.e., PP&E) and log of labor (i.e., the number of employees). *Firm_LP* is labor productivity, measured as natural logarithm of value added per employee. *Firm_KP* is capital productivity, measured as natural logarithm of value added per PP&E. Gross margin and PP&E used to calculate Inputs of *Firm_TFP*, *Firm_LP,* and *Firm_KP* (i.e., gross margin, PP&E) are deflated by the Producer Price Index to enhance comparability across years. *Ind_TFP* (*Ind_LP*) is calculated as the industry average of *Firm_TFP*(*Firm_LP*). *Ind_TFP$_{DISP}$* is productivity dispersion, measured as the interquartile difference of *Firm_TFP* in an industry. *Ind_LP$_{DISP}$* is labor productivity dispersion, measured as the interquartile difference of *Firm_LP* in an industry. *Post* is an indicator variable that equals zero if the fiscal year is between 1990 and 1993, and one if the fiscal year is between 1994 and 1996. *Non-Discloser* is an indicator variable that do not comply with the disclosure regulation, and zero otherwise. *FirmUnc* is standard deviation of log-change in sales in the pre-regulation period. *Global* is the quartile rank of the export market share of an industry in the pre-regulation period. *IndUnc* is the quartile rank of the standard deviation of log change of sales of an industry in the pre-regulation period. *Price-Cost Margin* is industry sales divided by industry operating cost in the pre-regulation period. All other variables are defined in Appendix A. The differences significant at the 10% or lower level are bolded in Table 1.

TABLE 2: Correlation Matrix

This table presents Pearson correlations among the key variables. Panel A reports correlations among firm-level variables. Panel B reports correlation between industry-level dependent variables and main variables of interests.

Panel A. Firm-level variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) *Firm_TFP*	1.000									
(2) *Firm_LP*	**0.907**	1.000								
(2) *Firm_KP*	**0.771**	**0.484**	1.000							
(3) *Post*	**0.138**	**0.211**	**0.041**	1.000						
(4) *Market Share*	**0.107**	**0.046**	**0.047**	-0.032	1.000					
(5) *Size*	**0.169**	**0.225**	**-0.189**	**0.244**	**0.268**	1.000				
(6) *Asset Growth*	-0.019	-0.008	-0.038	**-0.130**	**0.053**	0.029	1.000			
(7) *Leverage*	0.014	0.010	-0.005	**0.049**	**0.051**	0.004	**-0.049**	1.000		
(8) *Sales Growth*	**0.141**	**0.142**	**0.078**	**0.057**	**0.060**	**0.134**	**0.290**	0.022	1.000	
(9) *Neg Earn*	**-0.182**	**-0.141**	**-0.178**	**0.118**	**-0.052**	**-0.081**	**-0.171**	**0.195**	**-0.082**	1.000

Panel B. Industry-level variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) *Ind_TFP*	1.000															
(2) *Ind_LP*	**0.974**	1.000														
(3) *Ind_TFP$_{DISP}$*	-0.113	**-0.174**	1.000													
(4) *Ind_LP$_{DISP}$*	-0.081	**-0.138**	**0.962**	1.000												
(5) Post	**0.322**	**0.343**	-0.051	-0.086	1.000											
(6) *Herfindahl Index*	**0.183**	**0.129**	**0.126**	**0.157**	-0.080	1.000										
(7) *Industry Profitability*	**0.487**	**0.386**	-0.085	-0.110	-0.015	-0.113	1.000									
(8) *Industry Investment*	**-0.167**	**-0.192**	0.118	**0.124**	**-0.297**	**0.192**	-0.078	1.000								
(9) *Industry Size*	**0.279**	**0.318**	**0.211**	**0.204**	**0.453**	**0.126**	**-0.197**	-0.013	1.000							
(10) *Industry Leverage*	0.050	0.035	0.032	0.043	0.062	0.095	0.013	-0.044	0.072	1.000						
(11) *Industry Sales Growth*	0.035	0.004	0.045	0.057	0.055	0.090	-0.102	**0.358**	0.109	0.104	1.000					
(12) Profitability Dispersion	**0.335**	**0.304**	0.026	0.003	0.025	-0.072	**0.584**	**-0.130**	-0.064	0.100	**-0.153**	1.000				
(13) *Investment Dispersion*	-0.077	-0.046	0.012	0.021	**-0.152**	0.065	-0.105	**0.726**	-0.006	-0.004	**0.252**	-0.045	1.000			
(14) *Size Dispersion*	-0.054	-0.046	0.023	0.061	-0.020	**0.291**	**-0.208**	**0.274**	**0.508**	-0.023	**0.152**	**-0.125**	**0.142**	1.000		
(15) *Leverage Dispersion*	0.045	0.036	0.041	0.072	0.104	0.026	-0.022	-0.074	-0.003	**0.728**	0.022	0.078	-0.014	-0.062	1.000	
(16) *Sales Growth Dispersion*	-0.109	-0.107	-0.009	-0.014	-0.120	-0.014	-0.106	**0.310**	-0.036	0.100	**0.658**	-0.053	**0.388**	0.065	0.024	1.000

