Capital Structure and Adaptation to Shocks: Danish Firms During the Cartoon Crisis*

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Abstract

In this paper, we analyze how capital structure affects firms' response to an unexpected demand shock. We study the boycott of Danish products in Muslim countries in response to a Danish newspaper publishing caricatures of prophet Muhammad. We exploit variation in exposure to the boycott among Danish exporters and variation in their capital structure before the boycott to separate the role of economic and financial distress. Using detailed data on financial statements, workforce structure and outsourcing activities, we find that firms with high leverage reduce sales, employment and asset holdings and exhibit flight to flexibility: they substitute employees with outsourcing and owning assets with leasing. Low leverage firms are able to withstand the shock without reducing employment and investment because they compensate for lost demand by introducing new products and redirecting their sales elsewhere. JEL Codes: D22, F14, G32, J21, L23, L25

1 Introduction

The ability to adapt and thrive in a changing environment is a key characteristic of successful firms. Change, especially when it is sudden and unexpected, requires making quick and inherently risky decisions. A firm hit by an unexpected demand shock faces a trade-off whether to downsize and fire some workers, or try to maintain the employment and find new ways of selling its products, potentially requiring additional investment and innovative effort. Uncertainty about the persistence of the shock further adds to the challenges in this situation. In general, firms will choose the profit maximizing alternative among potential strategies conditional on any constraints that they may face. In particular, financial obligations may pose a crucial constraint in considering these alternatives. If the firm has large upcoming debt payments, it may have no resources to retain excess workers and to make costly investment, or may consider the risk of investment too high given the negative consequences of missing debt payments. On the other hand, limited liability can make the firm more willing to take additional risks. Studying the link between the capital structure of the firm and their ability to respond to shocks is therefore crucial to assess potential costs of high financial leverage and to understand determinants of firms' success in the face of a changing economic environment.

In this paper we analyze how financial leverage influences the way in which firms adapt to economic shocks. We take advantage of a natural experiment in Denmark, which led to a sudden and unexpected reduction of foreign demand for a small set of firms in an otherwise growing economy. In September 2005, a Danish newspaper published caricatures of the prophet Muhammad, which subsequently led to widespread boycott of Danish products in Muslim countries. We show that the capital structure of firms exposed to the boycott has a significant impact on their ability to adapt to the shock and on the choice of mechanisms for the adaptation. While firms with low and high leverage have similar exposure to the boycott, only the former are able to withstand the shock without reducing employment or investment and to redirect their sales elsewhere. High leverage firms, on the other hand, reduce their sales, employment, and investment, and exhibit flight to flexibility: they partially substitute employment with outsourcing and owning assets with leasing. When the boycott hits, firms do not know how long it will last and, since they need to continue making debt payments, they want to reduce other financial obligations and continue operating with more flexible inputs. At the same time, while they would certainly like to increase their sales elsewhere, their financial constraints do not allow them to make costly investments in developing new markets and attracting new clients.

A key advantage of our setting is that we can combine detailed data about firms' financial statements with administrative data on export flows at the product-destination level for each firm. This allows us to construct a precise measure of exposure to Muslim countries before the boycott, while also carefully distinguishing capital structure across firms at the time of the shock. As a result, we can use a triple-difference design to analyze the differential effects of the boycott for low- and high leverage firms, partialling out the time-varying effect of high leverage alone and the effect of exposure to Muslim countries alone. The financial statements and export data provide detailed

information about adjustments in sales, exports, export products, short- and long-term liabilities, investment, leasing, inventory, as well as internal and external labor inputs. Crucially, we can further merge financial statements of firms with worker-level data to measure changes in workforce composition, and for a subset of firms, we can add new data about outsourcing activities, which allow us to study firms' outsourcing decisions using a detailed task classification. As a result, we provide a comprehensive analysis of margins of adjustment to this negative demand shock, ranging from employment and investment responses to adjustments in the product market and relationships with suppliers and customers.

Our analysis has several parts. We start by establishing basic facts about the response to the crisis. Both low- and high leverage firms exposed to the boycott significantly reduce their exports. But despite similar initial exposure, the reduction for high leverage firm is higher. The difference is driven by non-Muslim destinations and hence is related to their ability to redirect exports elsewhere. Consistent with the difference in export response, high leverage firms experience a significantly larger decrease in total sales. In fact, firms with low leverage do not significantly reduce sales, which suggests that domestic sales increased enough to cover their losses caused by the boycott. Financial constraints seem to play a role for these effects: while low leverage firms weakly increase their debt holdings, high leverage firms do not and even slightly reduce it. For both low- and high leverage firms the shock is too small to drive firms out of business and as a result we do not observe any significant bankruptcy response.

We then proceed to analyze the employment response. High leverage firms exposed to the boycott significantly reduce employment while low leverage firms actually slightly increase it. We analyze the skill composition of the workforce and find that the share of college-educated workers decreases for high leverage firms. Interestingly, the reduction in employment is accompanied by an increased probability of outsourcing – we observe that high leverage firms are significantly more likely to use outsourcing after the boycott. Using a subsample of firms for which we have more detailed data, we present evidence that firms start outsourcing high-skill tasks unrelated to their core activity, e.g. IT or marketing. Combined with the decreasing share of skilled workers, this suggests that firms substitute employment of expensive workers performing tasks unrelated to the core activities with more flexible outsourcing arrangements.

The analysis of adjustments in investment and leasing shows similar patterns of moving towards more flexible arrangements. We document that while low leverage firms increase investment in response to the crisis (presumably to be able to accommodate new products or markets), high leverage firms do not – in fact they even seem to sell more assets. High leverage firms are however more likely to engage in new leasing contracts, using both financial and operating leasing. They therefore seem to substitute owning assets with leasing them, which confirms the flight to flexibility observed for employment and outsourcing.

We also analyze changes in firms' supply chain. In particular, we document interesting patterns in accounts payable: while we observe an increase for low leverage firms, the same is not true for high leverage firms. This finding suggests that after an exogenous demand shock suppliers are

willing to provide additional liquidity to firms which are less indebted, but are not willing to do the same for high leverage firms. Instead, to increase their liquidity, high leverage firms significantly reduce holdings of inventory, presumably trading off lower costs against the ability to account for upstream or downstream variability.

On the other side of the supply chain, accounts receivable increase for low leverage firms but not for high leverage firms. While this is partially explained by differential changes in sales, the magnitude of coefficients suggests that it may also reflect better financing conditions which low leverege firms give to their customers to increase demand and boost sales. While we only see aggregate sales and cannot directly observe the sales expansion by products, we can analyze exports more thoroughly. Doing so reveals that low- and high leverage firms stop exporting to roughly the same number of countries (as they are boycotted by the same set of Muslim countries) but low leverage firms are able to partially compensate for these losses by introducing new products into non-Muslim destination markets. Moreover, these products are not only slight modification of the existing product portfolio: we analyze the response using detailed product-destination data on export flows and show that low leverage firms increase the number of 6-, 4- and even 2-digit product categories in their exports.

In order to shed more light on the underlying mechanism of liquidity constraints due to higher ex ante leverage, we carefully discuss alternative explanations for the results. We first show that leverage is not simply a proxy for firm size, product variety, or differences across industries. Explicitly controlling for these differences across firms interacted with year dummies to allow for flexible time trends yields quantitatively very similar results across high and low leverage firms. We also analyze the role of an alternative channel related to liquidity - cash holdings - and show that while it does play some role, leverage seems to be the main driver of the results. Moreover, we analyze the effects of having a large stock of long-term debt acquired more than 1 year ago, indicating more debt maturing soon after the boycott starts, and show that it supports our main conclusion. We also present a series of robustness checks using different assumptions and definitions of our key variables.

Our results provide new evidence on the ways in which capital structure influences firms' operations. We show that financial leverage influences trade-offs between employment and outsourcing and between owning assets and leasing them. While some recent papers have documented that flexibility of employment affects the capital structure (Kuzmina 2013; Simintzi, Vig, and Volpin 2014; Baghai et al. 2016; Serfling 2016 and a review article by Matsa, 2017), we show that this relationship also works in the other direction: capital structure affects labor flexibility. Our further contribution is demonstrating that the flexibility trade-off also applies to physical capital: leverage affects the propensity to use leasing instead of investment. In addition, the richness of our data allows us to provide evidence on the relationship between leverage and other dimensions of firm's operations which were rarely analyzed before: inventory holdings, accounts payable and receivable, skill composition of the workforce, and type of tasks which are outsourced. This comprehensive analysis illustrates the link between capital structure and firms' operations ranging from internal

restructuring and investment decisions to product market consequences.

We also contribute to the literature about the consequences of financial distress. Our shock is not large enough to drive firms into bankruptcy but we still observe that high financial leverage impedes an efficient response to the crisis. Because bankruptcy is rare, analyzing the adverse effect of debt even if a firm is far from bankruptcy is important for understanding the determinants of corporate leverage choices. While leverage is known to affect many aspects of the firm, including wages (Graham et al., 2016), pool of available employees (Brown and Matsa, 2016), firing decisions (Caggese, Cuñat, Metzger, et al., 2016), capital vintage (Eisfeldt and Rampini, 2007), pricing (Busse, 2002), markups (Chevalier, 1995), or investment (Almeida et al., 2011), we show that it also directly affects the end goal of all these intermediate factors - firm's ability to generate business. More leveraged firms in our analysis see higher reduction of sales because they are unable to boost domestic sales, export new products and enter new markets. While Hortaçsu et al. (2013) show customer-driven adverse effects of leverage on sales, our results highlight that sales can suffer because of the effect of leverage on the firm itself.

Distinguishing between consequences of financial and economic distress is a common challenge in the literature studying the costs of high indebtedness (Asquith, Gertner, and Scharfstein, 1994; Opler and Titman, 1994; Andrade and Kaplan, 1998; Zingales, 1998). Because most of the time financial distress is started or accompanied by economic distress, it is hard to disentangle whether observed effects can be attributed to the financial side. We address this challenge by precisely measuring the size of economic distress and controlling for the response of firms who face the same economic distress but not financial distress. We compare Danish exporters with low and high leverage within the group of firms affected by the boycott and control for outcomes of low and high leverage firms not exposed to the boycott.

A unique feature of our setting is an unexpected demand shock which affects firms in a heterogeneous way and is unrelated to local economic conditions.[1] The unexpected character of the shock alleviates concern about endogenous choice of leverage in anticipation of future developments. Indeed, we demonstrate that the leverage choices of firms exposed to the boycott do not differ from those who are not exposed. The fact that the shock is highly targeted allows for meaningful partial equilibrium analysis. The aggregate size of the shock for the Danish economy is small and hence the impact on local demand or wages and other general equilibrium effects are not confounding our analysis. At the same time, some firms are highly exposed to Muslim countries and for them the shock does have a large economic impact.

On a broader level, our paper also relates to the new and growing literature on the relationship between international trade and corporate finance, see Foley and Manova (2015) for a review. Manova (2013) and Chaney (2016) provide models of heterogeneous firms where financial constraints affect the extensive and intensive margin of firm-level exports. Amiti and Weinstein (2011) estimate an important role of the health of financial institutions for firm-level exports during crises,

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[1]This is in contrast to a related paper by Giroud and Mueller (2016) who analyze the effect of leverage on employment losses following local demand shocks in the aftermath of financial crisis to quantify the role of leverage for overall employment losses.

and Paravisini et al. (2015) find that credit shocks during the financial crisis 2008 mainly affect the intensive margin of exports. In addition, Desai, Foley, and Forbes (2008) show that internal capital markets shield multinational affiliates from the negative liquidity shock of a currency depreciation and help them grow differentially during a currency crisis.

Another strand of the trade literature has recently explored the link between trade and firm dynamics, in particular focusing on the effect of competition and trade shocks on product mix (Mayer, Melitz, and Ottaviano 2014, 2016) and innovation (Bloom, Draca, and Van Reenen 2016, Autor et al. 2016, Aghion et al. 2017). We add to this literature by emphasizing the importance of financial constraints in the determination of firms' innovative behavior and product mix. Moreover, our findings on the flight to flexibility of high leverage firms relate to the literature on trade and organizations (Antràs and Rossi-Hansberg 2009). In a related paper, Friedrich (2016) uses the Cartoon Crisis to show that exposed firms are more likely to change their hierarchical structure, leading to wage compression across the workforce. In the present paper we focus on the link between capital structure and organizational structure, and show that negative demand shocks combined with financial constraints drive decisions related to outsourcing (Grossman and Helpman 2002) and leasing (Eisfeldt and Rampini 2009).

