Online Appendix

Anatomy of the Greek Depression with Firm-Level Data: The Importance of Demand Shocks

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A Data

A1 Data Description

The firm-level data that we use are proprietary and have been obtained from ICAP Group S.A., a private research company that collects and maintains detailed balance sheet and income statement data for S.A. ("Société Anonyme" - Public Limited Companies) and Limited-Liability (Ltd) companies in Greece, along with their establishment date, location and ownership status, for credit risk evaluation and management consulting. In Greece, the law requires all S.A. and Ltd companies to file annual financial statements with the national business register (the "General Electronic Commercial Registry - G.E.MI.") and ICAP strives to cover the universe of these firms.[1]

Our dataset contains firm-level information for 30,420 Greek firms operating in all sectors, except for banks and insurance companies, for the time period 1998 - 2014.[2] Our dataset is the largest available firm-level dataset for the Greek economy. A natural question is whether our firm-level dataset resembles well the aggregate Greek economy. Table A1 summarizes the coverage in our data compared to the aggregate economy between 1998 and 2014. The columns in the table present the ratio of gross output aggregated from our sample relative to the aggregate quantity in

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[1]The coverage in the ICAP database for S.A. and Ltd companies ranges between 90% and 96% for the years 2011- 2014 (Giannoulakis and Sakellaris, 2022). The dataset used in this paper is a subset that contains the required detailed financial information.

[2]Starting from the ICAP database we kept a dataset that contained all requisite accounting information along with detailed information for establishment date, location and 2-digit NACE REv. 2 industry classification. Details on the cleaning procedures for the firm-level data can be found in Online Appendix B.

Eurostat as reported in its Structural Business Statistics (SBS).[3] The data in Eurostat are from census sources and cover the universe of Greek firms. As Table A1 shows, the coverage in our sample is consistently high: it averages roughly 57 percent of the aggregate economy.

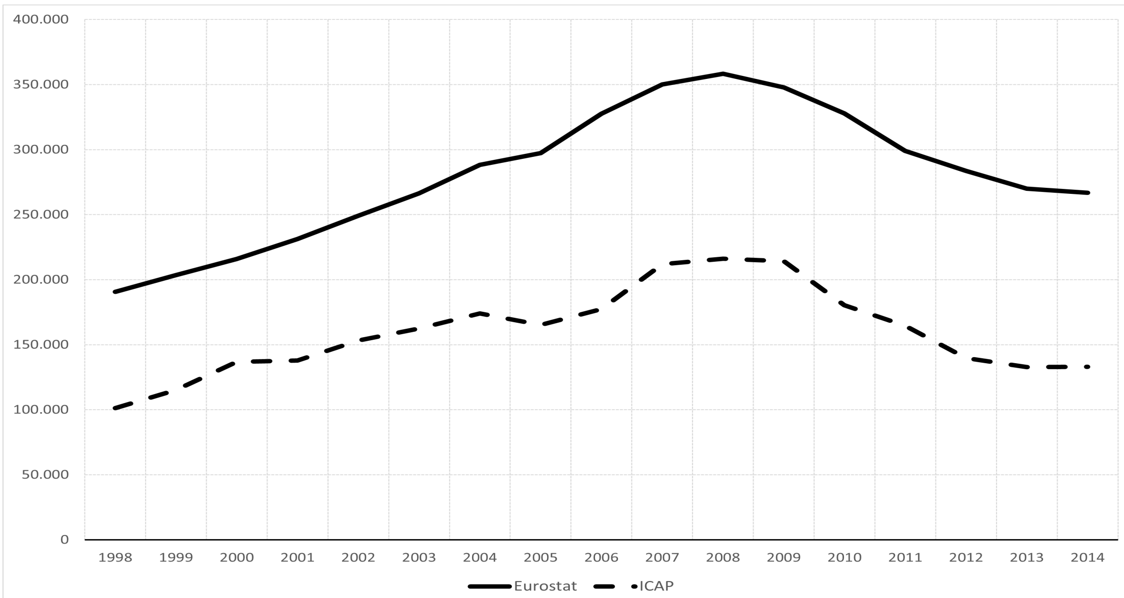


Figure A1: Aggregate Gross Output in our Dataset and Eurostat (SBS)

Notes: In this Figure, we compare the evolution of aggregate gross output (expressed in million euros) in our dataset with the same aggregate as recorded by Eurostat (Structural Business Statistics-SBS).

