Competitive externalities of U.S. government economic development subsidies *

Elisa Casi
Norwegian School of Economics
elisa.casi@nhh.no

Costanza Cincotta
Norwegian School of Economics
costanza.cincotta@nhh.no

Allison Koester
Georgetown University
allison.koester@georgetown.edu

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Abstract: We study the competitive effects of government economic development subsidies - a widely-used U.S. policy tool intended to stimulate economic growth and encourage specific types of corporate behavior. Subsidies lower subsidized firms' costs to deploy their competitive strategies, potentially leading to negative externalities for *non*-subsidized firms. Using a novel dataset that tracks U.S. federal, state, and local government subsidies to U.S. publicly traded firms over more than two decades, we predict and find evidence consistent with subsidies negatively impacting non-subsidized firms' market share and financial performance. The lower market share results are driven by subsidies in the form of loans - a type of subsidy that provides competitors with only a temporary increase in resources. In contrast, the worse financial performance results (e.g., lower sales, higher operating expenses, and lower operating income) are driven by non-loan subsidies - a type of subsidy that provides competitors with a permanent increase in resources. The negative impact of competitors' loan subsidies on non-subsidized firms' market share is short-lived, whereas the negative impact of competitors' non-loan subsidies on non-subsidized firms' sales and operating income persists for multiple years. We also find that government subsidies serve as an attractive market force that encourage firm entry and discourage firm exit within a product market. These findings highlight previously unexplored competitive externalities of government economic development subsidies.

JEL classification: H25, M48, H71, D40, L22

Keywords: government economic development subsidies; product market competition

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1 Introduction

U.S. governments provide billions of dollars of economic development subsidies to corporations each year (Huang (2022); Jensen and Malesky (2018)). Corporate economic development subsidies (hereafter "subsidies") are financial assistance provided by U.S. federal, state, and local governments to for-profit firms and require subsidized firms to engage in specific activities that governments expect to facilitate economic growth. Most studies in the accounting and economics literatures that consider government subsidies focus on subsidy effectiveness (e.g., Aobdia et al. (2024); De Simone et al. (2022); Jensen (2017)) or subsidy-receiving firms (e.g., Huang (2022); Raghunandan (2024); Pappas et al. (2024)). There is little research on how subsidies affect the non-subsidized firms that compete in the same product market as corporate subsidy recipients. Our study seeks to advance this nascent literature. Government subsidies provide subsidized firms with a cash infusion and reduce the costs the recipient firms bear when implementing their competitive strategies. Investments that in the absence of a subsidy are unprofitable may become profitable after taking the extra financial resources the subsidy provides into consideration. This results in subsidies providing a competitive advantage for recipient firms, resulting in *non*-subsidized firms being at a competitive *dis*advantage. Thus, we posit that subsidies negatively impact the corporate competitive environment through their relative harm to non-subsidized firms.

While the lack of large sample corporate subsidy data has historically limited research in this area, we leverage a relatively new dataset of U.S. federal, state, and local government subsidies awarded to specific corporations to examine the effect of subsidies on non-subsidized firms. This dataset has been used and validated in recently published papers in the accounting and economics literatures (e.g., Jansa and Gray (2017); Huang (2022); Dong et al. (2023); Raghunandan (2024); Aobdia et al. (2024)). We identify non-subsidized firms' competitors using the text-based network industry classifications (TNICs) from Hoberg and Phillips (2010) and Hoberg and Phillips (2016). This classification assigns firms to a product market space in year t based on the similarity of their product descriptions in their annual

Form 10-Ks. This classification is specific to each firm and is dynamic over time (i.e., it captures changes in an individual firm's product market competitors each year). We identify 34,823 subsidies with an aggregate value of $278 billion awarded by U.S. federal, state, or local governments from 2000 through 2021 to 1,593 unique U.S. publicly traded firms (9,851 firm-years). Subsidized and non-subsidized firms compete with each other within a product market space. Within the 55,453 non-subsidized firm-years we study, 52% compete with a subsidized firm in a given year (untabulated).

Our first set of analyses consider the change in a non-subsidized firm's relative market share and individual financial performance as a function of the subsidy amounts awarded to its product market competitors. Our research design follows Donohoe et al. (2022), who consider the competitive externalities of a large 2004 U.S. federal income tax reduction for repatriating firms on non-repatriating firms' competitive environment. The strength of our identification strategy comes from the variation we exploit arising from competitor firms' subsidies, as both a competitor firm's decision to apply for a subsidy and a government's decision to award a competitor firm a subsidy are plausibly exogenous to a non-subsidized firm. Non-subsidized firm fixed effects control for time-invariant firm characteristics and year fixed effects control for governments' propensity to provide different levels/mixes of subsidies in different time periods. Thus, our coefficients of interest capture *within-firm variation over time* in a non-subsidized firm's market share and financial performance as a function of the extent its product market competitors are subsidized by a U.S. government.

Empirical analyses reveal that as competitor firms' aggregate subsidies as a percentage of a non-subsidized firm's resources increase, non-subsidized firms capture a smaller percentage of total sales within their product market and experience worse financial performance in the form of lower sales, higher operating expenses, and lower operating income. These findings are consistent with government subsidies negatively impacting non-subsidized firms. In terms of economic magnitude, a one standard deviation increase in competitor firms' subsidy amount in year t is associated with a 1.4% decrease in a non-subsidized firm's operating

income in the same year. Our analyses consider the year subsidies are awarded as well as the following two years. The negative impact on subsidized firms' market share is present in year t but not in years t+1 or t+2. The negative impact on subsidized firms' operating performance persists through year t+1 and generally disappears by year t+2. These results indicate that the negative impact of subsidies on non-subsidized firms is short-lived, consistent with the idea that non-subsidized firms rapidly adjust their business strategies to counteract the competitive challenges posed by their competitors' subsidies.

However, differences in government subsidy *type* may affect the extent of subsidized firms' competitive threat to their non-subsidized peers. While subsidies in the form of loans offer resources that are temporary in nature, non-loan subsidies are a permanent transfer of resources from a government to a firm. When we separately consider subsidies based on their permanent versus temporary nature (i.e., loans and non-loans), we find that competitors' *loan* subsidies drive non-subsidized firms' decrease in market share in year t, while competitors' *non-loan* subsidies drive non-subsidized firms' lower sales, higher operating expenses, and lower operating income in year t. The negative impact of non-loan subsidies on non-subsidized firms' sales and operating income persists through year t+2. These findings highlight the importance of bifurcating competitors' subsidies as a function of government resource transfer permanence.

In exploratory analyses, we consider whether different types of non-loan subsidies exhibit differential relations with non-subsidized firms' market share and financial performance. Differential relations may exist due to differences in how subsidy resource inflows align with subsidized firms' resource outflows. For example, a firm must generally incur a resource outflow before a cost reimbursement from a government is possible. In contrast, cash grants from a government do not necessarily require a firm to incur a resource outflow prior to the subsidy inflow. We also note that some subsidy types are useful only to a subset of firms in specific years. For example, income tax subsidies are only useful to a firm when the firm has taxable income to offset. Our exploratory analyses reveal that competitor firms' subsidies in

the form of cash grants and tax abatements are associated with non-subsidized firms' lower sales, higher operating expenses, and lower operating income in year t. While these two types of competitor firm non-loan subsidies continue to be associated with non-subsidized firms' lower sales in year t+2, these types of competitor firm subsidies are unrelated to non-subsidized firms' operating expenses or operating income in year t+2. However, we remind a reader that when competitors' non-loan subsidies are considered as a collective group, their negative impact on non-subsidized firms' sales and operating income does persist through year t+2.

Our final set of analyses investigate whether subsidies have an incremental effect on firms' product market entry and exit rates. While a firm's decision to enter a new product market or exit its existing product market is multifaceted, we posit that governments subsidizing firms' costs to deploy their competitive strategies could affect firms' product market entry/exit decisions at the margin. If the possibility of receiving a subsidy serves as an attractive market force, then we expect to observe more firms entering and fewer firms exiting a product market as government subsidies to existing firms in the product market increase. In contrast, if subsidies contribute to subsidized firms being more difficult to compete with, then we expect to observe fewer firms entering and more firms exiting a product market as government subsidies to existing firms in the product market increase.

We find that as competitor firms' subsidy amounts increase, more firms enter and fewer firms exit a product market. The increase in entry rate occurs in the year of competitor firms' subsidy awards, whereas the decrease in exit rate occurs in years t through t+2. When we split competitor firm subsidies into their loan and non-loan components, we find that both types of subsidies are associated with an increase in entry rate and decrease in exit rate. In exploratory analyses, we again split non-loan subsidies into three subgroups. Competitor firms' subsidies in the form of cash grants primarily drive the increase in product market entry rate in year t, whereas all three types of non-loan subsidies are associated with the decrease in product market exit rate in at least one of the three years considered. These

findings are consistent with government subsidies serving as an attractive market force, encouraging new firms to enter a product market and discouraging existing firms to exit a product market.

Our study contributes to the nascent literature that analyzes the effects of government economic development subsidies on firm-specific outcomes. The subsidies literature tends to focus on whether subsidies achieve their intended public policy goals (e.g., Papke (1994); Greenstone et al. (2010); Slattery and Zidar (2020)), including whether achievement is affected by the political connectedness of the subsidy-receiving firm (e.g., Aobdia et al. (2024)) or government and corporate transparency related to the subsidies (e.g., De Simone et al. (2022)). The handful of studies that focus on subsidies and *firm-specific* outcomes consider the relation between subsidies and *subsidized firm* characteristics (e.g., disclosure (Huang (2022)), corporate misconduct (Raghunandan (2024)), and income smoothing (Pappas et al. (2024))).

We take a different approach by focusing on the *non-subsidized firms* that compete with subsidy-receiving firms. We build upon two papers that consider the competitive effects of income tax rate cuts. Donohoe et al. (2022) examines the competitive effects of a 2004 one-time tax rate reduction on U.S. firms' repatriated foreign earnings. The authors find that the preferential tax treatment for a subset of firms has a negative economic effect on the performance of competitor firms that do not benefit from the one-time preferential tax rate. Kim et al. (2021) also consider the competitive effects of differential tax rates by examining how foreign tax rate cuts affect U.S. domestic competitor firms that do not benefit from these foreign tax rate reductions. The authors find that foreign country tax rate reductions escalate the competitive threat that U.S. domestic firms face. Our analyses consider the competitive effects of government economic development subsidies, which include tax abatements/credits for all types of taxes, as well as preferential term loans, cash grants, and cost reimbursement programs. We provide novel evidence on how the government subsidies of competitor firms shape the competitive environment of non-subsidized firms.

The results of our study have important policy implications. Specifically, our findings improve our understanding of the impact of government subsidies on competition dynamics and offers valuable insights for policy makers interested in mitigating the negative externalities of subsidy awards on non-subsidized firms' competitive environment. While the European Commission has acknowledged the potential adverse impacts of government subsidies on market competition (https://eur-lex.europa.eu/eli/reg/2022/2560/oj), there is little empirical evidence on the competitive externalities of U.S. government subsidies from the perspective of individual non-subsidized firms. We believe that our findings offer an important first step in contributing to this void in the literature.

2 Institutional Background & Hypotheses Development

2.1 Government Economic Development Subsidies

In the U.S., economic development subsidies are a common policy tool used by governments to spur economic growth through the private sector. Subsidies often target certain industries (e.g., the manufacturing sector) or certain activities (e.g., workforce training programs or infrastructure rehabilitation), and can be granted by federal, state, or local governments. Subsidies can take a variety of forms. The four most common types of subsidies we study are loans with preferential terms, various types of tax incentives (abatements and credits) related to income and non-income taxes, cash grants, and a handful of other forms (e.g., cost reimbursement programs) that we group together. The following provides examples of the four subsidy types in our sample at the *subsidy program level*: (1) $365 million related to a U.S. federal loan program for oil and gas field machinery and equipment awarded by the U.S. Export-Import Bank (the official export credit agency of the U.S.) to 42 firms between 2007 and 2019, (2) $80 million in Technology and Innovation cash grants awarded by the U.S. Department of Commerce to 33 firms between 2009 and 2018, (3) $95 million in Economic Development for a Growing Economy (EDGE) tax credits (aimed at supporting job creation

and calculated as a percentage of the anticipated increase in tax withholdings generated by the new jobs) awarded by the Indiana Department of Commerce and Economic Opportunity to 84 firms between 2004 and 2021, and (4) $300 million of cost reimbursement related to industrial development training awarded by the Alabama Department of Education to approximately 1,200 firms during our sample period.