The remainder of this paper is organized as follows. Section 2 provides details about the Cartoon Crisis and exposed firms. In Section 3 we describe our econometric approach and describe the data. We present our empirical findings in Section 4. Section 5 provides robustness analysis and Section 6 discusses alternative mechanisms underlying the main results. We conclude in Section 7.

2   The Cartoon Crisis

This section first describes the timeline of events that led to the Cartoon Crisis and then discusses the consequences for Danish exporters across different industries. In particular, we analyze the duration of the boycott, extent of export reduction, and persistence of adverse effects after the end of the official boycott.

2.1   Timeline of Events

Denmark's largest newspaper, *Jyllands-Posten,* published 12 cartoons of the Prophet Muhammad on September 30, 2005. According to this article, the cartoons were a statement in favor of freedom of expression, in response to the self-censorship of Danish artists regarding illustrations in a recently published book about the life of Muhammad.

The cartoons first led to public protests among Danish Muslims that received no formal response from *Jyllands-Posten* or the Danish government. As a consequence, the group of Danish Muslims contacted ambassadors of several Muslim countries to Denmark to get help in disseminating information about the cartoons in the Muslim world. The group was successful in placing the cartoons on the agenda of the conference of the Organization of Islamic Countries (OIC) in Mecca in December 2005. This event set in motion widespread media coverage and political debate in

Export to Muslim Countries
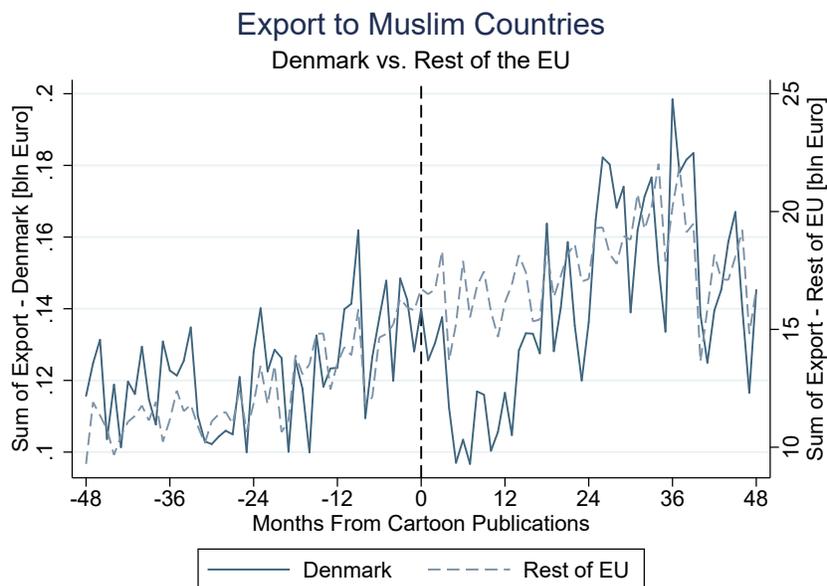### Denmark vs. Rest of the EU

Figure 1: Exports to Muslim Countries for Denmark vs the Rest of the EU

Muslim countries. By the end of January 2006, Saudi Arabia and Kuwait were the first countries to declare an official boycott of Danish products. These announcements were followed by more violent protests at Danish embassies in Syria, Iran, Pakistan, and other countries. At the same time, the boycott quickly spread to many other Muslim countries around the world.[2]

2.2 Danish Exporters

2.2.1 Duration of the Boycott and Persistence of the Shock

Ex ante, firms had to build expectations about the duration of the shock to make the necessary adjustments. To illustrate the actual timing and duration of the boycott, Figure 1 compares total monthly exports from Denmark and from the rest of the EU to countries with at least 50% Muslim population.[3] The horizontal axis defines time (in months) relative to September 2005 when the cartoons were first published. As the time line illustrates, the boycott started with a delay of several months because the dissemination in the Muslim world took a considerable amount of time. The figure shows that while exports from other European countries continued to grow over this

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[2]For a detailed time line of events, see for example Jensen (2008).

[3]Consistent with the findings by Michaels and Zhi (2010), a deterioration in attitudes towards Danish products led to a substantial reduction in Danish exports even to Muslim countries that did not declare an official boycott. Muslim population shares follow a report by the Pew Research Center (2009) based on national Census data from the years 2000-2006 and the World Religion Database using Muslim population estimates for the year 2005. The countries are United Arab Emirates, Afghanistan, Albania, Algeria, Azerbaijan, Bangladesh, Burkina Faso, Bahrain, Brunei, Djibouti, Egypt, Western Sahara, Gambia, Guinea, Indonesia, Iraq, Iran, Jordan, Kyrgyzstan, Comoros, Kuwait, Kazakhstan, Lebanon, Libya, Morocco, Mali, Mauritania, Maldives, Malaysia, Niger, Nigeria, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Sudan, Sierra Leone, Senegal, Somalia, Syria, Chad, Tajikistan, Tunisia, Turkey, Uzbekistan, Yemen, and Mayotte.
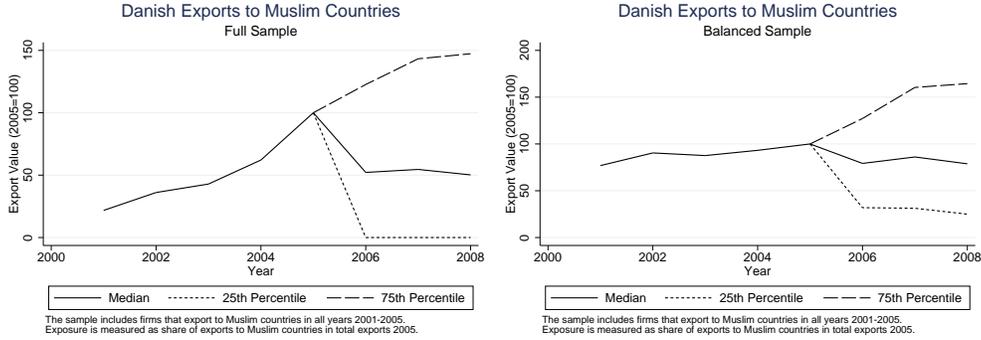
Figure 2: Exports to Muslim Countries for Danish Firms

period, Danish exports experienced a sudden drop and remained at 25% below their previous level for more than one year. Danish exports largely recovered over 2007 at the aggregate level.

The aggregate time series suggests a temporary shock with a full recovery by mid-2007 compared to the export volume from other EU countries. But this aggregate time series hides important heterogeneity in the persistence of the shock across Danish exporters. Figure 2 ilustrates the time series of export volume to Muslim destinations among firms that exported to these markets in 2005 before the boycott. We normalize their export value to Muslim countries in 2005 to 100 to illustrate the average drop in 2006 and the dispersion in outcomes over the post-boycott period. Specifically, the Figure shows the interquartile range of export values across exposed firms after 2005. The left panel includes all firms exporting in 2005, while the right one includes all firms exportingthroughout the period 2001-2005. The median firm was unable to reach their 2005 export volume to Muslim countries again in 2007 and the bottom quartile of exposed firms remained at less than 50% of their pre-boycott export volume to Muslim countries in 2007. This is true even if we restrict attention to firms who had very stable and successful business activities in Muslim countries over 2001-2005 (right panel). These results emphasize that firms experienced a large reduction in exports to Muslim countries on average, the recovery is very heterogeneous across firms, and the shock is persistent for a substantial share of exporters. In other words, the aggregate recovery in Figure 1 is driven by a small share of high-growth firms and by new entrants into these markets.

2.2.2 Exposure: Danish Exports to Muslim Countries

This section sheds more light on the exposure to the boycott across industries and on the importance of particular destination markets. The left panel of Figure 3 illustrates the share of firms by industry that exported to Muslim countries before the boycott. Exposed firms are a substantial share of exporters in a large set of different industries, ranging from consumer products such as textiles, food, and furniture, to heavy machinery and equipment. Moreover, the right panel of Figure 3 reports the average and median share of exports in these destination markets among exposed firms. There is considerable variation in the importance of Muslim destinations both across sectors but also across firms within industries. The difference between average and median shares by industry
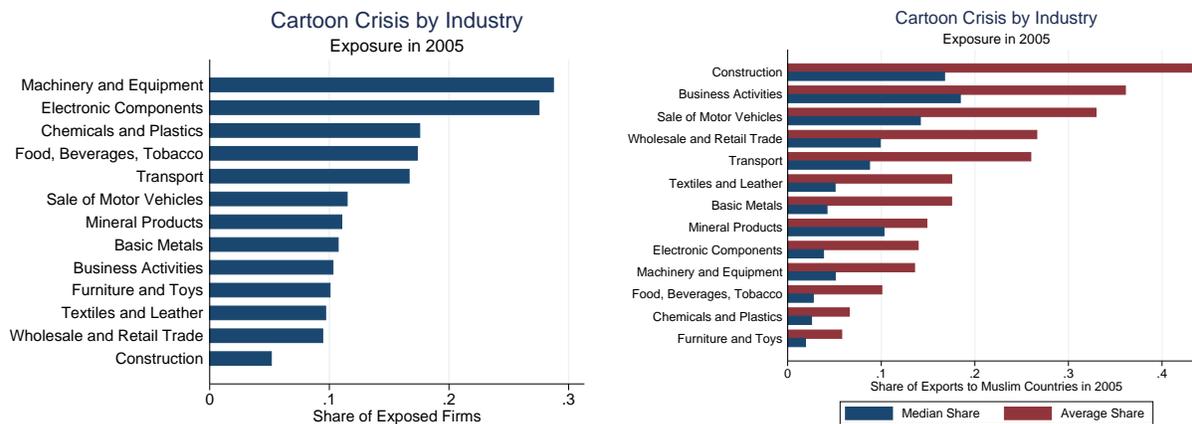
Figure 3: Boycott across Industries

The median and average share of exports to Muslim countries in the right panel is calculated within the group of exposed firms.

indicate a small share of firms with high exposure in each industry, which we will characterize further below.[4]

3 Data and Empirical Strategy

In this section, we discuss our empirical strategy and introduce the data and main definitions.

3.1 Data

An important advantage of our empirical context is that we can combine a variety of administrative data sources for the universe of firms and workers in Denmark, including firm-level trade data, financial statements of firms, and employer–employee matched data over the period 2001–2006. In addition, we are able to add detailed information on outsourcing and input expenditure. We discuss these data sources in detail below.

The first data source is the Danish Foreign Trade Statistics Register (UHDI), which provides annual firm-level trade value by product-destination pairs at the CN-8-digit product level. Importantly, any trade flows with countries outside the EU are precisely measured by the customs authority (Extrastat). In contrast, Danish firms only have to declare exports to EU member states above a threshold of approximately $250,000 per year (Intrastat). Thus, firms selling small quantities only to destinations within the EU will not be included in the sample of exporters.

Second, we add financial statements of firms from the Accounting Register (FIRE) and additional information on founding date, sales, employment, industry, and firm exit from the Danish

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[4]We provide additional details on the change in log exports to Muslim countries for 2005-2006 by industry in Appendix Figure A.1. Consumer products experienced the largest drop in exports but there is a substantial reduction in exports of capital goods and intermediates across different industries as well.

Business Register (FIRM). The accounting data provides balance sheet and profit and loss statements with detailed information about short-term and long-term liabilities, assets, investment and leasing activities, and input costs, in particular for labor services. A smaller subset of firms also provides more detailed responses on purchases of goods and services (VARK), with a specific section of the survey listing expenditures on outsourcing across different tasks, such as transportation, accounting, consulting, catering, IT, and marketing.

Finally, we use firm identifiers from the Firm-Integrated Database for Labor Market Research (FIDA) to match the firm-level data with worker-level information from the Danish integrated database for labor market research (IDA). IDA covers the universe of firms and workers in Denmark over 1980–2011. The data contain information about primary employment in November each year, including plant and firm identifiers, location and industry of the establishment, and detailed worker characteristics such as gender, age, education, experience, tenure, hourly wages, and annual earnings.

3.2 Definitions and Sample Descriptives

The main sample uses data on all private Danish exporters during 2003-2005. This yields a panel of about 15,000 firms. We measure exposure to the Cartoon Crisis based on exports to Muslim countries in 2005 before the boycott. The control group consists of all firms in the sample without any exports to Muslim countries in 2005. Given the widespread rejection of Danish products even without formal declaration of a boycott in many countries, we choose a broad definition of Muslim countries, including all countries with at least 50% Muslim population in 2005. Any firm with at least 0.5% of their exports in these markets will be considered exposed to the shock.[5] The treatment group includes firms with heterogeneous degrees of exposure in terms of export shares and export volumes; this will lead to stronger implications if we find effects of the boycott even for this heterogeneous group of firms. In addition, we will use the total share of previous exports in Muslim destination markets as a direct measure of the size of the shock at the firm level.