Firm_TFP is total factor productivity, measured as the residual from regressing log of value added (i.e., gross margin) on log of capital (i.e., PP&E) and log of labor (i.e., the number of employees). *Firm_LP* is labor productivity, measured as natural logarithm of value added per employee. *Firm_KP* is capital productivity, measured as natural logarithm of value added per PP&E. Gross margin and PP&E used to calculate Inputs of *Firm_TFP*, *Firm_LP,* and *Firm_KP* (i.e., gross margin, PP&E) are deflated by the Producer Price Index to enhance comparability across years. *Ind_TFP* (*Ind_LP*) is calculated as the industry average of *Firm_TFP*(*Firm_LP*). *Ind_TFP$_{DISP}$* is productivity dispersion, measured as the interquartile difference of *Firm_TFP* in an industry. *Ind_LP$_{DISP}$* is labor productivity dispersion, measured as the interquartile difference of *Firm_LP* in an industry. *Post* is an indicator variable that equals zero if the fiscal year is between 1990 and 1993, and one if the fiscal year is between 1994 and 1996. *Non-Discloser* is an indicator variable that do not comply with the disclosure regulation, and zero otherwise. *FirmUnc* is standard deviation of log-change in sales in the pre-regulation period. *Global* is the quartile rank of the export market share of an industry in the pre-regulation period. *IndUnc* is the quartile rank of the standard deviation of log change of sales of an industry in the pre-regulation period. *Price-Cost Margin* is industry sales divided by industry operating cost in the pre-regulation period. All other variables are defined in Appendix A. Correlation coefficients significant at the 10% or lower level are bolded in Table 2.

TABLE 3: Effect of the Capacity Utilization Disclosure on Firm Level Productivity

This table reports the estimation results of the baseline regression at firm level from the equation (1). It reports the effect of the mandated disclosure on firms' productivity (*Firm_TFP*).

	(1) *Firm_TFP*
Post	0.212***
	(0.027)
Market Share	0.248
	(0.348)
Size	-0.059**
	(0.027)
Asset Growth	-0.253***
	(0.048)
Leverage	0.002
	(0.002)
Sales Growth	0.406***
	(0.068)
Neg Earn	-0.106***
	(0.040)
Obs.	1585
Adjusted R-squared	0.809
Firm FE	YES
Year FE	NO

Firm_TFP is total factor productivity, measured as the residual from regressing log of value added (i.e., gross margin) on log of capital (i.e., PP&E) and log of labor (i.e., the number of employees). *Firm_LP* is labor productivity, measured as natural logarithm of value added per employee. *Firm_KP* is capital productivity, measured as natural logarithm of value added per PP&E. Gross margin and PP&E used to calculate Inputs of *Firm_TFP*, *Firm_LP,* and *Firm_KP* (i.e., gross margin, PP&E) are deflated by the Producer Price Index to enhance comparability across years. *Ind_TFP* (*Ind_LP*) is calculated as the industry average of *Firm_TFP*(*Firm_LP*). Ind_TFP_{DISP} is productivity dispersion, measured as the interquartile difference of *Firm_TFP* in an industry. Ind_LP_{DISP} is labor productivity dispersion, measured as the interquartile difference of *Firm_LP* in an industry. *Post* is an indicator variable that equals zero if the fiscal year is between 1990 and 1993, and one if the fiscal year is between 1994 and 1996. *Non-Discloser* is an indicator variable that do not comply with the disclosure regulation, and zero otherwise. *FirmUnc* is standard deviation of log-change in sales in the pre-regulation period. *Global* is the quartile rank of the export market share of an industry in the pre-regulation period. *IndUnc* is the quartile rank of the standard deviation of log change of sales of an industry in the pre-regulation period. *Price-Cost Margin* is industry sales divided by industry operating cost in the pre-regulation period. All other variables are defined in Appendix A. Standard errors are clustered by firm and reported in parentheses. ***, **, and * denote two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 4: Cross-sectional Variation in Effect of the Capacity Utilization Disclosure on Firm Level Productivity: Non-discloser, Firm Demand Uncertainty