Some subsidies offered by state and local governments target specific firms. Such subsidies are used by these governments to incentivize a specific firm to re-locate (or an existing firm to expand its operations) within a state, county, or city boundary. Firm-specific subsidies can be very generous. For example, Washington state awarded a $8.7 billion subsidy to retain Boeing's manufacturing facilities in the state (a 16-year extension of what was supposed to be a one-time tax incentive that Boeing had been previously awarded by the state government). However, firm-specific subsidies of such a large dollar amount are outliers within our sample. On occasion, state and local governments act collaboratively when offering firm-specific subsidies. For example, in 2009 the Iowa state government, in collaboration with local governments within Iowa, awarded IBM a $53 million subsidy to upgrade an office building and fill the upgraded office building with newly created jobs for information technology workers.

The academic literature has studied both the determinants and consequences of government subsidies. For example, larger firms tend to obtain subsidies but such firms do not display stronger financial performance (Huang (2022); Du et al. (2023)). Many papers find that corporate political connections play a role in federal and state governments awarding subsidies to firms (e.g., Cohen et al. (2011); Jensen and Malesky (2018); Aobdia et al. (2024)). For state government-awarded subsidies, interstate competition is among the most important factors influencing a government's decision to award a subsidy. Both Mast (2020) and Slattery (2022) show that state governments' use of this policy tool is driven by the desire to encourage existing firms to expand operations within their state and attract new firms to their state.

On the consequences side, many studies investigate the impact of state government economic development subsidies on economic growth. These studies find mixed evidence on the effects of these policies on local employment and economic growth (e.g. (Papke, 1994; Greenstone et al., 2010; Slattery and Zidar, 2020)). For example, approximately one-third of firms receiving a state government subsidy fail to satisfy their promised job creation target (Dong et al. (2023)). In addition, no positive economic growth effects of state government subsidies are detected when subsidies are low in transparency (De Simone et al., 2022) and when subsidized firms have political ties to the state governments providing the subsidy (Aobdia et al., 2024). Recent papers also consider how subsidies impact subsidized firms' behavior. Subsidized firms are more likely to engage in income smoothing, which is interpreted as these firms attempting to avoid attracting public attention because they face greater political scrutiny (Pappas et al., 2024). Subsidized firms are also more likely to violate government regulations (Raghunandan (2024)). These findings are consistent with government subsidies having some negative externalities. In contrast, subsidized firms provide more voluntary disclosure about their business activities including information about jobs creation and capital investment, which is interpreted as consistent with subsidized firms' incentive to help awardee governments be more transparent and lower their own public scrutiny (Huang (2022)). This highlights a positive externality of subsidies on firm behavior.

While these papers study *subsidized firms'* behavior and economic outcomes in these firms' local operating environment, they do not consider the competitive effects of subsidies on *non-subsidized firms*. We explicitly study the potential negative externalities of subsidies by focusing on how subsidies affect non-subsidized firms' market share, individual financial performance, and product market entry/exit rates.

2.2 Hypotheses Development

Government economic development subsidies can provide a significant boost to a company's financial resources in the form of preferential term loans, cash grants, tax breaks,

and cost reimbursement programs. These financial resources can be leveraged by recipient firms to offset the costs of deploying their competitive strategies (e.g., reducing operating costs associated with hiring additional employees, investing in capital assets and research and development (R&D) activities, enhancing product offerings, and/or expanding market reach). This increase in financial resources gives subsidized firms a competitive edge relative to their non-subsidized competitors, potentially leading to an imbalance in a competitive market.

Economic theory proposes that product market competitors can engage in strategies aimed at ousting their rivals, with the long-term goal of securing market dominance and pricing control (Donohoe et al. (2022)). For example, subsidized firms can invest their government-provided extra resources in R&D to innovate and improve their products or services. This could result in the creation of superior product offerings, which may attract more customers and lead to increased market share. Furthermore, subsidized firms can use their financial advantage to expand their market reach, either by increasing their marketing and advertising efforts or by entering new markets. Subsidized companies can also use these extra resources to undercut competitors on price. With the extra financial cushion, subsidized firms may be able to lower their prices, potentially below the market average, to attract more customers without a negative impact on their bottom-line earnings. This price reduction strategy can put significant pressure on non-subsidized firms, forcing them to either match the lower prices (thereby reducing their profit margins) or risk losing market share.

Non-subsidized firms failing to receive the same level of government-provided resources can present economic challenges. For instance, under the concept of predatory "long-purse" theory, Benoit (1984) posits that financially robust rivals may target competitors with limited funds, aiming to decrease their cash flows and ultimately force them out of the market. While non-subsidized firms can request a loan from credit providers, the existence of information asymmetry could hinder such lending decisions. Lending decisions are typically based on

current and/or past profits, which may be lower for non-subsidized firms due to subsidized rivals' predatory actions. Consequently, if non-subsidized firms fail to secure credit, they may be left with no option but to pull back on investment and production. Non-subsidized firms, lacking the same financial resources as their subsidized competitors, may struggle to keep up with the pace of innovation, leading to a decrease in their relative product market share and individual economic performance.

In the short-term, the above-described competitive strategies can be empirically inferred by examining outcomes such as decreased market share and profitability (Donohoe et al., 2022). In essence, government subsidies can provide recipient firms with the means to deploy resource-consuming competitive strategies that non-subsidized firms may find challenging to match. This imbalance in resources can lead to a deterioration in the economic performance of non-subsidized firms. Overall, the above discussion leads to the following directional hypothesis:

- *H1: The economic performance of non-subsidized firms decreases as government subsidy award amounts to competitor firms increase.*

Government-provided economic development subsidies can also shape a firm's decision to enter and/or exit a product market. On the one hand, subsidies can serve as a signal to prospective entrants about market viability. Subsidies may signal a favorable business environment in that the government aims to financially stimulate a specific market or industry. This suggests that new firms should be interested in entering this product market and existing firms should be interested in remaining in (i.e., not exiting) the product market.

On the other hand, when a firm receives a government subsidy, the firm gains additional financial resources that non-subsidized firms (both prospective entrants and existing competitors) lack. A subsidized firm can leverage a subsidy to engage in the aggressive competitive strategies described above, increasing the barriers to entry for new firms and the barriers to competition for existing firms. This suggests that new firms should be less interested in entering this product market and existing firms should be more interested in

exiting the product market (all else equal). Overall, it is unclear as to the directional impact of government economic development subsidies on firm market entry and exit rates in a product market space. Thus, we state our (non-directional) hypothesis as follows:

- *H2: The market entry (exit) rate within a non-subsidized firm's product market changes as government subsidy award amounts to competitor firms change.*

3 Research Design

3.1 Data

We identify U.S. government economic development subsidies by using Good Jobs First's (GJF) Subsidy Tracker dataset. GJF is a U.S.-based non-profit and nonpartisan research center that tracks the use of U.S. government economic development subsidies. The Subsidy Tracker dataset provides comprehensive subsidy data from U.S. federal, state, and local award programs. The data are gathered via government disclosures, Freedom of Information Act (FOIA) requests, and the media. The dataset is subsidy-specific and details the granting government/agency, program description, recipient organization information, subsidy description, subsidy amount, subsidy type, and award year. The dataset is commonly used in the recent literature on U.S. government subsidies to U.S. publicly traded firms (e.g., Jansa and Gray (2017); De Simone et al. (2022); Huang (2022); Dong et al. (2023); Raghunandan (2024); Aobdia et al. (2024)). We consider all types of subsidies awarded by U.S. federal, state, and local governments.

We employ the Text-based Network Industry Classification (TNIC) as established by Hoberg and Phillips (2010) and Hoberg and Phillips (2016) to identify a firm's product market competitors each year.[1] The TNIC determines a firm's product market by comparing the pairwise similarity between firms' business and product market descriptions in their Form

[1]Following the authors' guidelines, we use the baseline TNIC Database which is *"calibrated to be as granular as three-digit SIC codes"*, see https://hobergphillips.tuck.dartmouth.edu/industryclass.htm for detailed information on the database and the measure.

10-K filings (specifically Item 1). Both the list of firms and its competitors are taken from Compustat. The measure is unique to each firm and year, meaning that every firm has its own distinct set of competitors that form its product market based on the similarity of its product description with other firms' product descriptions. Two firms with a higher similarity score are considered closer competitors within a product market. This measure is extensively used in the literature (e.g., Bonaime et al. (2018); Grullon et al. (2019); Cao et al. (2019); Bustamante and Frésard (2021); Donohoe et al. (2022)). There are three key advantages of using this measure instead of an industry classification based on SIC or NAICS codes. First, TNIC does not assume that firms within the same SIC/NAICS code are necessarily in competition (an assumption that may not always hold). Secondly, TNIC defines product markets based on firms' product descriptions, which should more accurately represent product market competitors relative to SIC/NAICS codes. Finally, TNIC allows each firm's set of competitors to change over time, which captures the idea that firms enter new product spaces and exit other product spaces over time (e.g., Amazon competes with a different set of firms in 2022 relative to in 2012 and in 2002).

3.2 Empirical Specifications

Our first hypothesis considers the economic performance of non-subsidized firms as a function of the subsidy amounts received by firms in the same product market ("competitor firms"). We follow the research design used in Donohoe et al. (2022) and estimate the following model:

$$Y_{it} = \beta * SAC_{it} + \rho * X_{it-1} + \sigma * Z_{it-1} + \alpha_i + \gamma_{jt} + \epsilon_{it} \tag{1}$$

We test H1 using five dependent variables that capture different aspects of a firm's economic performance. The first variable, *Market Share*, captures a non-subsidized firm's relative share of its product market and is measured as a non-subsidized firm's revenues as a

percentage of all competitors' revenues in the non-subsidized firm's product market in year t. The remaining four variables capture a non-subsidized firm's revenues (*Sales*), cost of goods sold (*COGS*), selling, general, and administrative expenses (*SGA*), and operating income (*Op Inc*), with each measure scaled by the non-subsidized firm's lagged total assets so that each metric is relative to the firm's beginning-of-year resources.

Our independent variable of interest, *SAC* (an abbreviation for the term Subsidy Amount Competitors), is measured as the sum of the subsidy amounts awarded to all subsidized competitors in a non-subsidized firm's product market space in year t. We scale this amount by the non-subsidized firm's lagged total assets so that the aggregate subsidy amount is relative to the non-subsidized firm's beginning-of-year resources.

We control for time-varying characteristics of the non-subsidized firm (X_{it-1}): cash holdings (*Cash*), the natural logarithm of total assets (*Size*), the market-to-book ratio (*MTB*), and leverage (*Leverage*).[2] At the product market-year level (Z_{it-1}), we control for competitors' median sales volatility (*Sales Vol Competitors*) and subsidized competitors' weighted average cash holdings (*Cash Subsidized Competitors*), as well as the product market's Herfindahl-Hirschman Index (*Product Market HHI*). To allow for a delayed effect of these variables on non-subsidized firm performance, we lag all control variables by one year. These variables follow Donohoe et al. (2022) and are defined in detail in Appendix A. Non-subsidized firm fixed effects (α_i) control for time-invariant firm characteristics. Year fixed effects (γ_{jt}) control for time-varying macroeconomic conditions as well as time-series variation in governments' propensity to award subsidies to firms. We estimate an OLS regression and cluster standard errors by firm.