Figure 4 shows the distribution of exposure to the boycott, defined as share of exports to Muslim countries before the start of the boycott, for low- and high leverage firms. A large group of firms have low exposure which does not exceed 10% of exports but among both low- and high leverage firms there is a sizable group almost exclusively focused on Muslim markets. Low- and high leverage firms have very similar exposure and indeed there is no statistical difference in the degree of exposure between the two groups.[6] Therefore in our main specification we directly compare the reaction of all firms using a simple indicator of exposure. In section 5, however, we present results for an alternative specification which explicitly takes into account the cross-sectional differences in exposure.

We capture the differences in firms' capital structure by calculating the book leverage, defined

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[5]This restriction aims to reduce false categorization of treated firms and to focus on firms with a relevant share of business in Muslim countries. \We provide additional robustness checks for the definition of exposure in Section 5.

[6]The Kolmogorov-Smirnov test cannot reject the null of equal distributions with p=0.27.

Distribution of Exposure
Treatment Group, 2005

The figures use Epanechnikov kernels with bandwidth 0.045. Low and high leverage firms
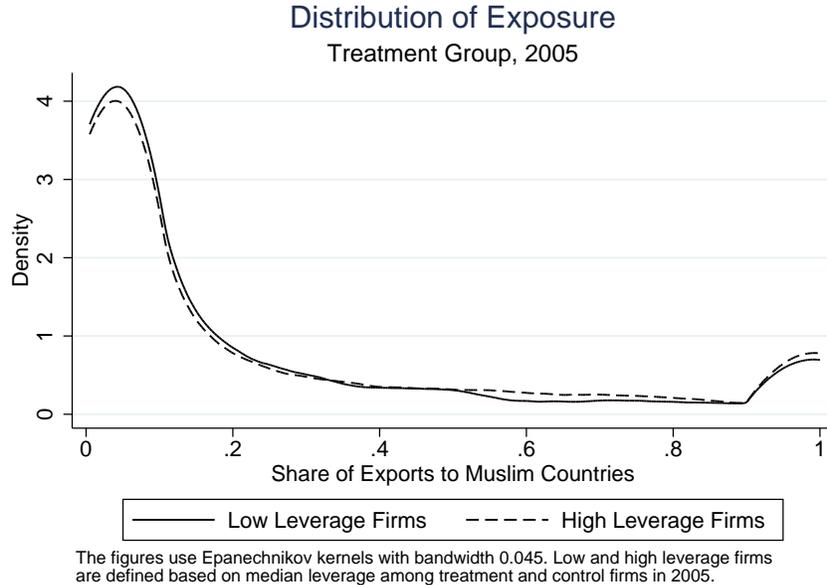are defined based on median leverage among treatment and control firms in 2005.

Figure 4: Distribution of Exposure (Share of Exports to Muslim Countries) for High- and Low Leverage Firms

as the ratio of total liabilities to total assets. Its distribution in treatment and control groups is presented in Figure 5. The two groups have similar distribution of leverage and if anything, leverage is slightly higher for the control group. Figure A.1 in the Appendix presents the distributions for firms within the treatment group with low and high exposure to the boycott and they track each other very closely. Our main measure of leverage will be an indicator variable for high leverage firms, which is defined to be 1 if a firm's leverage is above the median. While in the basic specification we use the country-wide median, Section 5 demonstrates that the results are robust to defining the median by industry. In another robustness check, we show that our results still hold if total leverage is substituted with financial leverage which excludes debt to suppliers.

As documented in Figure 5, the typical level of book leverage in our sample is relatively high and there are several factors which can explain this. First, firms in Denmark - similarly to other countries in continental Europe - are more bank-dependent than US firms and hence their leverage ratios are higher. Second, we use only firms involved in international trade, whose levels of debt are higher. And third, our debt measure includes all liabilities and hence is significantly higher than the ratio excluding debt to suppliers. We provide alternative results, which are consistent with the results from our main specification, using measures of financial leverage that exclude debt to suppliers in Section 5.

Table 1 provides the descriptive statistics for low and high leverage firms in control and treatment groups separately. We report all results for the pre-boycott period 2001-2005. One important difference between control and treatment group is size. Not surprisingly, firms exporting to Muslim countries (which are relatively distant and exotic markets) are larger on average. There is also a

Distribution of Leverage
2005

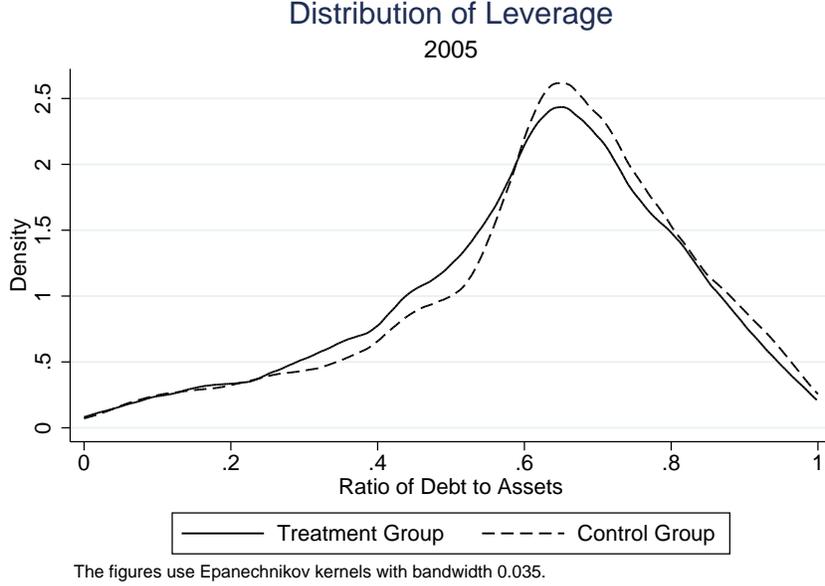The figures use Epanechnikov kernels with bandwidth 0.035.

Figure 5: Distribution of Leverage for Firms Exposed and Not Exposed to the Boycott

difference between size of low- and high leverage firms within the treatment group, as evidenced by sales, exports and employment. While firm-fixed effects will absorb any effect of size which is time-invariant, it is possible that size also influences the response to the boycott. We explicitly consider this possibility in Section 6, which shows that the effect of leverage is not capturing the differential size of firms. Further rows of Table 1 show indicator variables for usage of outsourcing and leasing, and shares of leasing expenses in investment and sales. We define these variables based on costs from the profit and loss statement (outside labor, separated into temporary agency workers and subcontractors; and operating leasing costs) and additional information about new financial leases, attached to the financial statement. In general, firms are similar across their outsourcing and leasing practices. Treated firms are a bit less likely to outsource and use leasing but there are no significant differences within the treatment group (if anything, high leverage firms appear to use leasing slightly more often).

3.3 Empirical Strategy

Our main specification to estimate the role of leverage for adaptation to a negative economic shock is:

$$
Y_{it} = a_1 HighLev_i \cdot Exposed_i \cdot Post_t + a_2 Exposed_i \cdot Post_t
$$
$$
+ \sum_{t=2001}^{2006} (\beta_{1t} \cdot Yr_t \cdot HighLev_i + \beta_{2t} \cdot Yr_t \cdot Exposed_i + \beta_{3t} \cdot Yr_t) + \mu_i + \epsilon_{i,t}. \tag{1}
$$

The dependent variable Y_{it} measures firm outcomes such as sales, employment, workforce composition, outsourcing, investment, leasing activity, inventory changes, and changes in debt. Because

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Table 1: Summary Statistics

For sales, employment, exports and leverage sample median is reported. Other variables are binary indicators (except for ratios of financial leasing to investment and operating leasing to sales) and sample means of reported for them.

	(1)	(2)	(3)	(4)
	Control Group		Treatment Group	
	Low Lev	High Lev	Low Lev	High Lev
Firms	6,520	6,775	1,000	828
Observations	33,573	34,161	5,431	4,309
Sales	1.8m	1.8m	5.9m	3.8m
Employment	8.4	8.3	27.5	17.3
Exports	0.05m	0.04m	1.40m	0.66m
Leverage	0.586	0.782	0.558	0.766
External Labor	0.761	0.752	0.674	0.689
Temp Workers	0.533	0.523	0.495	0.492
Subcontracting	0.627	0.621	0.504	0.530
Financial Leasing	0.134	0.132	0.099	0.129
Operational Leasing	0.750	0.756	0.636	0.688
Fin Leasing / Investment	0.099	0.043	0.041	0.061
Op Leasing / Sales	0.030	0.036	0.028	0.033

Note: Sales, employment, exports, and leverage report the sample median.

of concerns about serial correlation in many of these outcomes, we use growth rates for most of the analysis. The main coefficient of interest is a_1, the differential response of high leverage firms exposed to the boycott in the period during and after the crisis. As we show in Figure 4, exposure to the shock is very similar for high and low leverage firms in the treatment group, which means the interaction with high leverage isolates the role of financial distress conditional on economic distress. This is a key advantage of our research design. Throughout all regressions, we control for differences in outcomes between firms in the control and treatment group by year, and we also control for annual differences between high and low leverage firms. The identifying assumption of the interaction effect is that absent the shock, and conditional on other controls, the difference between high and low leverage firms in the treatment group would have followed the same path as difference between high and low leverage firms in the control group. Importantly, we include firm-fixed effects in all specifications to account for idiosyncratic time-invariant determinants of firm outcomes. These characteristics may for example include location, industry, management practices, and firm size. In additional robustness checks, we provide further results including time-varying controls for firm size. Another robustness analysis provides detailed results controlling for continuous firm-level exposure to the boycott, and interacting leverage and exposure. All results cluster standard errors at the industry-year level because firms' adjustment may interact with other firms in their industry and we want to allow for arbitrary correlation of these responses.

3.4 Identifying Variation

The boycott of Danish products during the Cartoon Crisis is a particularly attractive setting to study the response of highly leveraged firms to financial distress. In this section, we argue to what extent our research design addresses the two main empirical challenges common to the literature on consequences of financial leverage: distinguishing financial distress from economic distress and endogeneity of capital structure choice. We address the first concern by precisely measuring the size of the economic shock and controlling for its direct consequences using the response of firms who were similarly affected but have less debt on their balance sheet. We further benefit from the small aggregate size of the shock that implies no effects on firms through global demand effects or the banking sector. The second concern of endogeneity is harder to address because we do not have exogenous variation in the capital structure. Nonetheless, the unexpected nature of our shock allows us to convincingly argue that firms did not adjust their capital structure in anticipation of this particular event and hence the effects we observe can be interpreted as ex-post consequences of high leverage for firms who chose to have a lot of debt. We discuss this interpretation in more details below.

Financial distress is usually accompanied or triggered by economic distress. Firms with high leverage have trouble meeting their debt obligations when their economic situation deteriorates. Oftentimes this is related to important developments inside a firm: losing key employees or important customers, facing a new aggressive competitor or lagging behind in technological innovation. It is very challenging to distinguish the consequences of these economic factors from consequences of financial distress. For example, if we observe that a financially distressed firms decreases investment, is it because of its capital structure or simply because the demand for its product decreased and this caused both financial distress and reduction of investment? This problem is widespread in the corporate finance literature and few papers are able to convincingly distinguish these mechanisms. To tackle this problem we use a difference-in-difference strategy and explicitly control for the consequences of economic distress. The firm-level trade data before the crisis allows us to measure the size of the economic shock precisely for each firm. This means we can compare the differential response of firms with similar exposure to the boycott, but with different leverage before the crisis. As a result, we attribute any differences between high and low leverage firms to the impact of differences in financial distress. The assumption behind this procedure is that high leverage firms would exhibit similar reaction to low leverage firms if their leverage ratio was lower. Given that their exposure to the shock is the same (see Table 4), this is a reasonable assumption. However, to explicitly account for potential differences in exposure and in firm size (since high leverage firms are on average smaller than low leverage firms, see Table 1), Sections 5 and 6 present additional evidence supporting our main results.