This table reports the coefficient estimates from the equation (1a). Columns (1) and (2) report the cross-sectional difference in the impact of the mandated disclosure on firm productivity between firms that comply with the disclosure and those that do not (*Non-discloser*). Columns (3) and (4) report the cross-sectional variation in the impact of the mandated disclosure on firm productivity with respect to a firm's demand uncertainty (*FirmUnc*).

	(1) *Firm_TFP*	(2) *Firm_TFP*	(3) *Firm_TFP*	(4) *Firm_TFP*
Post	0.175***		0.122***	
	(0.031)		(0.044)	
Post x Non-discloser	0.175**	0.177**		
	(0.078)	(0.079)		
Post x FirmUnc			0.748**	0.763**
			(0.361)	(0.365)
Obs.	1313	1313	1585	1585
Adjusted R-squared	0.813	0.813	0.812	0.814
Controls	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
Year FE	NO	YES	NO	YES

Firm_TFP is total factor productivity, measured as the residual from regressing log of value added (i.e., gross margin) on log of capital (i.e., PP&E) and log of labor (i.e., the number of employees). *Firm_LP* is labor productivity, measured as natural logarithm of value added per employee. *Firm_KP* is capital productivity, measured as natural logarithm of value added per PP&E. Gross margin and PP&E used to calculate Inputs of *Firm_TFP*, *Firm_LP,* and *Firm_KP* (i.e., gross margin, PP&E) are deflated by the Producer Price Index to enhance comparability across years. *Ind_TFP* (*Ind_LP*) is calculated as the industry average of *Firm_TFP*(*Firm_LP*). Ind_TFP_{DISP} is productivity dispersion, measured as the interquartile difference of *Firm_TFP* in an industry. Ind_LP_{DISP} is labor productivity dispersion, measured as the interquartile difference of *Firm_LP* in an industry. *Post* is an indicator variable that equals zero if the fiscal year is between 1990 and 1993, and one if the fiscal year is between 1994 and 1996. *Non-Discloser* is an indicator variable that do not comply with the disclosure regulation, and zero otherwise. *FirmUnc* is standard deviation of log-change in sales in the pre-regulation period. *Global* is the quartile rank of the export market share of an industry in the pre-regulation period. *IndUnc* is the quartile rank of the standard deviation of log change of sales of an industry in the pre-regulation period. *Price-Cost Margin* is industry sales divided by industry operating cost in the pre-regulation period. All other variables are defined in Appendix A. Standard errors are clustered by firm and reported in parentheses. ***, **, and * denote two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 5: Effect of the Capacity Utilization Disclosure on Industry Productivity

This table reports the aggregate effect of the mandated disclosure on the first moment (*Ind_TFP*) and the second moment (Ind_TFP_{DISP}) of industry productivity (Hypothesis 3). Column (1) reports the aggregate effect of the mandated disclosure on the level of industry productivity. Column (2) reports the aggregate effect of the mandated disclosure on productivity dispersion across that industry's firms.

	(1) *Ind_TFP*	(2) Ind_TFP_{DISP}
Post	0.271***	-0.236**
	(0.043)	(0.104)
Herfindahl Index	0.369**	0.241
	(0.157)	(0.154)
Ind_Profit	2.148**	1.941
	(0.865)	(1.182)
Ind_Invest	-0.700***	0.282
	(0.153)	(0.308)
Industry Size	0.042	0.403**
	(0.086)	(0.151)
Industry Leverage	-0.001	-0.000
	(0.006)	(0.013)
Industry Sales Growth	0.629***	-0.226
	(0.167)	(0.202)
Industry Profitability Dispersion	-2.456*	2.420**
	(1.340)	(1.094)
Investment Dispersion	0.352***	0.026
	(0.114)	(0.186)
Size Dispersion	-0.124	-0.342*
	(0.075)	(0.176)
Leverage Dispersion	0.002	-0.001
	(0.003)	(0.009)
Sales Growth Dispersion	-0.148	0.068
	(0.156)	(0.105)
Obs.	173	173
Adjusted R-squared	0.875	0.404
Industry FE	YES	YES
Year FE	NO	NO