Given our fixed effects, the *SAC* coefficient captures *within-firm variation over time* re-

[2]We believe that controlling for cash holdings is particularly important in this setting. Fresard (2010) uses shifts in import tariffs as a source of variation in product market competition and finds evidence supporting a causal relation between corporate cash holdings and product market performance. The underlying idea is that incumbent firms with larger cash holdings gain market share as competition intensifies in their industries, suggesting that cash-rich firms can deter entry and limit competitors' investment. In addition, Chi and Su (2016) note a higher valuation of cash holdings for firms facing more significant competitive threats, indicating the importance of cash holdings in countering such threats.

garding the effect of the change in a non-subsidized firm's market share of sales and financial performance as a function of the extent to which its product market competitors are subsidized by the government. The strength of our identification lies in the fact that the variation we exploit arises from competitor firms' subsidies, as both a competitor firm's decision to apply for a subsidy and a government's decision to award a competitor firm a subsidy are plausibly exogenous to a non-subsidized firm's economic performance.

Our second hypothesis considers the impact of subsidies on firms' decision to enter (or exit) a product market space. We test this hypothesis by estimating Equation (1) using the dependent variables *Entry* and *Exit*. The variable *Entry* is measured as the number of new firms that enter a non-subsidized firm's product market in year t, scaled by the total number of competitor firms in the non-subsidized firm's product market space at the end of year $t-1$. The variable *Exit* is measured as the number of firms that exit a non-subsidized firm's product market in year t, scaled by the total number of competitor firms in the non-subsidized firm's product market space at the end of year $t-1$.

3.3 Sample Selection

Identifying subsidized firm-year observations is a crucial step in our sample selection procedure. We describe this step in detail given its importance and because of the extensive data cleaning procedures required. We obtain the GJF Subsidy Tracker dataset through an academic subscription in early 2024. The data are organized at the subsidy level, with information detailing which government (U.S. federal, one of the 50 U.S. states, or a local government) provided the subsidy, subsidy amount (if available), subsidy type (e.g., loans, tax abatements/credits, cash grants, etc.), and subsidy requirements (if applicable and if available).

Both a parent firm and its subsidiaries can receive subsidies. Within the Subsidy Tracker dataset, each parent-subsidiary relation is static and is based on the latest available year as of the dataset. This creates an empirical challenge for time-series data analysis, as a parent-

subsidiary link as of 2024 may not be a valid link in the year a subsidy was awarded (prior to 2024). Attributing a subsidy to a parent firm in a year the parent does not own the subsidy-receiving subsidiary induces measurement error and could lead to incorrect inferences. For example, Subsidy Tracker links Whole Foods to Amazon in every year Whole Foods appears in the dataset (as early as 2002), but Amazon did not acquire Whole Foods until 2017. Without cleaning the parent-subsidiary-year links in the Subsidy Tracker dataset, a researcher using the GJF-provided parent firm information will erroneously attribute subsidies awarded to Whole Foods from 2002 through 2016 to Amazon.

We overcome this empirical challenge by validating each parent-subsidiary-year link in the Subsidy Tracker dataset using the WRDS Company Subsidiary dataset. This dataset contains information on U.S. publicly traded firms' subsidiaries as disclosed in their Form 10-K Exhibit 21 and other sources.[3] We sort the data by year and view a parent-subsidiary-year link as valid if the WRDS Company Subsidiary dataset indicates that a parent firm owns the subsidiary firm in a particular year. Once a parent-subsidiary is validated for a given year, we assume the parent firm owns the subsidiary firm in all subsequent years unless the SDC Platinum dataset reveals that another firm has acquired the subsidiary in a subsequent year. We attempt to rematch subsidiaries for which we break an incorrect parent-subsidiary-year link to another parent firm in a different year using the WRDS Company Subsidiary dataset.[4] To illustrate the validation process using the Amazon/Whole Foods example, we retain the parent-subsidiary link between Amazon and Whole Foods beginning in 2017 and break the parent-subsidiary link for 2016 and all prior years. Whole Foods was a publicly traded firm prior to being acquired by Amazon, so Whole Foods is retained in our sample as a parent firm prior to 2017.

We also eliminate subsidies awarded to firms in the financial services sector (SIC 60 through 67). This sector was subject to extraordinary U.S. federal government intervention

[3] As the WRDS Company Subsidiary dataset relies on disclosures that only U.S. publicly traded firms provide, subsidized parent firms that are not a U.S. publicly traded firm in the award year are dropped.

[4] A manual inspect of nearly 7,000 parent-subsidiary-years in the cleaned dataset reveals a 99.99% correct linking rate.

during the 2008-2009 global financial crisis, and we do not want our inferences to be affected by this non-generalizable government intervention. Table 1 Panel A details these data steps and shows that our final sample includes 34,823 subsidies with an aggregate magnitude of $278.2 billion from 2000 through 2021.

We present descriptive information about these subsidies by year in Table 1 Panels B and C. Subsidies by year are further divided by award type (loans or non-loans), with non-loan awards further divided into three categories: cash grants, tax abatements/credits, and a residual 'other' category that captures non-loan awards unrelated to cash grants and taxes. Table 1 Panel B shows that subsidies are largest during 2008 and 2009 as governments sought to stimulate the economy during the global financial crisis. Non-loan subsidies comprise 66% of the aggregate subsidy award amount, with tax-related subsidies comprising 12% of the aggregate amount. Table 1 Panel C presents analogous information using subsidy counts. The largest number of subsidies were granted in 2013, 2014, and 2010, respectively. Non-loan subsidies comprise 95% of all subsidy awards, and tax-related subsidies comprise 64% of all subsidy awards. The descriptive statistics in these two panels highlight that government subsidies are frequent and economically material.

While Table 1 Panels A through C present data at the subsidy level, we estimate Equation (1) at the firm-year level. Thus, we aggregate the 34,823 individual subsidy awards into 9,851 subsidy-receiving firm-years. Table 1 Panel D shows that the mean subsidy amount per firm-year (*Subsidy Amount)* is $28.2 million. The following provides examples of the four subsidy types in our sample at the *subsidized firm-year level*: (1) Caterpillar was awarded a $17 million preferential term loan in 2014 from the U.S. Export-Import Bank to facilitate the sale of goods/services to a foreign buyer, (2) General Motors was awarded a $6 million cash grant in 2014 from the U.S. Department of Energy related to the development and integration of predictive models related to the structural performance of carbon fiber composites in automotive applications, (3) DuPont was awarded a $51 million income tax credit in 2010 through the federal government's Advanced Energy Manufacturing Tax Credit (48C) for

expanding its product of high-performance polyvinyl fluoride films used in the production of solar photovoltaic modules, and (4) IBM was awarded $12 million in cost reimbursement from the Iowa Department of Economic Development's Physical Infrastructure Assistance program.

Table 2 presents our sample selection steps to identify a sample of non-subsidized firm-years. We begin with the 98,679 focal firm-year observations from 2000 through 2021 with a valid TNIC from Hoberg and Phillips (2010) and Hoberg and Phillips (2016). We begin the sample in 2000 due to subsidy data completeness following Aobdia et al. (2024) and end the sample in 2021 because the Hoberg and Phillips (2016) TNIC data end in this year. As our research question focuses on non-subsidized firms' competitive environment, we remove the 9,851 firm-years identified as subsidy recipients per the Subsidy Tracker dataset (as described above). We also remove firms in the financial services sector (SIC 60 through 67) to ensure that our results are not driven by the extraordinary U.S. federal government subsidies given to many firms in this industry during the global financial crisis Huang (2022). Following Donohoe et al. (2022), we remove firm-years with sales growth greater than 100%, as these observations are suspected to have experienced a material merger or reorganization during the year. Finally, we require all firm-years to have non-missing values for our Equation (1) variables. This sample selection procedure yields 55,453 non-subsidized firm-year observations to test our hypotheses.

4 Descriptive Statistics

We present the descriptive statistics for the variables used to estimate Equation (1) in Table 3. The *SAC* mean of 0.368 indicates that on average a non-subsidized firm's competitors are awarded subsidies that aggregate to 36.8% of a non-subsidized firm's total assets. Thus, a non-subsidized firm competes against firms that in the aggregate receive economically material government subsidies (with materiality viewed relative to a non-subsidized

firm's resources). The *SAC* inter-quartile range is 0.0% to 8.2%, reflecting large variation in the extent to which a non-subsidized firm's competitors are awarded subsidies.

The *Market Share* mean of 0.057 indicates that on average a non-subsidized firm's revenues are 5.7% of all sales in its product market in a given year. The *Sales* mean indicates that a non-subsidized firm's revenues are 101.1% of its lagged assets, and the *COGS* (*SGA*) mean indicates that a non-subsidized firm's cost of goods sold (selling, general, and administrative expenses) are 72.8% (13.8%) of its lagged assets. Non-subsidized firm-years are on average profitable, with a mean (median) *Op Inc* value of 3.1% (9.4%) of lagged assets. On average, a non-subsidized firm's annual product market entry rate (*Entry*) is 39% and exit rate (*Exit*) is 31%, consistent with TNICs being dynamic over time.

5 Regression Results

5.1 Non-Subsidized Firms' Market Share and Financial Performance

Tables 4 through 6 present the results that test hypothesis one. We first discuss the relation between *SAC* and the variables that capture non-subsidized firms' competitive environment and financial performance as of year *t*. Given the inclusion of firm fixed effects and year fixed effects, β_1 is identified from *within-firm variation over time*. Table 4 Panel A reveals a negative and statistically significant relation between *SAC* and *Market Share* (column 1). This finding indicates that as competitor firms' subsidy amounts increase in year *t*, a non-subsidized firm captures a smaller percentage of total product market sales in the concurrent year. However, in terms of economic magnitude, the decrease is small. A one standard deviation increase in *SAC* is associated with a 0.07% decrease in a non-subsidized firm's market share.[5] While the column (1) finding indicates that non-subsidized firms' mar-

[5]This percentage is calculated by multiplying the *SAC* coefficient in Table 4 Panel A column 1 (-0.0005) by the *SAC* standard deviation (1.361).

ket share decreases as its product market competitors' subsidies increase, it does not shed light on whether a non-subsidized firm is worse off financially due to its product market competitors' subsidies increasing. In other words, a firm can still increase its profitability even as its share of product market revenues decreases. Our next tests consider non-subsidized firms' individual financial performance.

Table 4 Panel A shows a negative and statistically significant relation between *SAC* and *Sales* (column 2), consistent with non-subsidized firms' individual sales decreasing as competitor firms' subsidies increase. The column (2) finding confirms that the column (1) result does not reflect a non-subsidized firm's sales increasing at a slower rate than its product market competitors. While we do not find a statistically significant *SAC* coefficient when *COGS* is the dependent variable in column (3), we do find a positive and statistically significant relation between *SAC* and *SGA* in column (4). This latter finding is consistent with non-subsidized firms' non-product operating expenses (e.g., those related to non-product personnel, marketing, and research and development) increasing as competitor firms' subsidies increase. Given the findings in columns (2) and (4), it is perhaps unsurprising that we document a negative and statistically significant relation between *SAC* and *Op Inc* in column (5). This finding indicates that non-subsidized firms experience lower operating income as competitor firms' subsidies increase.[6] In terms of economic magnitude, the results in column (5) reveal that a one standard deviation increase in *SAC* is associated with a 1.4% decrease in a non-subsidized firm's operating income in year *t*.[7] Collectively, these findings are consistent with our first hypothesis which predicts that the economic performance of non-subsidized firms decreases as government subsidy amounts to competitor firms increase.

Table 4 Panel B (C) presents the results from estimating Equation (1) when the five dependent variables presented in Panel A are measured in year $t+1$ ($t+2$). These panels reveal that the negative relation between *SAC* and *Market Share* does not persist beyond year

[6]Estimating Equation (1) using a logged specification of competitor firms' aggregate subsidy amount yields similar inferences as the results presented in Table 4 (untabulated).

[7]This percentage is calculated by multiplying the *SAC* coefficient in Table 4 Panel A column 5 (-0.0101) by the *SAC* standard deviation (1.361).

t (column 1 in Panels B and C). While the negative relation between *SAC* and *Sales* persists in years t+1 and t+2 (column 2 in Panels B and C, respectively), the negative relation between *SAC* and *Op Inc* is persists only through year t+1 (column 5 in Panel B). These results suggest that the negative impact of competitors' subsidies on non-subsidized firms is short-lived, consistent with non-subsidized firms quickly altering their business strategies to address the competitive threat created by competitors receiving subsidies.