Endogeneity of leverage choice is another issue plaguing the empirical corporate finance literature. Because firms choose their leverage having expectations about the future, it is hard to rule out reverse causality and the influence of ommitted variables. For example,when we observe that a firm has more flexible labor contracts after increasing leverage, is this the causal effect of leverage

or did the anticipation of more flexible contracts make this firm choose higher leverage? Or perhaps something else happened at the firm, e.g. new management was introduced, which led both to the increase in leverage and to a change in contract flexibility? One contribution of our paper is the setting which greatly alleviates concerns about the reverse causality. The shock which we analyze was entirely unexpected and hence firm were unable to adjust their leverage before the boycott anticipating the occurrence of the shock. Concern about omitted variables is more plausible in our scenario: firms who choose to have high leverage may also differ in other dimensions and these differences may influence firms' reactions. This raises two potential questions: external validity and attribution of causal influence. We do not claim that the effects we find can be generalized to the entire population of firms. It is true that some firms pre-select into having large debt and we document ex-post consequences of debt for these firms. Whether or not these consequences would be the same if we randomly allocated more debt to other firms is a question which we do not address in this analysis. Arguably it is important to make predictions about differential responses to negative shocks for those firms that in fact choose high leverage to begin with. Another question is whether we can attribute the observed reaction to the effect of leverage or whether leverage is only a proxy for some other factor which we are not capturing. To address this possibility we explicitly discuss other potential explanations in section 6.

4   Results

In this section, we provide graphical and regression-based evidence on the differential response of Danish exporters with high or low leverage. We subsequently analyze responses of exports and sales, employment and outsourcing, investment and leasing, as well as adjustments in supply chain and in export markets and products.

4.1   Exports and Sales

The boycott significantly reduces affected firms' exports to Muslim countries and hence has a direct negative impact on their sales. However, production capacity freed by lower demand from Muslim countries could be used for producing goods sold in other markets. To boost sales elsewhere, firms may need to create new products, increase marketing expenses or offer more attractive prices to their customers. High leverage firms may be unable to afford these actions and as a result the net effect on their sales could be larger, even though the initial exposure to the boycott is the same.

The effects of the boycott on exports, sales, bankruptcy, and debt are presented in Table 2. Both low leverage and high leverage firms reduce exports as a consequence of the boycott (column 1). While the difference between the two groups is not significant, the point estimate for high leverage firms is negative, suggesting that they might experience a larger export drop. As expected, the decline is driven by Muslim countries (column 2; notice that both column 2 and 3 use only firms exposed to Muslim countries). However, for low leverage firms this decline is accompanied by an increase in exports to other countries (column 3) and increase in domestic sales. As a result, their

total sales do not decrease and even slightly increase (column 4). High leverage firms, however, do not significantly increase their exports elsewhere (sum of the coefficients in column 3 is not significantly different from zero) and as a result their total sales decrease. These results suggest that low leverage firms redirect their sales to other markets but high leverage firms are unable to do so. While we do cannot measure domestic sales at more detailed level, we analyze the drivers of the increase in exports to other countries more closely in Section 4.5.

The shock caused by the boycott is not large enough to drive affected firms out of business. Column 5 presents the results of a cross-sectional regression for all exporters in the sample in 2005 with the dependent variable being an indicator for firm exit in 2006. The effect of the boycott is close to zero and there is no significant difference between low- and high leverage firms. Firm survival is therefore unlikely to be an important element of the analysis. This is an interesting feature of our setting which allows us to study potential effects of leverage on firms' operations far away from bankruptcy threats.

While the shock is not large enough to cause bankruptcy, it definitely may threaten firms' liquidity and require additional funds to accommodate its consequences. Consistent with this, column 6 shows that after the boycott low leverage firms borrow more, insignificantly increasing their debt. However, firms with high leverage may be unable to increase borrowing because lenders consider them too risky given their already high debt. Indeed, the effect for high leverage firm is significantly smaller, and their net change of debt is actually negative. Notice that the need for additional funds is probably larger for high leverage firms: not only do they need to fund actions taken to adjust to the boycott, but they also need to cover their upcoming debt payments.

4.2 Employment Response

Adjusting employment is a natural margin of response to an adverse economic shock. If their demand decreases, firms may no longer need as much labor as before and hence may reduce employment. However, in the presence of numerous frictions, it is unlikely that firms simply adjust their employment proportionally to the lost demand. Hiring and firing is costly and employees build firm-specific human capital which contributes to the stickiness of employment after temporary negative shocks. This stickiness, known as labor hoarding (Okun, 1963), is especially likely in our setting as firms face significant uncertainty on how long the boycott will last. Hoarding labor, however, is costly. It requires paying workers' salaries today, even though they are not productive, and the benefits can only be recouped in the future in the form of reduced hiring and training costs. If a firm is financially constrained, it may be unable to use this strategy even if it is optimal in the long-term. Therefore we may expect that high leverage firms may be unable to engage in labor hoarding and hence they will choose to reduce employment more than firms with a lot of financial slack, even though it may be sub-optimal in the long run. An alternative story for why high leverage firms can be more likely to reduce employment is illustrated by Matsa (2010). Firms with higher leverage can credibly take a tougher stance when negotiating with their workforce and after a negative demand shock may be more successful in convincing unions that reducing the size

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Table 2: Response of the Amount of Business

All regressions, except column 5, include firm fixed effects and binary variables for each year interacted with indicators for high leverage and exposure to the boycott. Columns 2 and 3 contain only firms exposed to the boycott (because only for them it is meaningful to analyze exports to Muslim countries). The main independent variable is triple interaction of being exposed to the boycott (treatment), having high leverage and post-boycott period (year 2006) but in columns 2 and 3 all firms are exposed. Dependent variables in columns 1-4 are log-differences in the total export, total export to Muslim countries, total export to non-Muslim countries and total sales. Column 5 is a cross-sectional regression of exit indicator in 2006 while in column 6 dependent variable is log-change of total debt. The bottom row presents mean of dependent variables in the pre-boycott period. In all regressions standard errors are clustered on industry X year level (except column 5 where clustering is at industry level since only one year is included)

	(1) Δln(Export)	(2) Δln(Export Muslim)	(3) Δln(Export Other)	(4) Δln(Sales)	(5) Firm Exit 2006	(6) Δln(Debt)
Treatment X 2006	-0.1876*** (0.056)			0.0361* (0.020)	-0.0019 (0.0015)	0.0328 (0.022)
Treatment X High X 2006	-0.0664 (0.076)			-0.0516** (0.023)	0.0034 (0.003)	-0.0560* (0.029)
Year 2006		-0.6464*** (0.071)	0.3745*** (0.143)			
High X 2006		0.1350 (0.101)	-0.2489 (0.181)			
Observations	53,910	5,947	8,920	76,826	12,626	76,790
R-squared	0.227	0.207	0.210	0.185	0.007	0.158
Firms	13307	1563	1785	15208	12,626	15207
Sample Avg 01-05	0.0298	0.166	0.0200	0.0576	0.004	0.0422

Standard errors clustered on industry X year level

*** p<0.01, ** p<0.05, * p<0.1

of the workforce is necessary. In this case the reduction could benefit the firm and hence such a mechanism is related to the famous free cash flow problem described by Jensen (1986).

In this subsection we analyze the differential response of high- and low leverage firms. We show that high leverage firms indeed reduce employment, compared to the low leverage group. This reduction, however, is accompanied by increased propensity to use outsourcing which suggests that some tasks of dismissed workers are now being performed using more flexible outsourcing arrangements.

4.2.1 Intensive and Extensive Margin Adjustment

Table 3 presents the results for firms' employment response. While firms with low leverage actually increase employment (which indicates both labor hoarding and the expansion into other markets, see Subsection 4.5), highly-leveraged firms reduce the size of their workforce (column 1). They decrease the total number of employee hours by 6% compared to low leverage firms and hence the combined effect of the boycott for these firms is a 2.6% reduction in employment. Column 2 shows that, compared to low leverage firms, the number of workers goes down by 3.5%, significantly less than total hours. Therefore the reduction in employment comes both from firing some workers and from reducing hours for those who remain employed. Column 3 indicates the effect on the total wage bill. It is similar but slightly smaller than the employment effect, which may indicate both changes in workforce composition and limited ability to adjust personnel costs (e.g. because of contract rigidities or severance payments). Figure 6 illustrates the evolution of employment. Employment patterns before boycott were roughly similar for low- and high leverage firms. Since 2003 there was a slightly positive differential trend for high leverage firms but it was abruptly reversed by the boycott.

Our results confirm that financially constrained firms reduce employment to a larger extent when faced with a negative economic shock. This is consistent with the findings of Sharpe (1994) who shows that employment in high leverage firms is more cyclical in general as well as with recent results of Giroud and Mueller (2016) who show that leveraged firms were more likely to reduce employment in the last recession. A distinct feature of our setting is captured by the positive coefficient for low leverage firms: while all exposed firms face a negative economic shock, they have possibilities to expand into other markets. Therefore the negative effect of high leverage not only captures the reduced extent of labor hoarding but also limited expansionary response to the boycott. Firms in our sample are not dealing with a widespread recession, and hence we add to the previous research by showing that the negative effect of leverage also applies if firms operate in an otherwise growing economy.

Notice that the observed decline in employment for high leverage firms is larger than the decrease in total sales (although, admittedly, the magnitude of the difference is small compared to the standard errors of our estimates). This is particularly surprising because we would expect that labor hoarding does happen to some extent and some workers are kept in the firm and become less productive (as there is no demand to be satisfied by their work). While one possible explanation

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Table 3: Employment Response

All regressions include firm fixed effects and binary variables for each year interacted with indicators for high leverage and exposure to the boycott. The main independent variable is triple interaction of being exposed to the boycott (treatment), having high leverage and post-boycott period (year 2006). Dependent variables are log-differences in full-time equivalence employment (measure of total hours worked), count of workers employed and total wage bill. The bottom row presents mean of dependent variables in the pre-boycott period. In all regressions standard errors are clustered on industry X year level.

	(1)	(2)	(3)
	Δ ln(FTE Employment)	Δ ln(Workers)	Δ ln(Wagebill)
Treatment X 2006	0.0333**	0.0202***	0.0099
	(0.014)	(0.011)	(0.015)
Treatment X High Lev X 2006	-0.0594***	-0.0355***	-0.0419***
	(0.017)	(0.013)	(0.014)
Observations	76,826	76,826	74,826
R-squared	0.237	0.325	0.253
Firms	15208	15208	14963
Sample Avg 01-05	0.00121	0.0358	0.0503

Standard errors clustered on industry X year level

*** p<0.01, ** p<0.05, * p<0.1

may involve increased overall productivity (a recent paper by Lazear, Shaw, and Stanton, 2016, demonstrates that productivity may rise in recessions), another possibility is that some employees were substituted with other inputs. The use of outsourcing is particularly attractive if firms want to fire some workers with rigid full-time contracts but still be able to perform these workers' tasks on more flexible terms. We analyze this possibility in Subsection 4.2.3.

4.2.2 Workforce Composition

Whom do high leverage firms fire? While the simple story of downsizing would suggest a proportional decrease in employment across all types of workers, there are reasons to expect that this may not be the case. High skilled workers are more expensive and hence hoarding them is particularly costly. They are also more likely to have good outside options and may not be willing to accept some temporary reductions in wages and uncertain prospects for the future. On the other hand, it may be more costly to hire high skill workers and hence hoarding them may be more beneficial. Another dimension influencing the decision whom to fire is the relation to the core activity of the firm: while it may be hard to reduce employment of production workers who perform a crucial part of the production process, it may be easier to fire an accountant and outsource the bookkeeping to an outside firm.