Firm_TFP is total factor productivity, measured as the residual from regressing log of value added (i.e., gross margin) on log of capital (i.e., PP&E) and log of labor (i.e., the number of employees). *Firm_LP* is labor productivity, measured as natural logarithm of value added per employee. *Firm_KP* is capital productivity, measured as natural logarithm of value added per PP&E. Gross margin and PP&E used to calculate Inputs of *Firm_TFP*, *Firm_LP,* and *Firm_KP* (i.e., gross margin, PP&E) are deflated by the Producer Price Index to enhance comparability across years. *Ind_TFP* (*Ind_LP*) is calculated as the industry average of *Firm_TFP*(*Firm_LP*). Ind_TFP_{DISP} is productivity dispersion, measured as the interquartile difference of *Firm_TFP* in an industry. Ind_LP_{DISP} is labor productivity dispersion, measured as the interquartile difference of *Firm_LP* in an industry. *Post* is an indicator variable that equals zero if the fiscal year is between 1990 and 1993, and one if the fiscal year is between 1994 and 1996. *Non-Discloser* is an indicator variable that do not comply with the disclosure regulation, and zero otherwise. *FirmUnc* is standard deviation of log-change in sales in the pre-regulation period. *Global* is the quartile rank of the export market share of an industry in the pre-regulation period. *IndUnc* is the quartile rank of the standard deviation of log change of sales of an industry in the pre-regulation period. *Price-Cost Margin* is industry sales divided by industry operating cost in the pre-regulation period. All other variables are defined in Appendix A. Standard errors are clustered by firm and reported in parentheses. ***, **, and * denote two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 6: Cross-sectional Variation in Disclosure Regulation on Industry Productivity: Industry Globalization, Industry Demand Uncertainty

This table reports the results of regressing the level of industry productivity on industry globalization and on industry demand uncertainty. Columns (1) and (2) report the interactive effect of an industry's international competitiveness and the mandated capacity utilization disclosure on the level of industry productivity (*Ind_TFP*). Columns (3) and (4) report the interactive effect of industry demand uncertainty and the mandated capacity utilization disclosure on the level of industry productivity (*Ind_TFP*).

	(1) *Ind_TFP*	(2) *Ind_TFP*	(3) *Ind_TFP*	(4) *Ind_TFP*
Post	0.381***		0.197***	
	(0.072)		(0.031)	
Post x Global	-0.058**	-0.056**		
	(0.024)	(0.025)		
Post x IndUnc			0.078***	0.081***
			(0.024)	(0.027)
Obs.	166	166	173	173
Adjusted R-squared	0.873	0.881	0.868	0.876
Controls	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	NO	YES	NO	YES

Firm_TFP is total factor productivity, measured as the residual from regressing log of value added (i.e., gross margin) on log of capital (i.e., PP&E) and log of labor (i.e., the number of employees). *Firm_LP* is labor productivity, measured as natural logarithm of value added per employee. *Firm_KP* is capital productivity, measured as natural logarithm of value added per PP&E. Gross margin and PP&E used to calculate Inputs of *Firm_TFP*, *Firm_LP,* and *Firm_KP* (i.e., gross margin, PP&E) are deflated by the Producer Price Index to enhance comparability across years. *Ind_TFP* (*Ind_LP*) is calculated as the industry average of *Firm_TFP*(*Firm_LP*). Ind_TFP_{DISP} is productivity dispersion, measured as the interquartile difference of *Firm_TFP* in an industry. Ind_LP_{DISP} is labor productivity dispersion, measured as the interquartile difference of *Firm_LP* in an industry. *Post* is an indicator variable that equals zero if the fiscal year is between 1990 and 1993, and one if the fiscal year is between 1994 and 1996. *Non-Discloser* is an indicator variable that do not comply with the disclosure regulation, and zero otherwise. *FirmUnc* is standard deviation of log-change in sales in the pre-regulation period. *Global* is the quartile rank of the export market share of an industry in the pre-regulation period. *IndUnc* is the quartile rank of the standard deviation of log change of sales of an industry in the pre-regulation period. *Price-Cost Margin* is industry sales divided by industry operating cost in the pre-regulation period. All other variables are defined in Appendix A. Standard errors are clustered by firm and reported in parentheses. ***, **, and * denote two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 7: Cross-sectional Variation in Disclosure Regulation on Industry Productivity: Willingness to Coordinate

This table reports the results of regressing the level of industry productivity (*Ind_TFP*) on price to cost margin (*Price-Cost Margin*) that captures willingness to coordinate.