We next estimate Equation (1) after decomposing *SAC* into two components: subsidies related to preferential term loans (*SAC Loans*) and subsidies unrelated to loans (*SAC Non-Loans*). The key economic difference between these two categories is resource permanence. Loans represent a temporary inflow of resources (because the loans must eventually be repaid),[8] while non-loans represent an inflow of resources that stay with a subsidy recipient. Thus, one could expect different uses of the resources provided by these two types of subsidies as subsidized firms consider which competitive strategies can be funded. This in turn could result in non-subsidized firms being differentially affected by each subsidy types. The *SAC Non-Loans* (*SAC Loans*) mean of 0.234 (0.077) reported in Table 3 indicates that on average a non-subsidized firm's competitors are awarded subsidies that aggregate to 23.4% (7.7%) of a non-subsidized firm's total assets. These descriptives also reveal that within our sample competitor firms' non-loan subsidies are on average three times larger than their loan subsidies[9].

Table 5 Panel A column (1) shows negative and statistically significant relations between *Market Share* and both *SAC Loans* and *SAC Non-Loans*. When we turn to non-subsidized firms' financial performance metrics in columns (2) through (5), we find that the Table 4 Panel A findings are driven by non-loan subsidies (*SAC Non-Loans*). These results indicate that while both loan and non-loan subsidies harm non-subsidized firms' market share, only

[8]Less than 0.3% of the loans in our sample (all from a single program offered by Arkansas) are forgivable.

[9]In Table 1 Panel D, the raw subsidy data shows that the average loan subsidy (*Subsidy Amount Loan*) is \$19.1 million, which is larger than the average non-loan subsidy (*Subsidy Amount Non-Loan*) of \$9.1 million. The key difference between Table 1 and Table 3 is that Table 3 uses winsorized data, with values capped at the 1st and 99th percentiles. This adjustment ensures that the figures in Table 3 reflect more typical subsidy amounts, and results in non-loans being larger as a percentage of assets compared to loans.

non-loan subsidies have a negative impact on non-subsidized firms' financial performance metrics in the period concurrent with competitors receiving the subsidies. These differential findings by subsidy type are in line with the idea that negative competitive externalities are stronger when the subsidy is in the form of a permanent infusion of financial resources (i.e., a subsidy that does not have to be repaid). When subsidized firms are awarded a subsidy that is temporary in nature, they are expected to take less aggressive competitive actions where the risk of being unsuccessful is limited.

Table 5 Panel B (C) repeats the analyses presented in Table Panel A, with the dependent variables measured in year t+1 (t+2). Interestingly, Panel B shows that subsidized competitors' loans are associated with a *decrease* in subsidized firms' operating expenses in year t+1, leading to an *increase* in operating income. The positive relation between *SAC Loans* and *Op Inc* persist through year t+2. These results are again consistent with non-subsidized firms rapidly adjusting their business strategies to compete with subsidized firms. Panels B and C show that the negative relation between *SAC Non-Loans* and both *Sales* and *Op Inc* persists in years t+1 and t+2 (columns 2 and 5, respectively), consistent with this specific type of subsidy having a lasting negative impact on non-subsidized firms' competitive environment.

Table 6 presents the exploratory regression results where *SAC Non-Loans* is further decomposed into subsidies related to cash grants (*SAC Cash*), tax abatements/credits (*SAC Tax*), and a residual "other" category (*SAC Other*). Similar to Tables 4 and 5, Panel A of Table 6 focuses on non-subsidized firms' outcomes in year t while Panel B (C) focuses on outcomes in year t+1 (t+2). In Panel A, the negative relation between competitor firms' subsidy amounts and non-subsidized firms' market share in year t is primarily driven by loan subsidies (column 1). We also find that competitor firms' subsidies in the form of cash grants and tax abatements/credits are associated with non-subsidized firms' lower sales, higher operating expenses, and lower operating income in year t (columns 2 through 5). These findings reveal that non-subsidized firms' competitive environment is negatively impacted in year t

by some subsidy types but not others. We also find that these relations are less consistent in year t+1, and by year t+2 all three types of competitors' non-loan subsidies fail to be associated with non-subsidized firms' operating income. We caution strong interpretation of these exploratory results, as subsidized firms' differential resource use across the three types of non-loan subsidies is less clear than the different resource use between loan and non-loan subsidies.

Overall, our findings suggest that competitor firms' subsidies have an immediate negative impact on non-subsidized firms' competitive environment. Bifurcating competitors' subsidies as a function of resource transfer permanence reveals that competitor firms' subsidized *loans* have a negative effect on subsidized firms' market share only in year t, while competitor firms' subsidized *non-loans* have a negative effect on subsidized firms' sales and operating income through year t+2. These analyses provide valuable insights for policy makers interested in mitigating the negative externalities of subsidy awards on non-subsidized firms' competitive environment.

5.2 Non-Subsidized Firms' Product Market Entry and Exit Rates

Our second hypothesis considers whether market entry and exit rates in non-subsidized firms' product markets change as government subsidy award amounts to competitor firms in the same product market change. Table 7 Panel A reveals a positive and statistically significant relation between *SAC* and *Entry* in year t (column 1), indicating that an increase in subsidy amount within a product market space is associated with an immediate increase in firm entry. However, columns (2) and (3) reveal that this increase does not persist beyond year t. We find a negative and statistically significant relation between *SAC* and *Exit* in year t through year t+2 (columns 4 through 6), consistent with existing firms being less likely to exit their current product market as a function of subsidy amounts. In terms of economic magnitude, a one standard deviation increase in *SAC* is associated with a 1.3% increase in

firm entry and a 1.0% decrease in firm exit in year t.[10] These findings are consistent with government subsidies being an attractive market force.

To determine if results differ across subsidy type, we repeat these analyses after replacing *SAC* with its loan and non-loan components. Table 7 Panel B shows that the increase in market entry rate in year t is due to non-loan subsidies (column 1), while an increase in market entry rate in year t+1 is due to loan subsidies (column 2). This panel also shows that both loan and non-loan subsidies are generally associated with lower market exit rates the concurrent and future years (columns 4 through 6). These findings continue to highlight the importance of separately analyzing subsidies as a function of whether the recipient firm retains the resources given by the government (i.e., non-loan subsidies) or must return the resources to the government in the form of loan repayments.

Table 7 Panel C presents the exploratory results from further decomposing non-loans subsidies into their three subcomponents. Cash grants are the primary driver of the increase in market entry rate in year t (column 1). All three types of non-loan subsidies are associated with a decrease in market exit rate in year t (column 4), while tax subsidies and "other" subsidies drive the decrease in market exit rate through year t+2 (columns 5 and 6).

5.3 Exploratory Analyses: Subsidized Firms

Our hypotheses focus on how subsidies affect the corporate competitive environment through their potential relative *harm* to *non-subsidized* firms. Thus, we estimate Equation (1) using a sample that consists solely of non-subsidized firm-years. Another plausible way to approach these hypotheses is to consider how subsidies affect the corporate competitive environment through the potential *relative benefits* they afford to *subsidized* firms. While we believe our approach is the clearest and most direct way to understand how non-subsidized firms are impacted by subsidies awarded to their competitors, we explore whether inferences can be drawn from estimating a modified version of Equation (1) using a sample that consists

[10] The two percentages are calculated by multiplying the *SAC* coefficients in Table 7 Panel A column 1 (0.0096) and column 4 (-0.0076) by the *SAC* standard deviation (1.361).

solely of *subsidized* firms.

Such analyses require the following Equation (1) modifications. First, our primary variable of interest is *Sub Firm Subsidy*, measured as the sum of subsidy amounts awarded to subsidized firm i in year t divided by subsidized firm i's lagged total assets. We also create the variables *Sub Firm Subsidy Loan*s, *Sub Firm Subsidy Non-Loans*, *Sub Firm Subsidy Cash*, *Sub Firm Subsidy Tax*, and *Sub Firm Subsidy Other*, which are constructed analogous to *Sub Firm Subsidy* but with only subsidies related to loans, non-loans, cash grants, tax abatements/credits, and "other" (a residual category) in the numerator, respectively. Second, we calculate a version of *SAC* from a subsidized firm's point of view that excludes the subsidized firm's subsidies. In these analyses, *SAC* serves as a control variable (not our variable of interest); the larger the amount of subsidies awarded to other firms in the same product market space, the lower the potential benefit to a single subsidized firm in the product market space. Appendix B presents detailed definitions for these subsidized firm-specific variables. All other Equation (1) variables remain as previously discussed with firm i referring to the subsidized firm.

Appendix B presents the regression results from estimating Equation (1) using the sample of subsidized firm-year. Table B1 (B2) presents the regression results with market share and financial performance metrics (market entry and exit rates) as dependent variables. We focus on the concurrent year relation, as to keep the presentation and discussion of these exploratory analyses manageable. Table B1 Panel A shows that subsidized firms' subsidy amount is associated with lower sales (*Sales*) and lower cost of goods sold (*COGS*). As these coefficients are of similar magnitudes, it is not surprising that we observe a statistically *in*significant relation between subsidized firms' subsidy amount and their operating income (*Op Inc*). We also do not find a statistically significant relation between *Sub Firm Subsidy* and both *Market Share* and *SGA*. We interpret the β_1 results across all five columns to indicate that subsidies neither benefit nor harm subsidy-receiving firms' relative market share or financial performance. The *SAC* coefficient is statistically insignificant in four of

five columns and only marginally significant in the fifth column, indicating that subsidized firms are not harmed by the subsidies their competitors receive.

Table B1 Panels B and C show that the *Sub Firm Subsidy* results in Panel A are driven by subsidized loans (*Sub Firm Subsidy Loans*), with no relation between any type of non-loan subsidy and subsidized firms' market share or financial performance. The *SAC* coefficient continues to be only marginally significant or statistically insignificant in Panels B and C. Taken collectively, the Table B1 results (which consider only subsidized firms) coupled with the Table 4 results (which consider only non-subsidized firms) are consistent with the subsidies a firm receives helping to insulate the firm from the competitive harm that would otherwise be inflicted from competing with the other subsidized firms in its product market.

Table B2 in Appendix B presents the regression results from estimating the modified version of Equation (1) using only the sample of subsidized firms and the dependent variables that test our second hypothesis regarding product market entry and exit rate. We fail to find reliably statistically significant coefficients on our variables of interest or the *SAC* control variable in any of the three panels. These results are consistent with subsidies (both those received by a firm and those received by its competitors) having no discernible impact other firms' entry or exit within a subsidy-receiving firm's product market.

6 Conclusion

U.S. governments provide billions of dollars of economic development subsidies to corporations each year, with the goals of stimulating economic growth and encouraging specific types of corporate behavior. We study the competitive effects of these subsidies by analyzing the *non-subsidized firms* that compete with subsidy recipients in a product market space. We find that subsidies have an immediate negative effect on non-subsidized firms. As competitor firms' subsidy amounts increase, non-subsidized firms capture a smaller percentage of market share and experience lower revenues, higher operating expenses, and lower oper-

ating income in year t. When we expand our analyses to future time periods, we find that the negative impact of competitors' *loan* subsidies on non-subsidized firms' market share is present only in year t, whereas the negative impact of competitors' *non-loan* subsidies on non-subsidized firms' sales and operating income persists through year t+2. These findings highlight the usefulness of bifurcating competitors' subsidies as a function of resource transfer permanence (i.e., loans provide a temporary cash infusion from the government whereas non-loans provide a permanent cash infusion).

We also investigate the effects of subsidies on firms' market entry and exit rates within a product market space. We find an increase in market entry rate and a decrease in market exit rate as competitor firms' subsidies increase in magnitude. Non-loan (loan) subsidies are associated with an increase in market entry rate in year t (t+1), and both loan and non-loan subsidies are associated with a decrease in market exit rate in the current and future years. These results align with the notion that government subsidies act as a compelling force within a product market, promoting the entry of new firms and inhibiting the exit of existing firms.

Our study improves our understanding of the impact of government subsidies on competition dynamics and offers valuable insights for policy makers interested in mitigating the negative externalities of subsidy awards on non-subsidized firms' competitive environment. Despite the European Commission's concerns regarding the potential adverse impacts of government subsidies on market competition (https://eur-lex.europa.eu/eli/reg/2022/2560/oj), we are unaware of empirical evidence on the competitive externalities of U.S. government subsidies from the perspective of individual non-subsidized firms. We believe our study offers an important first step in filling this gap in the literature.