The effects of the boycott on the workforce composition are presented in Table 4. The share of high-skilled workers goes down by 0.8 pp which corresponds to 4% of the base value and is twice the magnitude of average yearly change. The result for all high-skill workers ratio lacks precision
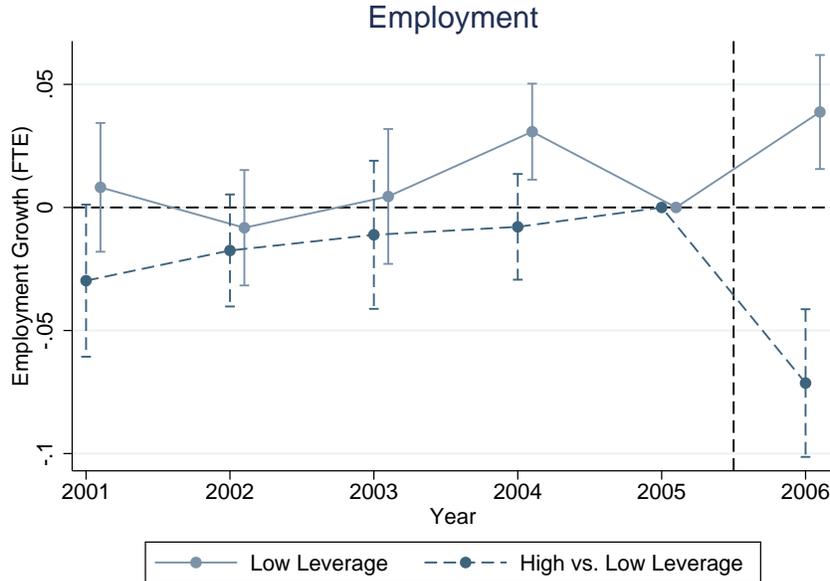
Employment

Figure 6: Employment Evolution for High- and low leverage Firms

The dependent variable is full-time equivalent employment level. The markers in the figure show coefficients from regression analogous to the main specification in which high leverage X treatment X pre-boycott term was split into several terms for each year separately. Coefficients for low leverage firms are for firms exposed to the boycott (treated) with leverage below median. Coefficients for high vs low leverage are differential effects for high leverage firms within treated firms. The brackets denote 90-percent confidence intervals.

but the decrease in the share of college-educated workers is significant and similar in magnitude, which suggests that college-educated workers (as opposed to PhD holders) are driving the effect. Compared to college graduates, firms are less likely to fire workers with vocational training, who comprise another large share of the workforce and may have accumulated more firm-specific human capital during their longer average tenure.

4.2.3 Outsourcing

The drop in employment for high leverage firms is higher than the decrease in their total sales. While the difference is not very large and several explanations are possible, it suggests that firms may substitute employed labor with some other inputs. In particular, firms may reduce costs by firing full-time employees with rigid contracts and using outsourcing to provide necessary inputs on more flexible terms. For example, a firm employing an in-house IT specialist may realize that after the boycott there is not enough work to be done by this person. Since it may be impossible to reduce the specialist's working hours, the firm may decide to fire him and outsource necessary IT services. Not only does this response allow to adjust to the lower demand today, but also helps to flexibly react to changes in the future (since the firm faces uncertainty about the duration and future severity of the boycott). We may therefore expect that firms use outsourcing to partially substitute laid-off workers.

Table 4: Changes in Workforce Composition

All regressions include firm fixed effects and binary variables for each year interacted with indicators for high leverage and exposure to the boycott. The main independent variable is triple interaction of being exposed to the boycott (treatment), having high leverage and post-boycott period (year 2006). Dependent variables are changes in share of workers of given category (college or more, college, PhD, vocational education). The bottom row presents mean of levels variables corresponding to the dependent variables in the pre-boycott period. In all regressions standard errors are clustered on industry X year level.

	(1)	(2)	(3)	(4)
	$\Delta\%$College+	$\Delta\%$College	$\Delta\%$PhD	$\Delta\%$Vocational
Treated X 2006	0.0004	0.0002	0.0002	0.0051
	(0.004)	(0.003)	(0.002)	(0.006)
Treated X High	-0.0080	-0.0067**	-0.0013	-0.0015
Lev X 2006	(0.005)	(0.003)	(0.002)	(0.008)
Observations	76,469	76,469	76,469	76,469
R-squared	0.170	0.173	0.177	0.155
Firms	15146	15146	15146	15146
Sample Avg 01-05	0.00388	0.00273	0.00115	0.00118

Standard errors clustered on industry X year level

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

On the other hand, the main reason why in-house employment is reduced is lower demand and hence lower production. The same channel may lead to reduced demand for services which are already outsourced. For example, if a firm uses translation services to perform its sales activities in the Middle East, the boycott may make these services rather useless. It is therefore unclear what direction of adjustment we should expect at the intensive margin. Nonetheless, the substitution story unambiguously suggests that we should see some firms starting to outsource activities they have not outsourced before. We therefore focus on the extensive margin response: our main dependent variable is an indicator whether a firm has any outsourcing, overall or in particular categories. We also hypothesize that total outsourcing expenses, while perhaps decreasing in general due to reduced firm operations, should increase compared to total sales.

The results of the outsourcing response analysis are presented in Table 5. High leverage firms systematically show an extensive margin response: they are over 5 pp. more likely to report any outsourcing (column 1) and this response comes both from using temporary agency workers (column 2) and subcontractors (column 3). This is a large effect given the fact that 75% of firms before the boycott already declared using some outsourcing and hence 5 pp. corresponds to 20% of the firms who have not used any outsourcing before. Column 4 shows that the share of total spending on outsourcing in sales significantly increases for high leverage firms. This result combines the extensive margin expansion with a potential intensive margin reduction of previously outsourced services in response to a decrease in demand. Column 5 further provides suggestive evidence of a reduction in outsourcing expenses at the intensive margin for low leverage firms, which is in contrast to the positive point estimate of twice the magnitude for high leverage firms. Graphical evidence

Table 5: Outsourcing Response

All regressions include firm fixed effects and binary variables for each year interacted with indicators for high leverage and exposure to the boycott. The main independent variable is triple interaction of being exposed to the boycott (treatment), having high leverage and post-boycott period (year 2006). Dependent variables are indicators for any outsourcing (column 1) and indicators for spending on temporary work agency services and for subcontracting (columns 2, 3). Columns 4 and 5 show share of outsourcing costs in total sales and log-change in total outsourcing costs. The bottom row presents averages of dependent variables in the pre-boycott period. In all regressions standard errors are clustered on industry X year level.

	(1) Any Outside Labor	(2) Any Temp Any Worker	(3) Any Contract Labor	(4) Outside Labor (% of Sales)	(5) Δln (Outside Labor)
Treated X 2006 (0.124)	-0.0339	0.0120 (0.028)	-0.0505 (0.028)	-0.0017 (0.032)	-0.0286 (0.002)
Treated X High Lev X 2006	0.0528** (0.023)	0.0296 (0.026)	0.0449 (0.029)	0.0044* (0.003)	0.0508 (0.108)
Observations	76,826	76,826	76,826	76,815	57,342
R-squared	0.359	0.320	0.429	0.557	0.733
Firms	15208	15208	15208	15208	14626
Sample Avg 2001-2005	0.748	0.523	0.601	0.014	0.094

Standard errors clustered on industry X year level
*** p<0.01, ** p<0.05, * p<0.1

for outsourcing adjustment is also presented in Figure 7. While the difference between low- and high leverage firms was never significant before the boycott, after the boycott high leverage firms are significantly more likely to use outsourcing.

The data we use in Table 5 comes directly from the profit and loss statement and hence the results are based only on total level of costs associated with outsourcing. To provide more details on what services exactly are being outsourced, we use supplementary data on outsourcing activities from a firm survey on purchased intermediate goods and services collected by Statistics Denmark.[7] The data covers 1,221 manufacturing firms from our main sample and we conduct the subsequent analysis for this subsample. For surveyed firms we have information about outside services they purchase at a more detailed level. We construct several variables indicating non-zero spending in a given category. We then use our main specification (1) to see which categories are responsible for the increase observed in the overall profit and loss statement. The results are presented in Table 6. Because of much smaller sample size the results are less precise, but we do see ssignificantly different responses of high leverage firms for a variety of labor services. In particular, high leverage

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[7]For another recent application using this outsourcing survey to analyze firms' choices between intermediate inputs and in-house production, see Chan (2017).
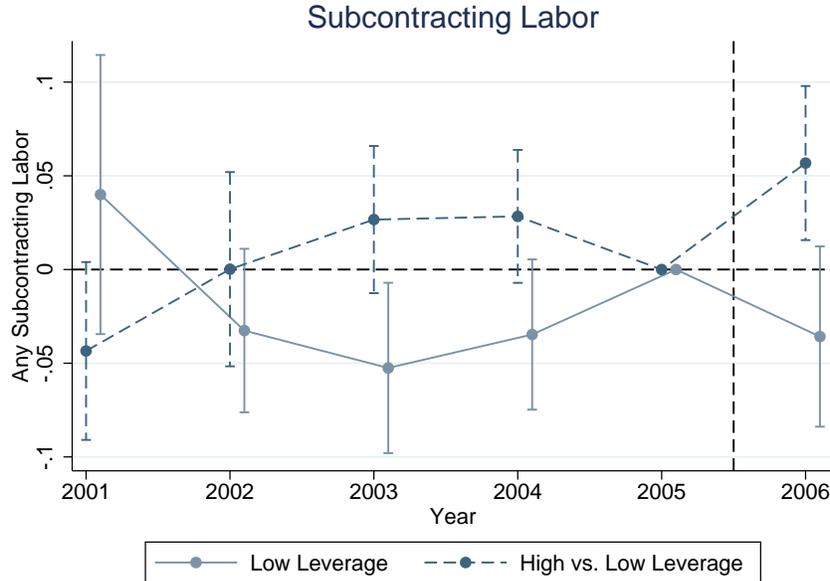
Figure 7: Spending on Outside Labor

The dependent variable is an indicator for any outsourcing-related costs. The markers in the figure show coefficients from regression analogous to the main specification in which high leverage X treatment X pre-boycott term was split into several terms for each year separately. Coefficients for low leverage firms are for firms exposed to the boycott (treated) with leverage below median. Coefficients for high vs low leverage are differential effects for high leverage firms within treated firms. The brackets denote 90-percent confidence intervals.

firms respond by outsourcing transportation, legal services, marketing, and ICT services after the boycott. We also find sizable increases in outsourcing of training and consulting, but these results are not precisely estimated. In general, these newly outsourced activities are more likely to correspond to tasks performed by high-skill workers, e.g. lawyers, accountants, consultants, or IT specialists. Combined with the decrease in high-skilled workers' share in total employment this is consistent with our hypothesis of substitution for non-core activities: instead of employing in-house high-skilled workers, firms decide to outsource these activities. In contrast, the results do not show any significant response in engineering services, suggesting that the manufacturing firms remain focused on their core competencies.

4.3   Investment Response

Another input to the production function, capital, can also be adjusted when a firm faces a negative demand shock. It is hard to quickly adjust the capital stock and hence it is more appropriate to analyze its changes: investment and divestment flows. Given that high leverage firms are financially constrained, we would expect that they reduce investment compared to their low leverage counterparts. Since the purchase of assets is capital-intensive, the reaction on this margin can be even more pronounced than the adjustment of employment. On the other hand, the fixed nature of many elements of the capital stock makes it almost impossible to adjust.

Table 6: Outsourcing Response - Detailed Analysis

All regressions include firm fixed effects and binary variables for each year interacted with indicators for high leverage and exposure to the boycott. The main independent variable is triple interaction of being exposed to the boycott (treatment), having high leverage and post-boycott period (year 2006). The data sample limited to 1221 firms for which the results of outsourcing survey are available. We define 12 categories of services being outsourced by grouping several related activity codes. The bottom row presents averages of dependent variables in the pre-boycott period. In all regressions standard errors are clustered on industry X year level.

	(1) Transport	(2) ICT	(3) Accounting & Legal	(4) Engineering	(5) Marketing	(6) HR & Training
Treated X 2006	0.0068 (0.005)	-0.0202* (0.011)	-0.0019 (0.011)	-0.0245 (0.028)	-0.0248 (0.016)	-0.0262* (0.016)
Treated X High Lev X 2006	0.0276* (0.015)	0.0379** (0.018)	0.0549** (0.021)	0.0117 (0.045)	0.0572** (0.022)	0.0545 (0.034)
R-squared	0.559	0.720	0.662	0.848	0.740	0.777
Average 2001-2005	0.985	0.965	0.965	0.614	0.932	0.870

	(7) Security	(8) Cleaning	(9) Food	(10) Consulting	(11) Construction & Repairs	(12) Sales Commission
Treated X 2006	0.0336 (0.022)	0.0064 (0.015)	0.0138 (0.025)	-0.0046 (0.033)	-0.0080 (0.009)	-0.0100 (0.023)
Treated X High Lev X 2006	0.0049 (0.037)	-0.0079 (0.026)	-0.0397 (0.039)	0.0748 (0.054)	0.0409* (0.024)	0.0212 (0.046)
R-Squared	0.821	0.712	0.848	0.740	0.688	0.852
Average 2001-2005	0.671	0.901	0.614	0.658	0.972	0.383
Observations	5,249	5,249	5,249	5,249	5,249	5,249
Firms	1,221	1,221	1,221	1,221	1,221	1,221

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In this section we look at changes in investment and divestment. We document that highly-leveraged firms who are exposed to the boycott decrease their investment compared to low leverage firms and increase divestment. We show that this shrinkage of capital is to some extent counteracted with leasing, a more flexible way of providing capital input.