	(1) *Ind_TFP*	(2) *Ind_TFP*
Post	0.183***	
	(0.048)	
Post x Price-Cost Margin	0.087**	0.079**
	(0.038)	(0.036)
Obs.	173	173
Adjusted R-squared	0.927	0.937
Controls	YES	YES
Industry FE	YES	YES
Year FE	NO	YES

Firm_TFP is total factor productivity, measured as the residual from regressing log of value added (i.e., gross margin) on log of capital (i.e., PP&E) and log of labor (i.e., the number of employees). *Firm_LP* is labor productivity, measured as natural logarithm of value added per employee. *Firm_KP* is capital productivity, measured as natural logarithm of value added per PP&E. Gross margin and PP&E used to calculate Inputs of *Firm_TFP*, *Firm_LP,* and *Firm_KP* (i.e., gross margin, PP&E) are deflated by the Producer Price Index to enhance comparability across years. *Ind_TFP* (*Ind_LP*) is calculated as the industry average of *Firm_TFP*(*Firm_LP*). Ind_TFP_{DISP} is productivity dispersion, measured as the interquartile difference of *Firm_TFP* in an industry. Ind_LP_{DISP} is labor productivity dispersion, measured as the interquartile difference of *Firm_LP* in an industry. *Post* is an indicator variable that equals zero if the fiscal year is between 1990 and 1993, and one if the fiscal year is between 1994 and 1996. *Non-Discloser* is an indicator variable that do not comply with the disclosure regulation, and zero otherwise. *FirmUnc* is standard deviation of log-change in sales in the pre-regulation period. *Global* is the quartile rank of the export market share of an industry in the pre-regulation period. *IndUnc* is the quartile rank of the standard deviation of log change of sales of an industry in the pre-regulation period. *Price-Cost Margin* is industry sales divided by industry operating cost in the pre-regulation period. All other variables are defined in Appendix A. Standard errors are clustered by firm and reported in parentheses. ***, **, and * denote two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 8: Difference in the Impact of the Regulation on TFP for Manufacturing versus Non-manufacturing Industries

This table reports the impact of the capacity disclosure regulation on industry productivity (*Ind_TFP*) using non-manufacturing industries as a control group. Panel A presents the average value of *Ind_TFP* for manufacturing and non-manufacturing industries in the pre-and post-period, respectively. Panel B reports the regression results using OLS regression.

Panel A. Univariate evidence

	Pre-Period (1990-1993)	Post-Period (1994-1996)	Post - Pre
Manufacturing Industries	-0.245	0.070	0.316
			(0.070)
Non-manufacturing industries	-0.121	0.128	0.249
			(0.103)
			0.067
			(0.020)

Panel B. Multivariate evidence

	(1) *Ind_TFP*	(2) *Ind_TFP*
Post	0.186***	
	(0.064)	
Post x MfactInd	0.120*	0.149*
	(0.066)	(0.073)
Obs.	226	226
Adjusted R-squared	0.829	0.836
Controls	YES	YES
Industry FE	YES	YES
Year FE	NO	YES