Our study is subject to several caveats. First, due to our use of TNIC classifications and individual firm-year financial information, we study only U.S. publicly traded firms. Our findings may not generalize to privately held firms' competitive environment. Second, we lack a completely exogenous shock to empirically exploit. While a competitor firm's

decision to apply for a subsidy and a government's decision to award a competitor firm a subsidy are both *plausibly* exogenous to a non-subsidized firm, we are unable to completely eliminate the possibility that a correlated omitted variable affects our inferences. In spite of these caveats, we believe that our study makes an important and novel contribution to the literature examining government subsidies' potential externalities.

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Table 1 - Subsidy Data Information

Panel A: Subsidy data cleaning steps

	N	**Total $M**
GJF subsidy awards (2000-2024)	645,889	19,266,276
Less: subsidies in 2023 and 2024 (due to the WRDS Subsidiary dataset ending in April 2022)	(9,395)	(58,759)
Less: subsidies awarded to firms and organizations without a GJF-identified publicly owned parent firm	(545,532)	(2,316,746)
Subsidies to publicly owned firms (parent firms or subsidiary firms) per GJF	90,962	16,890,771
Less: Subsidies to subsidiaries that are not owned by the GJF-lined parent as of the subsidy award year	(45,710)	(8,262,772)
Less: Subsidies without TNIC information	(2,068)	(8,633)
Less: subsidies awarded to firms with SIC 60 through 67	(8,361)	(8,341,154)
Sample of usable subsidies (2000-2021)	**34,823**	**278,212**

Table 1 (cont.)

Panel B: Subsidy information (award amounts)

Year	Total Amt ($M)	Loan face amount ($M)	Subsidy amount excluding loans ($M)			
		Total	Total	Cash	Tax	Other
2000	2,038	321	1,717	55	189	1,473
2001	940	218	723	118	144	461
2002	1,051	556	495	22	46	427
2003	4,575	227	4,349	73	112	4,164
2004	3,820	147	3,673	355	163	3,155
2005	2,470	610	1,860	364	337	1,159
2006	3,552	1,764	1,789	173	291	1,325
2007	5,592	2,744	2,847	422	897	1,528
2008	67,865	65,816	2,049	287	918	844
2009	62,610	55,056	7,554	2,006	2,175	3,373
2010	13,009	7,737	5,272	1,646	1,683	1,943
2011	15,709	12,004	3,704	515	2,354	835
2012	11,897	6,505	5,391	1,015	1,396	2,980
2013	18,780	4,919	13,861	966	2,000	10,895
2014	23,939	15,678	8,261	1,774	2,252	4,235
2015	7,015	545	6,470	626	4,269	1,575
2016	4,176	492	3,684	357	2,919	408
2017	4,731	728	4,003	390	3,173	440
2018	4,084	724	3,359	329	1,744	1,286
2019	9,304	6,990	2,314	560	1,584	170
2020	4,249	919	3,330	380	2,061	889
2021	6,806	272	6,534	1,116	1,443	3,975
Total	278,212	184,972	93,239	13,549	32,150	47,540

Table 1 (cont.)

Panel C: Subsidy information (award count)

Year	Total N subsidies	Number of loan subsidies	Number of subsidies excluding loans			
		Total	Total	Cash	Tax	Other
2000	226	5	221	22	176	23
2001	274	3	271	32	179	60
2002	319	6	313	43	159	111
2003	441	7	434	52	239	143
2004	634	6	628	69	354	205
2005	733	8	725	94	391	240
2006	847	14	833	80	414	339
2007	1,306	98	1,208	205	633	370
2008	1,877	198	1,679	239	1,024	416
2009	2,288	409	1,879	300	1,065	514
2010	2,530	207	2,323	377	1,389	557
2011	2,411	154	2,257	299	1,464	494
2012	2,456	132	2,324	420	1,472	432
2013	2,869	148	2,721	418	1,847	456
2014	2,533	130	2,403	397	1,677	329
2015	2,278	120	2,158	350	1,562	246
2016	2,368	116	2,252	214	1,777	261
2017	1,933	37	1,896	200	1,511	185
2018	1,722	15	1,707	197	1,365	145
2019	1,650	37	1,613	277	1,225	111
2020	1,529	25	1,504	235	1,182	87
2021	1,599	25	1,574	178	1,309	87
Total	34,823	1,900	32,923	4,698	22,414	5,811

Table 1 (cont.)

Panel D: Subsidies aggregated to the firm-year level ($M)

Variables	N	Mean	SD	P25	P50	P75
Subsidy Amount	9,851	28.242	627.869	0.035	0.302	2.077
Subsidy Amount Loan	9,851	19.149	608.451	0	0	0
Subsidy Amount Non-Loan	9,851	9.093	116.168	0.022	0.223	1.500
Subsidy Amount Cash	9,851	1.369	17.647	0	0	0
Subsidy Amount Tax	9,851	3.264	32.322	0	0.050	0.635
Subsidy Amount Other	9,851	4.460	107.767	0	0	0.011

Notes: This table provides information related to the Subsidy Tracker dataset. In Panels A through C, data are presented at the subsidy unit of observation. Panel A describes how we match subsidies to firm-year information in Compustat, ensuring that each parent-subsidiary-year link is valid. Panel B provides annual subsidy amounts ($M) by award type (loans and non-loans, with the latter further subdivided into cash, tax, and other). Panel C presents analogous information as Panel B using subsidy count. Panel D presents firm-year level data on subsidy awards. The variable *Subsidy Amount* represents the total subsidy amount ($M) awarded to each firm-year. This total is divided into two categories: loan awards (*Subsidy Amount Loan*) and non-loan awards (*Subsidy Amount Non-Loan*). The non-loan category is further classified into three types: cash subsidies (*Subsidy Amount Cash*), tax subsidies (*Subsidy Amount Tax*), and a residual category (*Subsidy Amount Other*).

Table 2 - Sample Selection

	N
TNIC data aggregated at the focal firm-year level (2000 - 2021)	98,679
Less: focal firm-years that receive a subsidy	(9,851)
Less: firms in the financial services sector (SIC 60 through 67)	(24,065)
Less: firm-years with sales growth $>$ 100% following Donohoe et al. (2022)	(5,207)
Less: firm-years with missing Equation (1) regression variables	(4,103)
Final sample of non-subsidized firm-years	**55,453**

Notes: This table provides information related to our sample selection procedure.

Table 3 - Descriptive Statistics

Variables	N	Mean	SD	P25	P50	P75
Market Share	55,453	0.057	0.135	0.001	0.006	0.037
Sales	55,453	1.011	0.796	0.445	0.824	1.359
COGS	55,453	0.728	0.705	0.239	0.514	0.978
SGA	55,453	0.138	0.189	0.021	0.068	0.174
Op Inc	55,453	0.031	0.272	-0.010	0.094	0.164
Entry	55,453	0.382	0.529	0.129	0.233	0.417
Exit	55,453	0.306	0.202	0.164	0.273	0.423
SAC	55,453	0.368	1.361	0	0.004	0.082
SAC Loans	55,453	0.077	0.417	0	0	0
SAC Non-Loans	55,453	0.234	0.870	0	0.003	0.050
SAC Cash	55,453	0.034	0.278	0	0	0.003
SAC Tax	55,453	0.152	1.260	0	0.001	0.020
SAC Other	55,453	0.173	2.657	0	0	0.002
Cash	55,453	0.228	0.246	0.034	0.130	0.352
Size	55,453	5.788	1.947	4.377	5.747	7.146
MTB	55,453	2.217	2.050	0.996	1.614	2.649
Leverage	55,453	0.228	0.236	0.011	0.175	0.363
Sales Vol Competitors	55,453	0.036	0.032	0.017	0.024	0.041
Product Market HHI	55,453	0.254	0.232	0.088	0.166	0.344
Cash Competitors	55,453	0.246	0.207	0.071	0.175	0.386

Table 4 - Regression Results Hypothesis One

Panel A: Dependent Variables at t

Dependent Variables:	$Market\ Share_t$	$Sales_t$	$COGS_t$	SGA_t	$Op\ Inc_t$
	(1)	(2)	(3)	(4)	(5)
SAC	-0.0005**	-0.0062***	0.0011	0.0038***	-0.0101***
	(0.0002)	(0.0017)	(0.0018)	(0.0007)	(0.0012)
Cash	-0.0212***	-0.4489***	-0.3909***	-0.0771***	-0.0394***
	(0.0045)	(0.0263)	(0.0232)	(0.0078)	(0.0135)
Size	0.0104***	-0.1606***	-0.2005***	-0.0601***	0.0334***
	(0.0011)	(0.0073)	(0.0071)	(0.0021)	(0.0035)
MTB	0.0002	-0.0077***	0.0227***	0.0016**	-0.0004
	(0.0003)	(0.0019)	(0.0019)	(0.0007)	(0.0016)
Leverage	0.0070*	0.0355	-0.0456**	0.0510***	-0.0510***
	(0.0036)	(0.0231)	(0.0226)	(0.0075)	(0.0127)
Sales Vol Competitors	0.4939***	0.7317***	0.5244***	-0.0549***	0.1426***
	(0.0590)	(0.1343)	(0.1148)	(0.0201)	(0.0427)
Product Market HHI	0.0968***	-0.0371**	-0.0141	-0.0198***	0.0122*
	(0.0058)	(0.0147)	(0.0129)	(0.0036)	(0.0064)
Cash Competitors	0.0809***	-0.2062***	-0.1546***	0.0219**	-0.0654***
	(0.0153)	(0.0363)	(0.0321)	(0.0088)	(0.0164)
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes
N	55,453	55,453	55,453	55,453	55,453
Adjusted R^2	0.5603	0.8512	0.8450	0.7988	0.7258

Table 4 cont. - Regression Results Hypothesis One

Panel B: Dependent Variables at $t+1$

Dependent Variables:	$Market\ Share_{t+1}$ (1)	$Sales_{t+1}$ (2)	$COGS_{t+1}$ (3)	SGA_{t+1} (4)	$Op\ Inc_{t+1}$ (5)
SAC	-0.0001	-0.0052***	-0.0040**	0.0003	-0.0036***
	(0.0002)	(0.0017)	(0.0017)	(0.0006)	(0.0011)
Cash	-0.0110**	-0.5590***	-0.2266***	0.0078	-0.0872***
	(0.0053)	(0.0305)	(0.0274)	(0.0088)	(0.0148)
Size	0.0111***	-0.2496***	-0.0977***	-0.0427***	0.0447***
	(0.0013)	(0.0091)	(0.0079)	(0.0022)	(0.0034)
MTB	0.0003	0.0181***	0.0259***	0.0057***	0.0133***
	(0.0004)	(0.0023)	(0.0024)	(0.0009)	(0.0019)
Leverage	0.0115***	-0.0608**	-0.0144	0.0475***	-0.0750***
	(0.0039)	(0.0263)	(0.0232)	(0.0081)	(0.0134)
Sales Vol Competitors	0.1804***	0.8888***	1.072***	-0.0801***	0.2238***
	(0.0553)	(0.1521)	(0.1470)	(0.0261)	(0.0457)
Product Market HHI	0.1007***	-0.0594***	-0.0336**	-0.0138***	0.0122*
	(0.0078)	(0.0163)	(0.0150)	(0.0042)	(0.0073)
Cash Competitors	0.0235	-0.2081***	-0.1672***	0.0164	-0.0878***
	(0.0147)	(0.0411)	(0.0384)	(0.0101)	(0.0180)
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes
N	43,772	43,772	43,772	43,772	43,772
Adjusted R^2	0.56519	0.88004	0.84152	0.80156	0.73326