For Greece, there are three available data sources on firm sales: *ICAP Group S.A.* (our selected source), *EL.STAT.* (the national statistical authority), *Orbis-Amadeus* (from Bureau van Dijk (BvD) - a Moody's Analytics company). None of them provides census data. EL.STAT. has complete and extensive data only for manufacturing firms. ICAP has data for all sectors of the Greek economy, including manufacturing. Moreover, EL.STAT. has data only for firms with 10 or more employees excluding micro and very small firms, which our dataset does not exclude. Furthermore, the coverage of the aggregate economy (in terms of gross output) is higher in our dataset than in Orbis-Amadeus.[4] So, arguably, ICAP is the best available source of firm-level information for Greece.

[3]Gross output is defined by the Bureau of Economic Analysis (BEA) as: "a measure of an industry's sales or receipts, which can include sales to final users in the economy (GDP) or sales to other industries (intermediate input). At the firm-level, gross output is measured by aggregate gross sales.

[4]Kalemli-Özcan et al. (2024) provide a detailed presentation of the Orbis-Amadeus database for many countries, including Greece. In Table D.1.1 (Online Appendix, p. 69) of their study, we can see that the coverage of the aggregate economy, based on gross output, in Orbis-Amadeus is 55% for Greece over the period 1999-2012. The coverage in our ICAP sample for the same period is 57%.

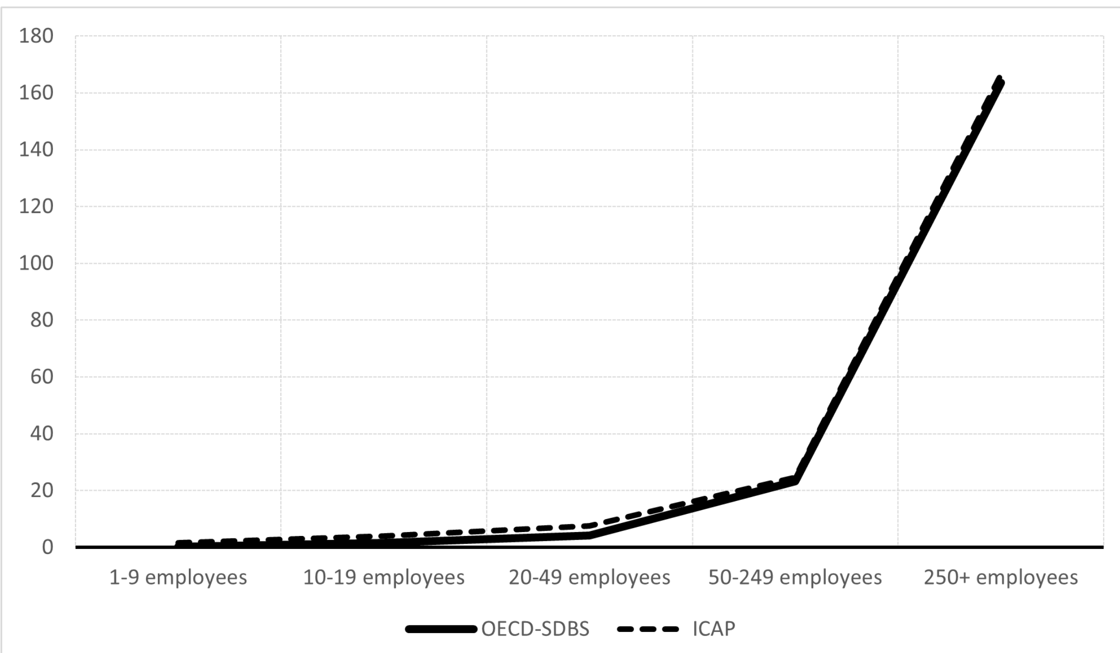
Year	Gross Output
1998	0.53
1999	0.57
2000	0.63
2001	0.60
2002	0.62
2003	0.61
2004	0.60
2005	0.56
2006	0.54
2007	0.61
2008	0.60
2009	0.62
2010	0.55
2011	0.55
2012	0.49
2013	0.49
2014	0.50
Average	0.57%

Notes: This Table summarizes the coverage in our data for Greece between 1998 and 2014. The columns in the table represent the ratio of aggregate gross output recorded in our sample relative to the same object in Eurostat as reported by its Structural Business Statistics (SBS). At the firm-level, gross output is measured by aggregate gross sales, deflated by the Producer Price Index (PPI).

Table A1: Gross Output coverage in our sample relative to Eurostat

It is reassuring that the time series properties of the aggregated magnitude for gross output from our raw sample track aggregate data quite well. Figure A1 plots aggregate gross output in our ICAP data set for the time period 1998-2014. It compares the aggregated quantity from our dataset to the respective aggregate as recorded by Eurostat. As we can see, the series in our sample mimics aggregate activity well. The trajectory of total firm sales tracks closely the trajectory of gross output at the macro-level. Moreover, the impact of the Greek Depression on aggregate gross output is quantitatively similar from 2008 to 2014 in our ICAP dataset (21% decline) and in the aggregate data from Eurostat (22% decline).