Firm_TFP is total factor productivity, measured as the residual from regressing log of value added (i.e., gross margin) on log of capital (i.e., PP&E) and log of labor (i.e., the number of employees). *Firm_LP* is labor productivity, measured as natural logarithm of value added per employee. *Firm_KP* is capital productivity, measured as natural logarithm of value added per PP&E. Gross margin and PP&E used to calculate Inputs of *Firm_TFP*, *Firm_LP,* and *Firm_KP* (i.e., gross margin, PP&E) are deflated by the Producer Price Index to enhance comparability across years. *Ind_TFP* (*Ind_LP*) is calculated as the industry average of *Firm_TFP*(*Firm_LP*). Ind_TFP_{DISP} is productivity dispersion, measured as the interquartile difference of *Firm_TFP* in an industry. Ind_LP_{DISP} is labor productivity dispersion, measured as the interquartile difference of *Firm_LP* in an industry. *Post* is an indicator variable that equals zero if the fiscal year is between 1990 and 1993, and one if the fiscal year is between 1994 and 1996. *Non-Discloser* is an indicator variable that do not comply with the disclosure regulation, and zero otherwise. *FirmUnc* is standard deviation of log-change in sales in the pre-regulation period. *Global* is the quartile rank of the export market share of an industry in the pre-regulation period. *IndUnc* is the quartile rank of the standard deviation of log change of sales of an industry in the pre-regulation period. *Price-Cost Margin* is industry sales divided by industry operating cost in the pre-regulation period. All other variables are defined in Appendix A. Standard errors are clustered by firm and reported in parentheses. ***, **, and * denote two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 9: Difference in the Impact of the Regulation on TFP for Manufacturing Firms in Korea versus Manufacturing Firms in Japan and Taiwan

This table reports the impact of the capacity disclosure regulation on firm productivity (*Firm_TFP*) using manufacturing firms in Japan and Taiwan as a control group. *Market Share* is dropped in the control variable due to the lack of precise industry classification code data. All variables are converted to us dollars for comparability.

	(1) *Firm_TFP*	(2) *Firm_TFP*
Post	-0.016	
	(0.034)	
Post x KoreanFirm	0.066**	0.102***
	(0.033)	(0.036)
Obs.	460	460
Adjusted R-squared	0.875	0.879
Controls	YES	YES
Firm FE	YES	YES
Year FE	YES	YES

Firm_TFP is total factor productivity, measured as the residual from regressing log of value added (i.e., gross margin) on log of capital (i.e., PP&E) and log of labor (i.e., the number of employees). *Firm_LP* is labor productivity, measured as natural logarithm of value added per employee. *Firm_KP* is capital productivity, measured as natural logarithm of value added per PP&E. Gross margin and PP&E used to calculate Inputs of *Firm_TFP*, *Firm_LP,* and *Firm_KP* (i.e., gross margin, PP&E) are deflated by the Producer Price Index to enhance comparability across years. *Ind_TFP* (*Ind_LP*) is calculated as the industry average of *Firm_TFP*(*Firm_LP*). Ind_TFP_{DISP} is productivity dispersion, measured as the interquartile difference of *Firm_TFP* in an industry. Ind_LP_{DISP} is labor productivity dispersion, measured as the interquartile difference of *Firm_LP* in an industry. *Post* is an indicator variable that equals zero if the fiscal year is between 1990 and 1993, and one if the fiscal year is between 1994 and 1996. *Non-Discloser* is an indicator variable that do not comply with the disclosure regulation, and zero otherwise. *FirmUnc* is standard deviation of log-change in sales in the pre-regulation period. *Global* is the quartile rank of the export market share of an industry in the pre-regulation period. *IndUnc* is the quartile rank of the standard deviation of log change of sales of an industry in the pre-regulation period. *Price-Cost Margin* is industry sales divided by industry operating cost in the pre-regulation period. All other variables are defined in Appendix A. Standard errors are clustered by firm and reported in parentheses. ***, **, and * denote two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 10: The Effect of the Mandated Capacity Utilization Disclosure in Change in Industry Productivity

This table reports the results of the regression of the mandated capacity utilization disclosure on the change in industry productivity (Δ*Ind_TFP*). The main variable of interest in column (1) is *Post*. Column (2) shows the effect of the mandated disclosure on change in industry productivity using dynamic regressions. I adjusted control variables to changes from t-2 to t-1.