Table 4 cont. - Regression Results Hypothesis One

Panel C: Dependent Variables at $t+2$

Dependent Variables:	*Market Share*$_{t+2}$	*Sales*$_{t+2}$	*COGS*$_{t+2}$	*SGA*$_{t+2}$	*Op Inc*$_{t+2}$
	(1)	(2)	(3)	(4)	(5)
SAC	0.0001	-0.0039**	-0.0010	-0.0006	-0.0006
	(0.0002)	(0.0018)	(0.0020)	(0.0007)	(0.0010)
Cash	-0.0089	-0.2185***	-0.1179***	0.0281***	-0.0800***
	(0.0058)	(0.0306)	(0.0280)	(0.0098)	(0.0162)
Size	0.0092***	-0.1775***	-0.0594***	-0.0303***	0.0556***
	(0.0015)	(0.0098)	(0.0088)	(0.0024)	(0.0037)
MTB	-0.0000	0.0185***	0.0185***	0.0062***	0.0061***
	(0.0006)	(0.0029)	(0.0030)	(0.0011)	(0.0020)
Leverage	0.0077*	-0.0588**	-0.0310	0.0379***	-0.0761***
	(0.0042)	(0.0260)	(0.0236)	(0.0081)	(0.0132)
Sales Vol Competitors	0.0727	0.9192***	0.9568***	-0.1001***	0.2442***
	(0.0568)	(0.1791)	(0.1625)	(0.0306)	(0.0468)
Product Market HHI	0.0794***	-0.0248	-0.0135	-0.0042	0.0046
	(0.0068)	(0.0165)	(0.0146)	(0.0039)	(0.0071)
Cash Competitors	0.0161	-0.1843***	-0.1470***	-0.0009	-0.0876***
	(0.0138)	(0.0472)	(0.0449)	(0.0110)	(0.0207)
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes
N	37,359	37,359	37,359	37,359	37,359
Adjusted R^2	0.55472	0.87087	0.83848	0.80266	0.72322

Notes: This table presents the results from estimating Equation (1) using the dependent variables that test our first hypothesis. Dependent variables are measured in year t in Panel A, in year $t+1$ in Panel B, and in year $t+2$ in Panel C. All variables are defined in Appendix A. Standard errors clustered at the firm level are reported in parentheses below each coefficient. Stars indicate significance levels: ***, $p < 0.01$, **, $p < 0.05$, *, $p < 0.10$.

Table 5 - Regression Results Hypothesis One: Considering Loans and Non-Loans

Panel A: Dependent Variables at t

Dependent Variables:	$Market\ Share_t$	$Sales_t$	$COGS_t$	SGA_t	$Op\ Inc_t$
	(1)	(2)	(3)	(4)	(5)
SAC Loans	-0.0012***	-0.0058	-0.0068	0.0009	0.0015
	(0.0004)	(0.0039)	(0.0042)	(0.0014)	(0.0023)
SAC Non-Loans	-0.0008**	-0.0105***	0.0043	0.0079***	-0.0207***
	(0.0003)	(0.0028)	(0.0032)	(0.0013)	(0.0023)
Cash	-0.0212***	-0.4486***	-0.3911***	-0.0773***	-0.0386***
	(0.0045)	(0.0263)	(0.0232)	(0.0078)	(0.0135)
Size	0.0103***	-0.1610***	-0.2003***	-0.0597***	0.0324***
	(0.0011)	(0.0073)	(0.0071)	(0.0021)	(0.0035)
MTB	0.0002	-0.0077***	0.0226***	0.0016**	-0.0003
	(0.0003)	(0.0019)	(0.0019)	(0.0007)	(0.0016)
Leverage	0.0071*	0.0360	-0.0458**	0.0505***	-0.0499***
	(0.0036)	(0.0231)	(0.0226)	(0.0075)	(0.0126)
Sales Vol Competitors	0.4937***	0.7309***	0.5241***	-0.0542***	0.1418***
	(0.0590)	(0.1342)	(0.1147)	(0.0201)	(0.0426)
Product Market HHI	0.0967***	-0.0376**	-0.0140	-0.0194***	0.0112*
	(0.0058)	(0.0147)	(0.0129)	(0.0036)	(0.0064)
Cash Competitors	0.0809***	-0.2056***	-0.1554***	0.0213**	-0.0636***
	(0.0153)	(0.0362)	(0.0321)	(0.0088)	(0.0163)
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes
N	55,453	55,453	55,453	55,453	55,453
Adjusted R^2	0.5603	0.8512	0.8450	0.7991	0.7267

Table 5 cont. - Regression Results Hypothesis One: Considering Loans and Non-Loans

Panel B: Dependent Variables at $t+1$

Dependent Variables:	$Market\ Share_{t+1}$	$Sales_{t+1}$	$COGS_{t+1}$	SGA_{t+1}	$Op\ Inc_{t+1}$
	(1)	(2)	(3)	(4)	(5)
SAC Loans	-0.0005	-0.0011	-0.0094***	-0.0051***	0.0050**
	(0.0005)	(0.0042)	(0.0036)	(0.0015)	(0.0022)
SAC Non-Loans	-0.0002	-0.0090***	-0.0043	0.0030***	-0.0090***
	(0.0003)	(0.0031)	(0.0029)	(0.0011)	(0.0021)
Cash	-0.0110**	-0.5589***	-0.2266***	0.0078	-0.0872***
	(0.0053)	(0.0305)	(0.0274)	(0.0088)	(0.0148)
Size	0.0111***	-0.2499***	-0.0978***	-0.0423***	0.0441***
	(0.0013)	(0.0091)	(0.0079)	(0.0022)	(0.0034)
MTB	0.0003	0.0182***	0.0259***	0.0056***	0.0134***
	(0.0004)	(0.0023)	(0.0024)	(0.0009)	(0.0019)
Leverage	0.0115***	-0.0604**	-0.0143	0.0472***	-0.0745***
	(0.0039)	(0.0263)	(0.0232)	(0.0081)	(0.0134)
Sales Vol Competitors	0.1803***	0.8886***	1.071***	-0.0799***	0.2234***
	(0.0553)	(0.1521)	(0.1469)	(0.0261)	(0.0457)
Product Market HHI	0.1007***	-0.0597***	-0.0338**	-0.0135***	0.0118
	(0.0078)	(0.0163)	(0.0150)	(0.0042)	(0.0072)
Cash Competitors	0.0235	-0.2075***	-0.1674***	0.0159	-0.0867***
	(0.0147)	(0.0410)	(0.0384)	(0.0100)	(0.0179)
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes
N	43,772	43,772	43,772	43,772	43,772
Adjusted R^2	0.56518	0.88004	0.84152	0.80178	0.73362

Table 5 cont. - Regression Results Hypothesis One: Considering Loans and Non-Loans

Panel C: Dependent Variables at $t+2$

Dependent Variables:	$Market\ Share_{t+2}$ (1)	$Sales_{t+2}$ (2)	$COGS_{t+2}$ (3)	SGA_{t+2} (4)	$Op\ Inc_{t+2}$ (5)
SAC Loans	-0.0002	0.0066	0.0060	-0.0022	0.0049**
	(0.0004)	(0.0043)	(0.0043)	(0.0014)	(0.0023)
SAC Non-Loans	0.0002	-0.0130***	-0.0044	-0.0005	-0.0035*
	(0.0005)	(0.0032)	(0.0034)	(0.0013)	(0.0020)
Cash	-0.0089	-0.2181***	-0.1177***	0.0280***	-0.0799***
	(0.0058)	(0.0306)	(0.0280)	(0.0098)	(0.0162)
Size	0.0092***	-0.1788***	-0.0598***	-0.0303***	0.0552***
	(0.0015)	(0.0098)	(0.0088)	(0.0024)	(0.0037)
MTB	-0.0000	0.0187***	0.0186***	0.0062***	0.0062***
	(0.0006)	(0.0029)	(0.0030)	(0.0011)	(0.0020)
Leverage	0.0077*	-0.0578**	-0.0306	0.0379***	-0.0758***
	(0.0042)	(0.0259)	(0.0236)	(0.0081)	(0.0132)
Sales Vol Competitors	0.0727	0.9175***	0.9566***	-0.1003***	0.2439***
	(0.0568)	(0.1790)	(0.1625)	(0.0306)	(0.0468)
Product Market HHI	0.0794***	-0.0257	-0.0137	-0.0043	0.0044
	(0.0068)	(0.0164)	(0.0146)	(0.0039)	(0.0071)
Cash Competitors	0.0161	-0.1828***	-0.1464***	-0.0009	-0.0871***
	(0.0138)	(0.0470)	(0.0448)	(0.0110)	(0.0206)
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes
N	37,359	37,359	37,359	37,359	37,359
Adjusted R^2	0.55471	0.87097	0.83850	0.80267	0.72334

Notes: This table presents the results from estimating Equation (1) using the dependent variables that test our first hypothesis after splitting competitor firms' subsidy amounts (SAC) into loan and non-loan components. Dependent variables are measured in year t in Panel A, in year $t+1$ in Panel B, and in year $t+2$ in Panel C. All variables are defined in Appendix A. Standard errors clustered at the firm level are reported in parentheses below each coefficient. Stars indicate significance levels: ***, $p < 0.01$, **, $p < 0.05$, *, $p < 0.10$.

Table 6 - Regression Results Hypothesis One: Exploratory Analyses Considering Three Types of Non-Loans

Panel A: Dependent Variables at t

Dependent Variables:	$Market\ Share_t$ (1)	$Sales_t$ (2)	$COGS_t$ (3)	SGA_t (4)	$Op\ Inc_t$ (5)
SAC Loans	-0.0012***	-0.0050	-0.0075*	0.0002	0.0032
	(0.0004)	(0.0039)	(0.0043)	(0.0014)	(0.0023)
SAC Cash	0.0002	-0.0131*	0.0010	0.0109***	-0.0267***
	(0.0005)	(0.0069)	(0.0076)	(0.0035)	(0.0065)
SAC Tax	0.0001	-0.0036**	0.0037**	0.0026**	-0.0074***
	(0.0001)	(0.0015)	(0.0017)	(0.0011)	(0.0020)
SAC Other	-0.0001*	-0.0004	0.0017	0.0003	-0.0011**
	(0.0000)	(0.0007)	(0.0014)	(0.0004)	(0.0006)
Cash	-0.0212***	-0.4488***	-0.3910***	-0.0772***	-0.0390***
	(0.0045)	(0.0263)	(0.0232)	(0.0078)	(0.0135)
Size	0.0105***	-0.1602***	-0.2002***	-0.0603***	0.0340***
	(0.0011)	(0.0073)	(0.0071)	(0.0021)	(0.0036)
MTB	0.0002	-0.0077***	0.0225***	0.0016**	-0.0003
	(0.0003)	(0.0019)	(0.0019)	(0.0007)	(0.0016)
Leverage	0.0070*	0.0363	-0.0465**	0.0503***	-0.0491***
	(0.0036)	(0.0232)	(0.0226)	(0.0074)	(0.0126)
Sales Vol Competitors	0.4940***	0.7368***	0.5232***	-0.0587***	0.1532***
	(0.0590)	(0.1344)	(0.1148)	(0.0201)	(0.0430)
Product Market HHI	0.0969***	-0.0368**	-0.0139	-0.0199***	0.0127**
	(0.0058)	(0.0147)	(0.0129)	(0.0036)	(0.0064)
Cash Competitors	0.0808***	-0.2072***	-0.1547***	0.0225**	-0.0667***
	(0.0153)	(0.0363)	(0.0321)	(0.0088)	(0.0163)
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes
N	55,453	55,453	55,453	55,453	55,453
Adjusted R^2	0.5603	0.8512	0.8451	0.7989	0.7260

Table 6 cont. - Regression Results Hypothesis One: Exploratory Analyses Considering Three Types of Non-Loans