4.3.1 Investment and Divestment

Table 7 shows the response of investment and divestment flows. Low leverage firms exposed to the boycott increase investment but high leverage firms do not (column 1). Instead, they sell their existing equipment (column 3), although the decrease, while economically large, is not statistically significant. Changes in investment and divestment of production-related assets (e.g. machines directly used in the production process) are much more pronounced than changes in other equipment (which includes e.g. general purpose cars or computer equipment). Notice that the sample size varies across columns and in general is lower than the size of the full sample used in the employment analysis. This is because of the lumpy character of investment and divestment and our log-based specification which drops observation with zero flows. Moreover, as a consequence of common accounting practice, our measure of investment flows includes new financial leases. In the next section we explicitly analyze a synthetic measure of own investment (excluding leasing) and hence we postpone interpreting the magnitudes from columns 1-2 in Table 7 until then. Nonetheless, a clear qualitative pattern emerges: low leverage firms expand, presumably because of new investment needed to access new markets, but high leverage firms are unable to do so and they reduce their capital instead.

Table 7: Investment Response

All regressions include firm fixed effects and binary variables for each year interacted with indicators for high leverage and exposure to the boycott. The main independent variable is triple interaction of being exposed to the boycott (treatment), having high leverage and post-boycott period (year 2006). Dependent variables are logs of investment/divestment flows. The flows are based on financial statement data and therefore they include new financial leases. The bottom row presents mean of levels of dependent variables in the pre-boycott period. In all regressions standard errors are clustered on industry X year level.

	(1) Investment (Production)	(2) Investment (Other)	(3) Divestment (Production)	(4) Divestment (Other)
Treated X 2006	0.3520***	0.0405	-0.2069	-0.1149
	(0.122)	(0.058)	(0.169)	(0.086)
Treated X High Lev X 2006	-0.2255**	-0.0388	0.3240	-0.0396
	(0.112)	(0.057)	(0.227)	(0.089)
Observations	45,821	67,519	26,913	56,318
R-squared	0.781	0.689	0.725	0.643
Firms	13437	14947	11136	14682
Sample Avg 01-05	2448	1064	1512	427.7

Standard errors clustered on industry X year level
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

4.3.2 Leasing

Similarly to the response of employment and outsourcing, the drop in investment and increase in divestment of high leverage firms may be to some extent substituted with leasing. A firm may decide not to buy a new asset or to sell an existing one and use leasing to provide the capital input instead. This requires less access to capital and hence may be particularly attractive for financially constrained firms. Moreover, it also allows for more flexible adjustment to changes in future economic conditions, a feature similar to the characteristics of outsourcing vis-a-vis employment.

The response of leasing at the intensive margin combines both the substitution of own assets with leasing and general downsizing of the firm and terminating some of existing leasing contracts. As a result, our main focus is on indicators for any leasing (and separately for any operating and financial leasing) to capture the extensive margin response. We also look at the relative measure of leasing expenses. Because our measure of operating leases comes from the profit and loss statement, we see the size of payments and can compare them to total costs. Financial leasing information comes from additional declarations about new leases supplementing the financial statement. Firms report the value of new equipment leased in a given year (as opposed to payments made this year) and hence we compare it to total investment.

As illustrated in Table 8, highly leveraged firms are significantly more likely to use both financial and operating leases after the boycott (columns 1-3). Figure 8 shows the graphical evidence for

Table 8: Leasing and Own Investment Response

All regressions include firm fixed effects and binary variables for each year interacted with indicators for high leverage and exposure to the boycott. The main independent variable is triple interaction of being exposed to the boycott (treatment), having high leverage and post-boycott period (year 2006). Dependent variables are indicators for any leasing (columns 1-3), share of value of new financial lease in total investment (column 4) and share of operating leasing costs in total costs (column 5). Column 6 and 7 show logs of own investment - a synthetic variable calculated as the difference between investment and new financial leases. The bottom row presents mean of dependent variables in the pre-boycott period. In all regressions standard errors are clustered on industry X year level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Any Lease	Any Lease (Financial)	Any Lease (Operating)	Fin Lease (% of Invst)	Op Lease (% of Costs)	ln(Own Invst)	ln(Own Inv Equipment)
Treated X 2006	-0.0434**	0.0013	-0.0368**	0.0003	-0.0098	0.1195**	0.3619***
	(0.018)	(0.025)	(0.016)	(0.007)	(0.009)	(0.058)	(0.128)
Treated X High Lev X 2006	0.0601***	0.0728***	0.0510**	0.0170***	0.0157	-0.1079*	-0.3050***
	(0.021)	(0.019)	(0.022)	(0.005)	(0.012)	(0.056)	(0.106)
Observations	76,826	76,826	76,826	69,321	76,825	69,228	45,414
R-squared	0.386	0.330	0.386	0.311	0.260	0.738	0.782
Firms	15208	15208	15208	14990	15208	14989	13411
Sample Avg 01-05	0.762	0.112	0.745	0.018	0.036	5.512	4.178

Standard errors clustered on industry X year level

*** p<0.01, ** p<0.05, * p<0.1

the leasing response. Compared to low leverage firms, high leverage firms do not seem to be significantly different in their use of leasing before the boycott but they are more likely to rely on it after the boycott hits. The intensive-margin measures of leasing in columns 4 and 5 also increase for high leverage firms, but the results are not precisely estimated. After financial leases are subtracted from total investment, we find a more precise and significantly negative response of own investment: contrary to low leverage firms, high leverage firms do not increase their own investment. Moreover, as evidenced in Table 7, they insignificantly increase divestment. Fixed assets they sell are presumably substituted with both operating and financial leasing. The magnitude of the own investment increase for low-leverage firms is large and close to 12%. While we cannot directly compute the equivalent number for the leasing response (because we only know operating leasing payments, not the value of the assets which would be comparable to investment), back of the envelope calculations (assuming that payments constitute around 15% of leased asset value) suggest that the leasing response of high-leverage firms can be sizable when compared both to low-leverage firms' investment and high-leverage firms' divestment reaction.
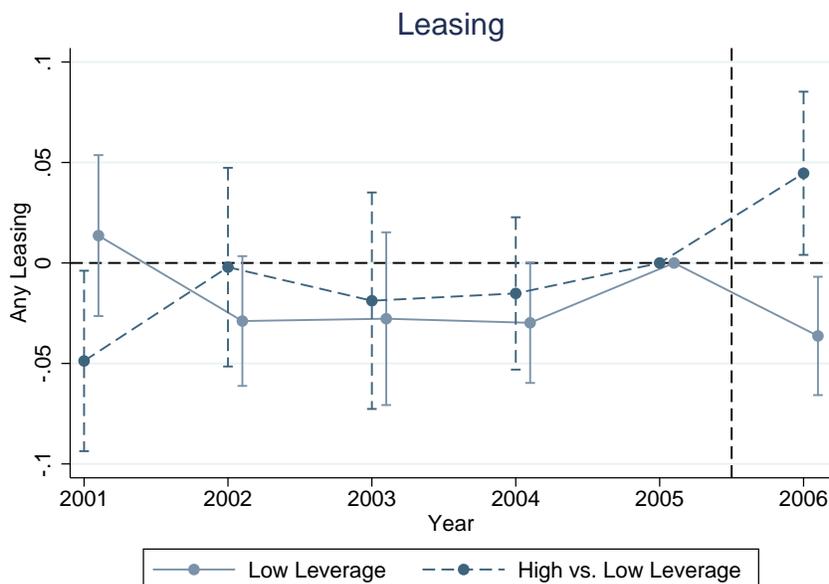
Figure 8: Leasing Response

The dependent variable is an indicator for any leasing costs. The bars in the figure show coefficients from regression analogous to the main specification in which high leverage X treatment X pre-boycott term was split into several terms for each year separately. Coefficients for low leverage firms are for firms exposed to the boycott (treated) with leverage below median. Coefficients for high vs low leverage are differential effects for high leverage firms within treated firms.

4.4 Supply Chain

An unforeseen demand drop leads to a liquidity shock which can have important consequences for the functioning of the supply chain. When some of the expected cash flows are not materialized, a firm would like to pay its suppliers later and receive money from customers faster. However, the suppliers may be unwilling to grant any payment extensions, especially if the firm is highly leveraged and may have trouble paying back its debt. On the other side of the chain, customers may actually request better trade credit conditions since their bargaining position is better when the firm just lost part of its demand. In this section, we analyze differential changes in accounts payable and receivable of firms with high and low leverage. We show evidence suggesting that while low leverage firms seem to secure additional demand by offering better payment conditions to their customers, high leverage firms are unable to do so. Moreover, low leverage firms increase their stock of debt to suppliers, presumably because they were able to negotiate extended payment dates. High leverage firms, instead, are unable to receive such a concession and their debt to suppliers remains roughly unchanged. We also show that high leverage firms reduce their level of inventory after the boycott, which suggests that they decide to decrease supply chain security to get access to liquid funds which are in high demand after the boycott.

Table 9: Accounts Payable

All regressions include firm fixed effects and binary variables for each year interacted with indicators for high leverage and exposure to the boycott. The main independent variable is triple interaction of being exposed to the boycott (treatment), having high leverage and post-boycott period (year 2006). Dependent variables are log-changes of short term debt (total and to suppliers and other creditors) and long-term debt. The bottom row presents mean of levels of dependent variables in the pre-boycott period. In all regressions standard errors are clustered on industry X year level.

	(1)	(2)	(3)	(4)
	Δln(Short-Term Debt)			Δ ln(Long-Term Debt)
	Total	To Suppliers	To Other	Δ Total
Treatment X 2006	-0.0116	0.1131**	-0.0496	-0.0277
	(0.026)	(0.047)	(0.038)	(0.075)
Treatment X High Lev X 2006	-0.0411	-0.0780**	-0.0582	-0.0704
	(0.035)	(0.039)	(0.043)	(0.069)
Observations	77,374	76,752	76,908	50,690
Firms	15,313	15,296	15,308	13,833
R-squared	0.147	0.108	0.132	0.231
Average 2001-2005	4.6m	1.2m	3.4m	3.0m

Standard errors clustered on industry X year level

*** p<0.01, ** p<0.05, * p<0.1

4.4.1 Accounts Payable and Other Debt

Short-term debt to suppliers increases for low leverege firms hit by the boycott, as evidenced by column 2 in Table 9. The stock of accounts payable goes up by 11% which is much more than the change in sales. This change suggests that low leverage firms were able to receive better payment conditions from their suppliers after the boycott. The total effect for high leverage firms, however, is insignificant which suggests that they were not able to receive such concessions. While the coefficients for other types of debt are insignificant, they suggest that overall high leverage firms must repay their debt and their creditors are unlikely to accommodate the unexpected demand shock by extending more credit.

4.4.2 Accounts Receivable from Customers

Table 10 presents results for accounts receivable. Low leverage firms significantly increase current and long-term receivables, particularly for ongoing work, and the increase is larger than the change in their sales. This increase is consistent with granting better payment conditions to their customers as a way to secure additional demand and sell products which could not be sold to Muslim countries. The increase in receivables is significantly smaller for high leverage firms. Even though they would clearly prefer to secure additional demand, they may unable to grant better payment conditions because they have their own financial obligations to meet.

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Table 10: Accounts Receivable

All regressions include firm fixed effects and binary variables for each year interacted with indicators for high leverage and exposure to the boycott. The main independent variable is triple interaction of being exposed to the boycott (treatment), having high leverage and post-boycott period (year 2006). Dependent variables are levels of current receivables: total, for goods and for on-going work and total long-term receivables; and log-change in inventories. The bottom row presents the mean of dependent variables in the pre-boycott period. In all regressions standard errors are clustered on industry X year level.