	(1) Δ*Ind_TFP*	(2) Δ*Ind_TFP*
Post	0.042*	
	(0.018)	
yr1992		0.018
		(0.030)
yr1993		-0.016
		(0.035)
yr1994		0.074*
		(0.035)
yr1995		0.008
		(0.050)
yr1996		0.030
		(0.031)
Obs.	148	148
Adjusted R-squared	0.014	0.012
Controls	YES	YES
Industry FE	YES	YES
Year FE	NO	NO

Firm_TFP is total factor productivity, measured as the residual from regressing log of value added (i.e., gross margin) on log of capital (i.e., PP&E) and log of labor (i.e., the number of employees). *Firm_LP* is labor productivity, measured as natural logarithm of value added per employee. *Firm_KP* is capital productivity, measured as natural logarithm of value added per PP&E. Gross margin and PP&E used to calculate Inputs of *Firm_TFP*, *Firm_LP,* and *Firm_KP* (i.e., gross margin, PP&E) are deflated by the Producer Price Index to enhance comparability across years. *Ind_TFP* (*Ind_LP*) is calculated as the industry average of *Firm_TFP*(*Firm_LP*). Ind_TFP_{DISP} is productivity dispersion, measured as the interquartile difference of *Firm_TFP* in an industry. Ind_LP_{DISP} is labor productivity dispersion, measured as the interquartile difference of *Firm_LP* in an industry. *Post* is an indicator variable that equals zero if the fiscal year is between 1990 and 1993, and one if the fiscal year is between 1994 and 1996. *Non-Discloser* is an indicator variable that do not comply with the disclosure regulation, and zero otherwise. *FirmUnc* is standard deviation of log-change in sales in the pre-regulation period. *Global* is the quartile rank of the export market share of an industry in the pre-regulation period. *IndUnc* is the quartile rank of the standard deviation of log change of sales of an industry in the pre-regulation period. *Price-Cost Margin* is industry sales divided by industry operating cost in the pre-regulation period. All other variables are defined in Appendix A. Standard errors are clustered by firm and reported in parentheses. ***, **, and * denote two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 11: Alternative Measure of Industry/Firm Productivity

This table reports the results of the regression of the mandated capacity utilization disclosure on alternative measure of firm and industry productivity. Panel A reports the estimation results when *Firm_LP*, firm-level labor productivity, *Firm_KP*, firm-level capital productivity are used as a dependent variable. In Panel B, two measures of industry labor productivity, *Ind_LP* and Ind_LP_{DISP}, are used as an alternative measure of industry productivity.

Panel A. The effect of the mandated capacity utilization disclosure on firm labor and capital productivity

	(1)	(2)
	Firm_LP	*Firm_KP*
Post	0.326***	0.121***
	(0.028)	(0.035)
Obs.	1585	1585
Adjusted R-squared	0.828	0.803
Controls	YES	YES
Firm FE	YES	YES
Year FE	NO	NO

Panel B. The effect of the mandated capacity utilization disclosure on industry labor productivity

	(1)	(2)
	Ind_LP	Ind_LP_{DISP}
Post	0.306**	-0.285**
	(0.086)	(0.095)
Obs.	173	173
Adjusted R-squared	0.863	0.384
Controls	YES	YES
Industry FE	YES	YES
Year FE	NO	NO

Firm_TFP is total factor productivity, measured as the residual from regressing log of value added (i.e., gross margin) on log of capital (i.e., PP&E) and log of labor (i.e., the number of employees). *Firm_LP* is labor productivity, measured as natural logarithm of value added per employee. *Firm_KP* is capital productivity, measured as natural logarithm of value added per PP&E. Gross margin and PP&E used to calculate Inputs of *Firm_TFP*, *Firm_LP,* and *Firm_KP* (i.e., gross margin, PP&E) are deflated by the Producer Price Index to enhance comparability across years. *Ind_TFP* (*Ind_LP*) is calculated as the industry average of *Firm_TFP*(*Firm_LP*). Ind_TFP_{DISP} is productivity dispersion, measured as the interquartile difference of *Firm_TFP* in an industry. Ind_LP_{DISP} is labor productivity dispersion, measured as the interquartile difference of *Firm_LP* in an industry. *Post* is an indicator variable that equals zero if the fiscal year is between 1990 and 1993, and one if the fiscal year is between 1994 and 1996. *Non-Discloser* is an indicator variable that do not comply with the disclosure regulation, and zero otherwise. *FirmUnc* is standard deviation of log-change in sales in the pre-regulation period. *Global* is the quartile rank of the export market share of an industry in the pre-regulation period. *IndUnc* is the quartile rank of the standard deviation of log change of sales of an industry in the pre-regulation period. *Price-Cost Margin* is industry sales divided by industry operating cost in the pre-regulation period. All other variables are defined in Appendix A. Standard errors are clustered by firm and reported in parentheses. ***, **, and * denote two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.