Panel B: Dependent Variables at $t+1$

Dependent Variables:	$Market\ Share_{t+1}$ (1)	$Sales_{t+1}$ (2)	$COGS_{t+1}$ (3)	SGA_{t+1} (4)	$Op\ Inc_{t+1}$ (5)
SAC Loans	-0.0006	-0.0005	-0.0098***	-0.0053***	0.0055**
	(0.0004)	(0.0042)	(0.0037)	(0.0015)	(0.0022)
SAC Cash	0.0008	-0.0102	0.0023	0.0056*	-0.0108**
	(0.0006)	(0.0070)	(0.0067)	(0.0032)	(0.0054)
SAC Tax	0.0002	-0.0031**	-0.0012	-0.0003	-0.0015
	(0.0001)	(0.0013)	(0.0015)	(0.0005)	(0.0009)
SAC Other	-0.0002**	-0.0005	0.0001	0.0004	-0.0008**
	(0.0001)	(0.0007)	(0.0006)	(0.0003)	(0.0004)
Cash	-0.0109**	-0.5588***	-0.2266***	0.0076	-0.0869***
	(0.0053)	(0.0305)	(0.0274)	(0.0088)	(0.0148)
Size	0.0112***	-0.2491***	-0.0970***	-0.0428***	0.0452***
	(0.0013)	(0.0092)	(0.0079)	(0.0022)	(0.0034)
MTB	0.0003	0.0181***	0.0258***	0.0056***	0.0134***
	(0.0004)	(0.0023)	(0.0024)	(0.0009)	(0.0019)
Leverage	0.0115***	-0.0603**	-0.0147	0.0472***	-0.0745***
	(0.0039)	(0.0263)	(0.0232)	(0.0081)	(0.0134)
Sales Vol Competitors	0.1802***	0.8940***	1.074***	-0.0814***	0.2283***
	(0.0553)	(0.1524)	(0.1471)	(0.0262)	(0.0460)
Product Market HHI	0.1008***	-0.0591***	-0.0331**	-0.0140***	0.0128*
	(0.0078)	(0.0163)	(0.0150)	(0.0042)	(0.0073)
Cash Competitors	0.0236	-0.2088***	-0.1682***	0.0160	-0.0877***
	(0.0147)	(0.0411)	(0.0384)	(0.0101)	(0.0180)
Firm Fixed-Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes
N	43,772	43,772	43,772	43,772	43,772
Adjusted R^2	0.56517	0.88002	0.84150	0.80175	0.73330

Table 6 cont. - Regression Results Hypothesis One: Exploratory Analyses Considering Three Types of Non-Loans

Panel C: Dependent Variables at $t+2$

Dependent Variables:	$Market\ Share_{t+2}$ (1)	$Sales_{t+2}$ (2)	$COGS_{t+2}$ (3)	SGA_{t+2} (4)	$Op\ Inc_{t+2}$ (5)
SAC Loans	-0.0003	0.0078*	0.0065	-0.0022	0.0049**
	(0.0004)	(0.0043)	(0.0043)	(0.0014)	(0.0023)
SAC Cash	0.0010	-0.0215***	-0.0103*	-0.0006	-0.0002
	(0.0006)	(0.0069)	(0.0058)	(0.0023)	(0.0038)
SAC Tax	0.0001	-0.0025*	0.0006	-0.0003	-0.0006
	(0.0001)	(0.0014)	(0.0013)	(0.0003)	(0.0010)
SAC Other	-0.0001*	-0.0007	-0.0009	0.0002	-0.0007
	(0.0000)	(0.0006)	(0.0005)	(0.0002)	(0.0004)
Cash	-0.0089	-0.2182***	-0.1174***	0.0280***	-0.0796***
	(0.0058)	(0.0306)	(0.0280)	(0.0098)	(0.0162)
Size	0.0093***	-0.1776***	-0.0592***	-0.0303***	0.0558***
	(0.0015)	(0.0098)	(0.0088)	(0.0024)	(0.0037)
MTB	-0.0000	0.0185***	0.0185***	0.0062***	0.0062***
	(0.0006)	(0.0029)	(0.0030)	(0.0011)	(0.0020)
Leverage	0.0077*	-0.0577**	-0.0305	0.0379***	-0.0759***
	(0.0042)	(0.0259)	(0.0236)	(0.0081)	(0.0132)
Sales Vol Competitors	0.0724	0.9249***	0.9588***	-0.0998***	0.2451***
	(0.0568)	(0.1794)	(0.1626)	(0.0306)	(0.0469)
Product Market HHI	0.0795***	-0.0247	-0.0130	-0.0043	0.0050
	(0.0068)	(0.0165)	(0.0146)	(0.0039)	(0.0071)
Cash Competitors	0.0161	-0.1844***	-0.1465***	-0.0011	-0.0875***
	(0.0138)	(0.0472)	(0.0449)	(0.0110)	(0.0207)
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes
N	37,359	37,359	37,359	37,359	37,359
Adjusted R^2	0.55468	0.87092	0.83849	0.80267	0.72329

Notes: This table presents the results from estimating Equation (1) using the dependent variables that test our first hypothesis after splitting competitor firms' subsidy amounts (*SAC*) into a loan component and three types of non-loan components (cash grants, tax abatements/credits, and other). Dependent variables are measured in year t in Panel A, in year $t+1$ in Panel B, and in year $t+2$ in Panel C. All variables are defined in Appendix A. Standard errors clustered at the firm level are reported in parentheses below each coefficient. Stars indicate significance levels: ***, $p < 0.01$, **, $p < 0.05$, *, $p < 0.10$.

Table 7 - Regression Results Hypothesis Two

Panel A: Baseline results

Dependent Variables:	$Entry_t$ (1)	$Entry_{t+1}$ (2)	$Entry_{t+2}$ (3)	$Exit_t$ (4)	$Exit_{t+1}$ (5)	$Exit_{t+2}$ (6)
SAC	0.0096***	0.0031	-0.0004	-0.0076***	-0.0037***	-0.0017**
	(0.0020)	(0.0024)	(0.0022)	(0.0007)	(0.0007)	(0.0007)
Cash	0.0155	-0.0264	0.0025	-0.0031	0.0136	0.0078
	(0.0218)	(0.0261)	(0.0261)	(0.0082)	(0.0088)	(0.0097)
Size	0.0093**	0.0086	0.0193***	-0.0073***	-0.0011	0.0007
	(0.0047)	(0.0055)	(0.0059)	(0.0019)	(0.0021)	(0.0022)
MTB	0.0097***	0.0168***	0.0062***	-0.0022***	-0.0017**	-0.0006
	(0.0018)	(0.0022)	(0.0024)	(0.0006)	(0.0007)	(0.0008)
Leverage	0.0272	0.0452**	0.0266	0.0060	0.0076	0.0032
	(0.0177)	(0.0194)	(0.0220)	(0.0065)	(0.0072)	(0.0076)
Sales Vol Competitors	-1.620***	-0.0529	-0.2953*	0.2354***	0.0788	0.1267*
	(0.1657)	(0.1574)	(0.1747)	(0.0639)	(0.0652)	(0.0651)
Product Market HHI	1.159***	-0.6458***	-0.2915***	-0.2728***	0.1822***	0.0764***
	(0.0301)	(0.0255)	(0.0247)	(0.0085)	(0.0091)	(0.0088)
Cash Competitors	0.3743***	0.3330***	0.1481***	-0.0363**	0.0045	0.0384**
	(0.0516)	(0.0468)	(0.0497)	(0.0174)	(0.0171)	(0.0182)
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes	Yes
N	55,453	52,457	45,702	55,453	52,457	45,702
Adjusted R^2	0.1893	0.1191	0.0791	0.3425	0.3040	0.2874

Table 7 cont. - Regression Results Hypothesis Two

Panel B: Considering loans and non-loans

Dependent Variables:	$Entry_t$ (1)	$Entry_{t+1}$ (2)	$Entry_{t+2}$ (3)	$Exit_t$ (4)	$Exit_{t+1}$ (5)	$Exit_{t+2}$ (6)
SAC Loans	0.0076	0.0156**	0.0021	-0.0097***	-0.0061***	-0.0023
	(0.0052)	(0.0064)	(0.0062)	(0.0016)	(0.0017)	(0.0020)
SAC Non-Loans	0.0193***	0.0008	-0.0019	-0.0131***	-0.0058***	-0.0037***
	(0.0034)	(0.0040)	(0.0038)	(0.0011)	(0.0011)	(0.0012)
Cash	0.0151	-0.0265	0.0025	-0.0029	0.0137	0.0078
	(0.0217)	(0.0261)	(0.0261)	(0.0082)	(0.0088)	(0.0097)
Size	0.0105**	0.0084	0.0191***	-0.0080***	-0.0014	0.0004
	(0.0047)	(0.0055)	(0.0059)	(0.0019)	(0.0022)	(0.0022)
MTB	0.0096***	0.0169***	0.0063***	-0.0022***	-0.0017**	-0.0006
	(0.0018)	(0.0022)	(0.0024)	(0.0006)	(0.0007)	(0.0008)
Leverage	0.0262	0.0451**	0.0267	0.0067	0.0079	0.0034
	(0.0177)	(0.0194)	(0.0220)	(0.0065)	(0.0072)	(0.0076)
Sales Vol Competitors	-1.617***	-0.0524	-0.2955*	0.2337***	0.0779	0.1260*
	(0.1656)	(0.1574)	(0.1747)	(0.0638)	(0.0652)	(0.0651)
Product Market HHI	1.160***	-0.6457***	-0.2916***	-0.2737***	0.1818***	0.0761***
	(0.0301)	(0.0255)	(0.0247)	(0.0084)	(0.0091)	(0.0088)
Cash Competitors	0.3730***	0.3338***	0.1484***	-0.0357**	0.0047	0.0386**
	(0.0515)	(0.0468)	(0.0497)	(0.0174)	(0.0171)	(0.0182)
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes	Yes
N	55,453	52,457	45,702	55,453	52,457	45,702
Adjusted R^2	0.1895	0.1192	0.0791	0.3431	0.3041	0.2874

Table 7 cont. - Regression Results Hypothesis Two

Panel C: Exploratory Analyses Considering Three Types of Non-Loans

Dependent Variables:	$Entry_t$ (1)	$Entry_{t+1}$ (2)	$Entry_{t+2}$ (3)	$Exit_t$ (4)	$Exit_{t+1}$ (5)	$Exit_{t+2}$ (6)
SAC Loans	0.0057	0.0163**	0.0018	-0.0094***	-0.0058***	-0.0020
	(0.0052)	(0.0065)	(0.0063)	(0.0016)	(0.0017)	(0.0020)
SAC Cash	0.0406***	-0.0082	0.0099	-0.0098***	-0.0037	-0.0023
	(0.0119)	(0.0106)	(0.0098)	(0.0027)	(0.0026)	(0.0031)
SAC Tax	0.0004	0.0005	-0.0036**	-0.0031***	-0.0017**	-0.0015***
	(0.0018)	(0.0027)	(0.0017)	(0.0009)	(0.0007)	(0.0006)
SAC Other	0.0019*	-0.0003	0.0005	-0.0008***	-0.0005**	-0.0008**
	(0.0011)	(0.0009)	(0.0011)	(0.0003)	(0.0002)	(0.0003)
Cash	0.0151	-0.0265	0.0025	-0.0029	0.0138	0.0078
	(0.0218)	(0.0261)	(0.0260)	(0.0082)	(0.0088)	(0.0097)
Size	0.0085*	0.0080	0.0192***	-0.0065***	-0.0007	0.0006
	(0.0047)	(0.0055)	(0.0058)	(0.0019)	(0.0021)	(0.0022)
MTB	0.0096***	0.0169***	0.0062***	-0.0022***	-0.0017**	-0.0006
	(0.0018)	(0.0022)	(0.0024)	(0.0006)	(0.0007)	(0.0008)
Leverage	0.0254	0.0457**	0.0264	0.0066	0.0079	0.0036
	(0.0176)	(0.0194)	(0.0220)	(0.0065)	(0.0072)	(0.0076)
Sales Vol Competitors	-1.627***	-0.0529	-0.2945*	0.2406***	0.0808	0.1273*
	(0.1658)	(0.1574)	(0.1747)	(0.0639)	(0.0652)	(0.0651)
Product Market HHI	1.158***	-0.6461***	-0.2916***	-0.2721***	0.1825***	0.0764***
	(0.0301)	(0.0255)	(0.0248)	(0.0085)	(0.0091)	(0.0088)
Cash Competitors	0.3753***	0.3341***	0.1474***	-0.0376**	0.0039	0.0381**
	(0.0517)	(0.0468)	(0.0497)	(0.0175)	(0.0171)	(0.0182)
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes	Yes
N	55,453	52,457	45,702	55,453	52,457	45,702
Adjusted R^2	0.1894	0.1192	0.0791	0.3418	0.3039	0.2875

Notes: This table presents the results from estimating Equation (1) using the dependent variables that test our second hypothesis. Regression results using competitor firms' subsidy amounts (SAC) are displayed in Panel A, competitor firms' subsidy amounts split into loan and non-loan components are displayed in Panel B, and competitor firms' subsidy amounts split into a loan component and three types of non-loan components (cash grants, tax abatements/credits, and other) are displayed in Panel C. All variables are defined in Appendix A. Standard errors clustered at the firm level are reported in parentheses below each coefficient. Stars indicate significance levels: ***, $p < 0.01$, **, $p < 0.05$, *, $p < 0.10$.