	(1) Δln(Receiv) (All Current)	(2) Δln(Receiv) (Goods)	(3) Δln(Receiv) (Ongoing Work)	(4) Δln(Receiv) (Other)	(5) Δln(Inventory)
Treated X 2006	0.0659 (0.041)	0.1269*** (0.040)	0.3133* (0.160)	0.0549 (0.107)	0.0271 (0.054)
Treated X High Lev X 2006	-0.0890*** (0.031)	-0.1640*** (0.041)	-0.1174 (0.199)	0.0282 (0.063)	-0.1148* (0.061)
Observations	76,711	75,060	18,467	74,966	43,480
R-squared	0.121	0.133	0.421	0.082	0.227
Firms	15203	15136	7844	15162	13601
Sample Avg 01-05	20121	11284	2702	8567	7451

Standard errors clustered on industry X year level

*** p<0.01, ** p<0.05, * p<0.1

4.4.3 Inventory

Every firm has some optimal level of inventory. Holding too much inventory is unnecessarily costly and diverts firm funds from more productive use. Holding too little, on the other hand, may put the firm at the risk of unexpected downtime because of disruptions in the supply chain. As far as stock of completed products is concerned, it also poses a risk of not being able to quickly fulfill customer orders. Choosing level of inventory is therefore a trade-off between costs and potential threats to smooth operations. When a firm is pressed for reducing costs and securing additional liquid funds, it may decide to lower its inventory holdings. Column 5 of Table 10 confirms such a reaction: after the boycott high leverage firms significantly reduce their level of inventory. While this can partially be explained by the fact that they reduce sales more than low leverage firms, the drop in inventory (over 11%) is much larger than the drop in sales. It therefore suggests that high leverage firms decrease their inventory holdings to avoid freezing their liquid funds which are in high demand after the boycott.

4.5 Redirecting Sales

In Section 3.2 we have shown that the pre-boycott export exposure to Muslim countries was similar for low- and high leverage firms. When the boycott hits, however, some firms may be able to accommodate it better than others. In particular, some firms may be able to find new markets or sell different products to their existing markets to mitigate the adverse effects of the shock. All these activities, however, are costly and risky, and hence financially constrained firms may be unable or unwilling to perform them. They may lack capital necessary to invest in the development of new markets or the risk of entering new markets may be simply too high given their need to honor financial obligations. Table 2 in Section 4.1 confirms that low leverage firms significantly increase exports to non-Muslim countries but high leverage firms do not. In this subsection we investigate the export response in more detail. We take advantage of the detailed product-destination level data on export flows and analyze the introduction of new products and entering new export markets by low- and high leverage firms.

Table 11 shows that as the result of the boycott, both low leverage and high leverage firms stopped exporting to around 20% of their export destinations. The drop is slightly higher for high leverage firms which suggests that low leverage firms were able to enter some new markets.[8] Columns 2-4 show that low leverage firms were able to introduce new products. The dependent variable is the number of product categories for which we observe non-zero export flows for a given firm. Column 2 defines product category based on the 6-digit classification from the harmonized system (HS), while columns 3 and 4 use the 4- and 2-digit classification, respectively. An example of 2-digit category is "Coffee, Tee, Mate and Spices". Within this group, 4-digit categories include "Coffee" and "Tea", while "Black Tea" or "Green Tea" are examples of 6-digit products. Therefore

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[8]This result emphasizes the importance of distinguishing high and low leverage firms. In a case study of dairy producers, Hiller, Schröder, and Sørensen (2014) do not find reallocation of products across markets after the boycott on average for exposed dairy producers.

Table 11: Redirecting Sales: New Export Markets and Products

All regressions include firm fixed effects and binary variables for each year interacted with indicators for high leverage and exposure to the boycott. The main independent variable is triple interaction of being exposed to the boycott (treatment), having high leverage and post-boycott period (year 2006). Dependent variables are log-changes of number of export destinations and number of exported products defined as non-zero flows in 6-, 4- and 2-digits product category in HS system. The bottom row presents mean of dependent variables in the pre-boycott period. In all regressions standard errors are clustered on industry X year level.

	(1) Δln(Num Countries)	(2) Δln(Num 6-dgt Products)	(3) Δln(Num 4-dgt Products)	(4) Δln(Num 2-dgt Products)	(5) Δln(Num Product-Country)
Treated X 2006	-0.1869***	0.0615*	0.0782**	0.0568**	-0.0579*
	(0.024)	(0.036)	(0.034)	(0.025)	(0.033)
Treated X High Lev X 2006	-0.0403*	-0.0917**	-0.0945***	-0.0661**	-0.0715**
	(0.023)	(0.037)	(0.035)	(0.030)	(0.029)
Observations	53,910	53,910	53,910	53,910	53,910
R-squared	0.174	0.180	0.171	0.148	0.208
Firms	13307	13307	13307	13307	13307
Sample Avg 01-05	7.810	11	7.878	4.149	30.60

Standard errors clustered on industry X year level

*** p<0.01, ** p<0.05, * p<0.1

while introducing new 6-digit products, evidenced by column 2, may be viewed as slightly modifying a firm's range of export products, introducing a new 2-digit category (column 4) is an important innovation which presumably required additional investment. Our results therefore confirm that low leverage firms actively innovate and look for new ways to use their existing capacity. Those ways include not only entering new markets (column 1) but also introducing new products which are often very different from existing product portfolio. Column 5 shows that introducing new products alleviates the drop in number of country-product pairs induced by the boycott for low leverage firms. The difference between high- and low leverage firms is higher for country-product pairs than for number of countries, which again confirms that high leverage firms are unable to introduce new products.

Are low leverage firms really entering new markets or perhaps only using them as a gateway to Muslim countries? One could imagine that in the face of the boycott some Danish producers may decide to use foreign firms to reach Muslim markets. For example, a Danish firm may be unable to export to Saudi Arabia and may decide to sell its products to a Russian firm, who can then sell it to Saudi Arabia. If that were the case, we could see Russia as a new export market while in reality the products still ended up in Muslim countries. This is an interesting possibility which we cannot rule out. However, we believe that it is unlikely to explain a significant portion of our results. First, the increase in the number of products suggests that firms do indeed significantly

change their operations and truly entering new markets is consistent with this evidence. Second, the boycott targets all products associated with Denmark, not only those produced in Denmark. Therefore a Danish brand will be boycotted even if the product is sold by a foreign firm or even is produced in a different country.

5 Robustness

Our results are based on a simple and intuitive research design: we categorize firms as low- or high leverage and compare firms who were exposed to the boycott, controlling for outcomes of firms with the same leverage status but not exposed to the boycott. This approach is very natural but it raises a question whether the results are robust to alternative specifications. In this section we present key robustness checks for our analysis, related to the degree of exposure, the definition of leverage and controlling for additional firm characteristics.

Table 12 reports the results of robustness checks. Each panel of the table reports results for a separate regression. In Panel A-C, we first use alternative measures of leverage. Panel A replaces the binary indicator for high versus low leverage before the boycott by the continuous measure of total debt over total assets before the boycott. This specification yields highly significant results of similar magnitude as our main results. In Panel B, we limit our attention to debt that is related to financial leverage, specifically using short-term and long-term bank debt rather than total liabilities. The coefficient estimates in this specification are slightly smaller than the main results, suggesting that all sources of liabilities contribute to the financial pressure that firms face after the boycott. Ignoring debt to suppliers for example reduces the precision in specifying the set of firms that face financial distress. Panel C defines high versus low leverage within industry, and shows that the main results are not explained by differences in leverage across industries. Arguably, this leverage definition within industry ignores valuable variation in the level of leverage across firms in different industries, which explains the reduction in power for these results.

Finally, Panel D focuses on the size of the shock. In this model, we replace the binary treatment indicator for boycott exposure with a continuous measure of the share of exports to Muslim countries in 2005. The results show that more exposed firms reduce employment more strongly, and are much more likely to increase their leasing activity. The point estimates for the share of outsourcing in total sales and for own investment are also about twice the size of the main estimates, suggesting that the effects are stronger for highly exposed firms, but these results are not precisely estimated.

6 Mechanisms and Alternative Explanations

In this section, we shed more light on the underlying mechanism for the main results. We first address the concern that leverage not only captures the role of financial constraints at the time of the boycott, but may also proxy for other unobserved differences across firms, in particular differences in firm size, industry, and product variety. In the second step, we focus on the mechanism through

Table 12: Robustness Results

Each panel in the table reports results for a separate regression. All regressions include firm fixed effects and year fixed effects, as well as the main regressor of interest interacted with year indicators. The main independent variable is the triple interaction of being exposed to the boycott (treatment), having high leverage and post-boycott period (year 2006). In all regressions standard errors are clustered on industry X year level.

Model Extension	(1) Δ ln(FTE Employment)	(2) Any Outside Labor	(3) Outside Labor (% of Sales)	(4) Any Leasing	(5) ln(Own Inv Equipment)
Panel A: Continuous Leverage					
Treated X 2006	0.0570***	-0.0619*	-0.0043	-0.0694***	0.3397*
	(0.021)	(0.037)	(0.003)	(0.025)	(0.177)
Treated X 2006	-0.0771***	0.0815**	0.0072	0.0807***	-0.1936
X Leverage	(0.028)	(0.034)	(0.005)	(0.029)	(0.207)
Panel B: Financial Leverage					
Treated X 2006	0.0209	-0.0238	-0.0024	-0.0461**	0.2731**
	(0.014)	(0.029)	(0.002)	(0.023)	(0.125)
Treated X 2006	-0.0313**	0.0279	0.0057**	0.0610***	-0.1130
X High Lev	(0.014)	(0.026)	(0.003)	(0.023)	(0.148)
Panel C: Leverage by Industry					
Treated X 2006	0.0301***	-0.0219	-0.0038**	-0.0261	0.2653**
	(0.011)	(0.025)	(0.002)	(0.016)	(0.109)
Treated X 2006	-0.0592***	0.0346*	0.0042	0.0372*	-0.2115*
X High Lev	(0.017)	(0.020)	(0.003)	(0.020)	(0.108)
Panel D: Continuous Exposure					
Exposure X 2006	-0.0321	-0.0602	-0.0039	-0.0081	0.1722
	(0.053)	(0.038)	(0.003)	(0.046)	(0.315)
Exposure X 2006	-0.1862***	0.0537	0.0072	0.1364***	-0.8118
X High Lev	(0.058)	(0.045)	(0.006)	(0.044)	(0.519)
Observations	76,826	76,826	76,815	76,826	45,414
Firms	15,208	15,208	15,208	15,208	13,411

Standard errors clustered on industry X year level

*** p<0.01, ** p<0.05, * p<0.1

Table 13: Alternative Explanations for Differential Adjustment of High and Low Leverage Firms

Each panel in the table reports results for a separate regression. All regressions include firm fixed effects and year fixed effects, as well as the main regressor of interest interacted with year indicators. The main independent variable is the triple interaction of being exposed to the boycott (treatment), having high leverage and post-boycott period (year 2006). In all regressions standard errors are clustered on industry X year level.

Model Extension	(1) Δ ln(FTE Employment)	(2) Any Outside Labor	(3) Outside Labor (% of Sales)	(4) Any Leasing	(5) ln(Own Inv Equipment)
Panel A: Industry-Time FE					
Treatment X 2006	-0.1009**	-0.0148	0.0076	0.0111	-0.7576***
	(0.040)	(0.027)	(0.005)	(0.026)	(0.256)
Treatment X 2006	-0.0595***	0.0540**	0.0045*	0.0543***	-0.1972*
X High Lev	(0.020)	(0.022)	(0.003)	(0.021)	(0.108)
Panel B: Empl Bins X Year FE					
Treatment X 2006	-0.0556***	0.0554**	0.0045*	0.0643***	-0.2522**
X High Lev	(0.020)	(0.023)	(0.003)	(0.023)	(0.111)
Panel C: Sales Bins X Year FE					
Treatment X 2006	-0.0587***	0.0536***	0.0047*	0.0600***	-0.2168**
X High Lev	(0.018)	(0.020)	(0.003)	(0.021)	(0.105)
Panel D: Export Products X Year FE					
Treatment X 2006	-0.0586***	0.0560**	0.0042*	0.0586***	-0.2933***
X High Lev	(0.018)	(0.023)	(0.002)	(0.022)	(0.103)
Observations	76,826	76,826	76,815	76,826	45,414
Firms	15208	15208	15208	15208	13411

Standard errors clustered on industry X year level

*** p<0.01, ** p<0.05, * p<0.1

which leverage affects firms' ability to adapt to the negative demand shock – reduced liquidity. First, reduced liquidity is the result of higher payments that highly leveraged firms need to make while facing a decrease in cash flows from the boycott. Second, reduced liquidity can be exacerbated if highly leveraged firms face limited access to additional capital. We illustrate this mechanism by analyzing the role of cash holdings as a buffer to provide flexibility to respond to changes in the market environment, and by analyzing the role of debt maturity on firms' responses after the boycott.

Table 13 analyzes the role of other firm characteristics that may influence firms' responses during a crisis, and whose influence the main analysis may partly attribute to the effects to leverage. To this end, we extend the main specification in equation (1) by adding additional control variables. Panel A first include industry-time fixed effects in order to rule out that differences in leverage across industries may drive the main results. This specification yields very precise estimates of

the reduction in employment and investment, and the increase in outsourcing and leasing, which are very similar in magnitude to the main results. As a consequence, sector-specific trends cannot explain the differential adjustment of high leverage firms after the boycott. Panels B and C show that the differences between high and low leverage firms are not explained by differences in firm size. Specifically, we group firms in ten bins according to firm size in 2005 and include interaction terms for each bin with each year of the sample period to allow for differential trends in the most flexible way. The results from this model are quantitatively similar to the main results and very precisely estimated. This is an important robustness check because Table 1 shows some differences in firm size between these two groups among exposed firms. Panel D provides an alternative check whether highly leveraged firms suffer more because they have fewer opportunities to redirect sales, measured by the number of export products before the boycott. This regression also rejects product variety as a main factor to explain the differences between high and low leverage firms that we find.

Another way of looking at firm's liquidity, ignored by our measure of leverage, is the size of cash holdings. The question is to what extent high leverage is correlated with low cash holdings that limit the firm's ability to respond to changes in the market environment. In order to shed light on this mechanism, Table 14 first analyzes the role of the quick ratio, defined as cash holdings relative to total liabilities. Panel A uses an indicator for high versus low quick ratio, where the cutoff is the median quick ratio among all exposed and non-exposed exporters in 2005. The results suggest that firms with higher cash holdings as a share of total liabilities reduce employment and investment less, and are less likely to use outsourcing and leasing. This is consistent with the shielding role of cash holdings in the face of adverse shocks. Yet, these results are non precisely estimated. Panel B replaces the binary indicator for high versus low quick ratio with the continuous measure of cash relative to liabilities in 2005. This additional variation provides more power to find statistically significant patterns of lower flight to flexibility among exposed firms with higher cash holdings. Yet, comparing the magnitude of these effects with the main results for high versus low leverage indicates that cash constraints only explain a small part of the adjustment pattern. The average quick ratio among exposed firms is 5% of total liabilities, with a standard deviation of 10%. This implies that an increase in the quick ratio by one standard deviation yields a muted employment reduction by 0.1%, compared to the average effect of -6% in Table 3. Another way of showing the small effect of cash holdings on firms' responses is to use the ratio of cash holdings compared to assets in Panel C. The insignificant results in this specification suggest that the findings in Panel B are mostly driven by liabilities in the denominator of the quick ratio, rather than by the size of cash holdings. The small size of cash holdings effect may be partially explained by the fact that cash holdings of most firms are small compared to the size of the economic shock. Another way to analyze the importance of cash would be to look at the cash flow instead of cash holdings. Unfortunately, cash flows are not available in our data and hence cash stock has to be used for our proxy for how cash-rich the firm is.

We provide additional suggestive evidence for the mechanism of reduced liquidity in Panel D of Table 14. Unfortunately we do not observe loan-level data on maturity. Instead, we can only use

Table 14: Results: Cash Holdings and Debt Maturity

Each panel in the table reports results for a separate regression. All regressions include firm fixed effects and year fixed effects, as well as the main regressor of interest interacted with year indicators. The main independent variable is the triple interaction of being exposed to the boycott (treatment), having high leverage and post-boycott period (year 2006). In all regressions standard errors are clustered on industry X year level.

Model Extension	(1) Δ ln(FTE Employment)	(2) Any Out- side Labor	(3) Outside Labor (% of Sales)	(4) Any Op Leasing	(5) ln(Own Inv Equipment)
Panel A: Quick Ratio					
Treated X 2006	-0.0105	0.0049	0.0010	0.0010	0.1217
	(0.022)	(0.023)	(0.002)	(0.020)	(0.138)
Treated X 2006	0.0313	-0.0321	-0.0017	-0.0317	0.1867
X High Quick	(0.023)	(0.023)	(0.002)	(0.020)	(0.125)
Panel B: Continuous Cash/Liabilities					
Treated X 2006	-0.0082	0.0051	0.0011	0.0044	0.1648
	(0.018)	(0.023)	(0.003)	(0.018)	(0.122)
Treated X 2006	0.0113*	-0.0130**	-0.0007**	-0.0154***	0.0391
X Quick Ratio	(0.007)	(0.005)	(0.000)	(0.004)	(0.026)
Panel C: Continuous Cash/Assets					
Treated X 2006	-0.0104	0.0062	-0.0038	0.0094	0.1056
	(0.025)	(0.032)	(0.002)	(0.028)	(0.192)
Treated X 2006	0.0349	-0.0374	0.0088	-0.0534	0.2582
X Cash/Asset Ratio	(0.045)	(0.050)	(0.007)	(0.058)	(0.353)
Panel D: High Share of Long-Term Debt Maturing Soon					
Treatment X 2006	0.0177	-0.0327	-0.0001	-0.0287	0.3260***
	(0.017)	(0.027)	(0.003)	(0.021)	(0.113)
Treatment X 2006	-0.0233*	0.0416*	0.0006	0.0266	-0.1972*
X Debt Maturing Soon	(0.012)	(0.022)	(0.002)	(0.018)	(0.112)
Observations	74,373	74,373	74,362	74,373	43,821
Firms	14,674	14,674	14,674	14,674	12,794

Standard errors clustered on industry X year level

*** p<0.01, ** p<0.05, * p<0.1

changes in net debt stocks in the years before the boycott to approximate for maturity after the boycott starts. In particular, we define firms as likely to face a high stock of maturing long-term debt in 2006 if less than half of their stock of long-term debt at the end of 2005 is accounted for by an increase in long-term debt during 2005. As a result these firms with lower share of recent increase in long-term debt face a higher liquidity constraint during the boycott when a larger share of their debt will mature.

Panel D of Table 14 replaces the indicator for high leverage with an indicator for high stock of long-term debt that will mature soon during the boycott. We also include interactions of this indicator variable with year dummies to flexibly account for different time trends of firms with high or low share of maturing debt during the boycott. We find a significant reduction in employment for firms with a higher share of maturing long-term debt. This response goes along with a significant increase in outsourcing of labor services and a reduction in own investment. The sign of leasing response and intensive margin of outsourcing response is as expected, but the coefficients are imprecisely estimated. These findings emphasize the role of liquidity constraints in explaining the differential responses across firms. Yet, long-term debt is only one part of total obligations of firms. This is consistent with the smaller effects that we find in Panel D compared to the main analysis.

In sum, these exercises first highlight that leverage does not simply capture differences across exposed firms based on firm size, industry, or product variety. Second, we show that differences in cash holdings relative to total liabilities are related to firm's ability to adapt to the boycott. But cash holdings are relatively small and therefore can only explain a small share of the overall differences in firms' adaptation. Third, we provide evidence based on long-term debt maturity to further highlight the role of liquidity constraints.

7   Conclusion

This paper shows how financial leverage influences firms' responses to an unexpected demand shock. We take advantage of a natural experiment in Denmark, the Muslim boycott of Danish exporters after a major Danish newspaper first published Muhammad cartoons in 2005, which led to a sudden and unexpected reduction of foreign demand for a small set of firms in an otherwise growing economy. We find evidence of systematically different adaptation to this shock between high and low leverage firms. While firms with low and high leverage have similar exposure to the boycott, only the former are able to withstand the shock without reducing employment or investment and to redirect their sales elsewhere. high leverage firms, on the other hand, reduce their sales, employment, and investment, and exhibit flight to flexibility: they partially substitute employment with outsourcing and owning assets with leasing.

Our results highlight the importance of liquidity constraints in determining the ability to adapt to a changing environment. Low leverage firms are able to increase their investment and add new product categories in their non-Muslim destination markets to counteract the negative demand shock. They also benefit from their relationships along the supply chain to stabilize their busi-

ness, receiving additional trade credit from suppliers and granting more delayed payment to their customers. high leverage firms are less able to extend their trade credit or to make investments; instead, their main focus seems on reducing their financial obligations in the face of this negative shock. This comparison emphasizes implicit costs of high leverage that firms have to take into account as they choose their capital structure to begin with. Importantly, we characterize the nature of these costs as a competitive disadvantage in times of crisis, even if a firm is not close to bankruptcy.

We note that all our results about firms' adaptation to this shock capture short-term responses within one year after the boycott started. This means we do not take a stand on the long-run costs or benefits of these differential adjustments. Financial distress at highly leveraged firms will be temporary and these firms might be able to regain market share from their less leveraged competitors in the future. Even more, it is possible that financial distress forces firms to engage in necessary change (Jensen, 1986) that may imply short-term losses, but could make the firm more profitable in the long run. This suggests that part of the response we document may represent short-term adjustments, while other parts may constitute structural change in firm organization triggered by financial distress from a negative demand shock. Without analyzing the role of capital structure, Friedrich (2016) shows that a small share of exposed firms decide to delayer and systematically change their occupational hierarchy and internal wage structure. We view these questions about the relationship between financial distress, organizational change and persistent consequences on competitive advantage as a promising avenue for future research.

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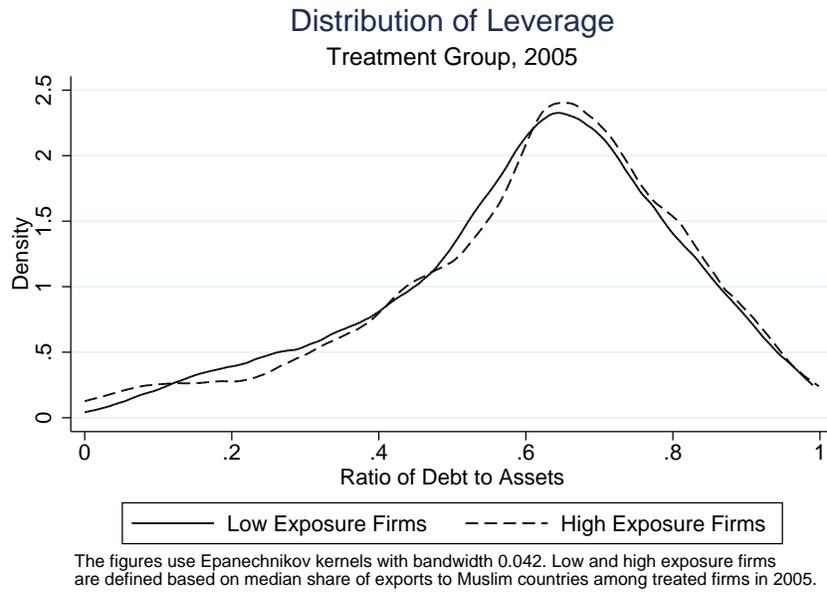
Online Appendix

Distribution of Leverage
Treatment Group, 2005

The figures use Epanechnikov kernels with bandwidth 0.042. Low and high exposure firms are defined based on median share of exports to Muslim countries among treated firms in 2005.

Figure A.1: Distribution of Leverage for Firms with Low and High Exposure to the Boycott
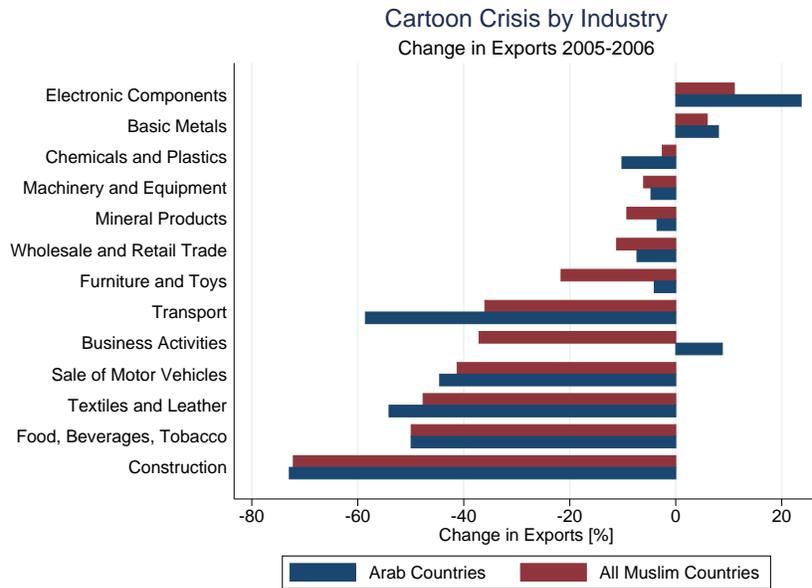

Cartoon Crisis by Industry
Change in Exports 2005-2006

Figure A.2: Boycott across Industries