Appendix A - Variable Definitions

Notes: This appendix presents variables (in alphabetical order) and their definitions. Data source information: "HP (2016) TNIC" references the Hoberg and Phillips (2016) Text-based Network Industry Classification and "GJF Subsidy Tracker" references the Good Jobs First Subsidy Tracker.

Cash	Cash and short-term investments (CHE_{t-1}) divided by total assets (AT_{t-1}). Source: Compustat.
Cash Competitors	Weighted average of cash held by product market competitors weighted by product similarity score as in Donohoe et al. (2022) as of the end of year $t-1$. Source: Compustat.
COGS	Cost of goods sold (COGS_t) divided by total assets (AT_{t-1}). Source: Compustat.
Entry	The ratio of firms that enter in t over total number of firms that existed in *t-1*. We capture firms entering the market by considering those firms that were not in the product market space in *t-1*. Source: HP (2016) TNIC.
Exit	The ratio of firms that exit in t over total number of firms that existed in t. We capture firms exiting the market by considering those firms that are no longer in the product market space in *t+1*. Source: HP (2016) TNIC.
Leverage	The ratio of current liabilities (DLC_{t-1}) plus long-term debt (DLTT_{t-1}) divided by total assets (AT_{t-1}). Source: Compustat.
Market Share	Sales (SALE_t) divided by the sum of all competitors' sales in non-subsidized firm i's product market space in year t. Source: Compustat.
MTB	Total assets (AT_{t-1}) minus total liabilities (LT_{t-1}) plus deferred taxes and investment tax credit (TXDITC_{t-1}), plus market value of equity (closing price (PRCC_F_{t-1}) multiplied by common shares outstanding (CSHO_{t-1}), divided by total assets (AT_{t-1}). Source: Compustat.
Op Inc	Operating income (OIBDP_t) divided by total assets (AT_{t-1}). Source: Compustat.

Product Market HHI	The Herfindahl-Hirschman Index (measured as the sum of the squared percentage of sales by each firm in a given product market space) at the end of year $t-1$. Source: HP (2016) TNIC.
Sales	Sales (SALE_t) divided by total assets (AT_{t-1}). Source: Compustat.
Sales Vol Competitors	Standard deviation of product market competitors' quarterly change in sales (SALE_{qt} less SALE_{qt-1}), scaled by average annual total assets (the average of AT_t and AT_{t-1}). We use the median value in year $t-1$ as in Donohoe et al. (2022). Source: Compustat Quarterly.
Size	The natural logarithm of total assets (AT_{t-1}). Source: Compustat.
SAC	SAC is an abbreviation for the term Subsidy Amount Competitors and is measured as the sum of subsidy amounts ($M) awarded to all subsidized competitors in non-subsidized firm i's product market space in year t divided by non-subsidized firm i's total assets (AT_{t-1}). Source: GJF Subsidy Tracker and HP (2016) TNIC.
SAC Cash	Constructed analogous to *SAC* but with only subsidies related to cash grants in the numerator. Source: GJF Subsidy Tracker and HP (2016) TNIC.
SAC Loans	Constructed analogous to *SAC* but with only subsidies related to loans in the numerator. Source: GJF Subsidy Tracker and HP (2016) TNIC.
SAC Non-Loans	Constructed analogous to *SAC* but with only subsidies related to non-loans (cash grants, tax abatements/credits, and a residual "other" category) in the numerator. Source: GJF Subsidy Tracker and HP (2016) TNIC.
SAC Other	Constructed analogous to *SAC* but with only subsidies related to a residual category of non-loans unrelated to cash grants or tax abatements/credits in the numerator. Source: GJF Subsidy Tracker and HP (2016) TNIC.
SAC Tax	Constructed analogous to *SAC* but with only subsidies related to tax abatements/credits in the numerator. Source: GJF Subsidy Tracker and HP (2016) TNIC.
SGA	Selling, general, and administrative expense (XSGA_t) divided by total assets (AT_{t-1}). Source: Compustat.

Appendix B - Subsidized Firm Analyses

Notes: This appendix presents the variable definitions and regression results from estimating Equation (1) using only *subsidized* firm-years. Data source information: "HP (2016) TNIC" references the Hoberg and Phillips (2016) Text-based Network Industry Classification and "GJF Subsidy Tracker" references the Good Jobs First Subsidy Tracker.

Sub Firm Subsidy	Sum of subsidy amounts ($M) awarded to firm i in year t divided by firm i's total assets (AT_{t-1}). Source: GJF Subsidy Tracker and HP (2016) TNIC.
SAC	SAC is an abbreviation for the term Subsidy Amount Competitors and is measured as the sum of subsidy amounts ($M) awarded to all subsidized competitors in firm i's product market space in year t divided by firm i's total assets (AT_{t-1}). Source: GJF Subsidy Tracker and HP (2016) TNIC.
Sub Firm Subsidy Loans	Constructed analogous to *Sub Firm Subsidy* but with only subsidies related to loans in the numerator. Source: GJF Subsidy Tracker and HP (2016) TNIC.
Sub Firm Subsidy Non-Loans	Constructed analogous to *Sub Firm Subsidy* but with only subsidies related to non-loans (cash grants, tax abatements/credits, and a residual "other" category) in the numerator. Source:GJF Subsidy Tracker and HP (2016) TNIC.
Sub Firm Subsidy Cash	Constructed analogous to *Sub Firm Subsidy* but with only subsidies related to cash grants in the numerator. Source: GJF Subsidy Tracker and HP (2016) TNIC.
Sub Firm Subsidy Tax	Constructed analogous to *Sub Firm Subsidy* but with only subsidies related to tax abatements/credits in the numerator. Source: GJF Subsidy Tracker and HP (2016) TNIC.
Sub Firm Subsidy Other	Constructed analogous to *Sub Firm Subsidy* but with only subsidies related to a residual category (i.e., non-loans unrelated to cash grants or tax abatements/credits) in the numerator. Source: GJF Subsidy Tracker and HP (2016) TNIC.

Table B1 - Regression Results Hypothesis One: Considering Subsidized Firms

Dependent Variables:	*Market Share*	*Sales*	*COGS*	*SGA*	*Op Inc*
	(1)	(2)	(3)	(4)	(5)
Panel A - Primary Analyses					
Sub Firm Subsidy	-0.0093	-0.0983***	-0.1068**	0.0032	-0.0338
	(0.0220)	(0.0352)	(0.0449)	(0.0056)	(0.0321)
SAC	-0.0016*	0.0037	0.0084*	-0.0003	-0.0019
	(0.0009)	(0.0035)	(0.0045)	(0.0005)	(0.0017)
Controls	Yes	Yes	Yes	Yes	Yes
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes
N	9,622	9,622	9,622	9,622	9,622
Adjusted R^2	0.76575	0.90693	0.85990	0.90072	0.69462
Panel B - Loans and Non-Loans					
Sub Firm Subsidy Loans	-0.0158	-0.0841**	-0.1197***	0.0018	-0.0093
	(0.0241)	(0.0358)	(0.0360)	(0.0044)	(0.0058)
Sub Firm Subsidy Non-Loans	0.0977*	-0.3342	0.1081	0.0251	-0.4426
	(0.0531)	(0.2621)	(0.3789)	(0.0661)	(0.4569)
SAC	-0.0016*	0.0037	0.0084*	-0.0003	-0.0018
	(0.0009)	(0.0034)	(0.0045)	(0.0005)	(0.0016)
Controls	Yes	Yes	Yes	Yes	Yes
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes
N	9,622	9,622	9,622	9,622	9,622
Adjusted R^2	0.76577	0.90692	0.85989	0.90071	0.69553
Panel C - All Types					
Sub Firm Subsidy Loans	-0.0158	-0.0840**	-0.1191***	0.0019	-0.0099
	(0.0242)	(0.0358)	(0.0362)	(0.0044)	(0.0061)
Sub Firm Subsidy Cash	0.1569	-0.5129	-0.5163	0.0103	-0.3393*
	(0.1995)	(0.3540)	(0.3661)	(0.1544)	(0.1801)
Sub Firm Subsidy Tax	0.1339	-0.5172	0.4375	0.1799	-1.709
	(0.0929)	(0.7992)	(1.209)	(0.1345)	(1.496)
Sub Firm Subsidy Other	0.0577	-0.1801	0.2097	-0.0388	0.0878
	(0.0546)	(0.2345)	(0.2841)	(0.0635)	(0.1135)
SAC	-0.0016*	0.0037	0.0083*	-0.0003	-0.0016
	(0.0009)	(0.0034)	(0.0045)	(0.0005)	(0.0013)
Controls	Yes	Yes	Yes	Yes	Yes
Firm Fixed-effect	Yes	Yes	Yes	Yes	Yes
Year Fixed-effect	Yes	Yes	Yes	Yes	Yes
N	9,622	9,622	9,622	9,622	9,622
Adjusted R^2	0.76572	0.90690	0.85987	0.90071	0.69847

Notes: This table presents the results from estimating Equation (1) using the dependent variables that test our first hypothesis. The sample is restricted to only subsidized firm-years. Variables specific to subsidized firms are defined in Appendix B and all other variables are defined in Appendix A. Standard errors clustered at the firm level are reported in parentheses below each coefficient. Stars indicate significance levels: ***, $p < 0.01$, **, $p < 0.05$, *, $p < 0.10$.

Table B2 - Regression Results Hypothesis Two: Considering Subsidized Firms

Dependent Variables:	$Entry_t$ (1)	$Exit_t$ (2)
Panel A - Primary Analyses		
Sub Firm Subsidy	-0.0534	-0.0377
	(0.1764)	(0.0497)
SAC	0.2386	-0.0035
	(0.2242)	(0.0022)
Controls	Yes	Yes
Firm Fixed-effect	Yes	Yes
Year Fixed-effect	Yes	Yes
N	9,622	9,476
Adjusted R^2	0.01482	0.24016
Panel B - Loans and Non-Loans		
Sub Firm Subsidy Loans	-0.0294	-0.0461
	(0.1853)	(0.0528)
Sub Firm Subsidy Non-Loans	-0.4553	0.1031
	(0.6412)	(0.2093)
SAC	0.2387	-0.0035
	(0.2242)	(0.0022)
Controls	Yes	Yes
Firm Fixed-effect	Yes	Yes
Year Fixed-effect	Yes	Yes
N	9,622	9,622
Adjusted R^2	0.01470	0.24010
Panel C - All Types		
Sub Firm Subsidy Loans	-0.0290	-0.0456
	(0.1859)	(0.0528)
Sub Firm Subsidy Cash	-0.7651	-0.2386
	(1.707)	(0.2565)
Sub Firm Subsidy Tax	-0.1494	0.6825
	(2.219)	(0.6552)
Sub Firm Subsidy Other	-0.4693	-0.0215
	(0.6652)	(0.1876)
SAC	0.2386	-0.0036*
	(0.2245)	(0.0022)
Controls	Yes	Yes
Firm Fixed-effect	Yes	Yes
Year Fixed-effect	Yes	Yes
N	9,622	9,622
Adjusted R^2	0.01445	0.24011

Notes: This table presents the results from estimating Equation (1) using the dependent variables that test our second hypothesis. The sample is restricted to only subsidized firm-years. Variables specific to subsidized firms are defined in Appendix B and all other variables are defined in Appendix A. Standard errors clustered at the firm level are reported in parentheses below each coefficient. Stars indicate significance levels: ***, $p < 0.01$, **, $p < 0.05$, *, $p < 0.10$.