We further explore the representativeness of our sample by comparing (aggregated) sales across the employment-size and age distributions in our sample with the same aggregates in the universe of firms. The national-level data for sales by employment-size and age comes from the OECD's Structural and Demographic Business Statistics (SDBS) database. We were not able to locate the needed information by size groups defined by sales. Thus, we present analyses only by employment-size categories.[5]



Notes: This Figure compares average firm sales (defined as the ratio of aggregate gross sales to the number of firms) by employment-size groups in our sample with the same object in the OECD-SDBS database. Gross sales are expressed in million euros.

Figure A2: Average Gross Sales by Size Category

[5] Although our ICAP dataset does not contain complete employment data, it contains an indicator that separates firms into employment-size groups.

Starting with firm size, Figure A2 compares average firm sales (defined as the ratio of aggregate gross sales to the number of firms) by employment-size groups in our sample with the same object in the OECD-SDBS database. The OECD-SDBS data for different size groups are available for the time period 2009-2014, so we calculated the average firm sales in our dataset for the same period. As we can see, average firm sales in our sample compare very favorably to that average in the total population, even for the very small firms (1-9 employees). Of course, the comparison has been made across the employment-size and not the sales-size distribution due to data limitations. There is still the possibility that very small firms are under-represented in our sample, especially since sole proprietorships are not included in the ICAP sample (and these firms are typically small). To mitigate this potential size-induced sampling bias, we have included firm size in the conditioning variables in the Probit equation (B.6) that we use for endogenous selection and sampling bias correction (see Online Appendix B2 for further details).

Shares in Active Firms			
	New Births	Young	Mature
OECD	5.30%	28.66%	71.34%
ICAP	5.77%	20.03%	79.97%

Table A2: Firm Numbers by Age Groups in our Dataset and OECD (SDBS)

Notes: This Table presents the shares of startups, young and mature firms in our ICAP dataset (averages for the period 1998-2014) and in OECD-SDBS database (for the year 2015, as OECD provides firm number data for different age groups only for 2015 and after).

Turning to firm age, Table A2 presents the number of startups, young and mature firms in our ICAP dataset (averages for the period 1998-2014) and in OECD-SDBS database (for the year 2015). OECD-SDBS provides firm number data for different age groups only for 2015 and after. Under the assumption that business demographics by age are not very different in 2015 than they were during the period 1998-2014 (i.e. the time dimension of our sample), we were able to compare the numbers of firms by age in our sample versus the population. A firm is mature if its age is greater than 5 years and young if its age is between 1 and 5 years. As we can see, the shares of active firms across the age distribution in our sample are consistent with the respective ones in the the OECD-SDBS database (unfortunately, sales shares were not available). The lower number of young firms in our sample can be attributed to the decline in the entry rate of Greek firms during the financial crisis.[6] We have included firm age in the conditioning variables in the selection equation (B.6) to correct for any age-related sampling bias (see Online Appendix B2 for further details).

Following the above discussion, we are confident that our sample is representative of the Greek economy and, thus, appropriate to study firm sales dynamics across the age and size distributions.

[6]The entry rate fell by 14% from 2008 to 2014 according to the national business register (General Electronic Commercial Registry - G.E.MI.).

A2 Data Cleaning

We prepare the data for estimation in three stages. First, we clean the data from basic reporting mistakes. Second, we keep firm-year information with fully available information for the variables of interest (sales, inventories, corporate debt and establishment date). Third, we trace and deal with gaps in the data.[7] In particular, we implement the following steps to clean the data:

1. We set to missing firm-year observations of gross sales and total assets that are zero or negative.

2. We set to missing firm-year observations of inventories and total debt that are negative.

3. We drop firms with 4 or more consecutive zero inventory observations.

4. We keep firm-year observations that have information on gross sales, total assets, inventories, total debt and establishment date.

5. We audit for duplicates in our data.

6. We address potential gaps in the data by removing firms from our sample that have a high number of missing observations. Specifically, we delete firms if they have three or more missing entries in their sales or inventory data, or if they have a single gap that lasts longer than five consecutive years. This helps maintain the internal consistency of our dataset.

Finally, we trim observations in the top and bottom 1% of firm sales growth rates to minimize the effect of outliers.

After the cleaning process, we end up with an unbalanced (due to the entry and exit) dataset containing 30,420 firms operating in the Greek economy.[8]

[7] By the term gap we mean a set of consecutive missing firm-year observations.
[8] The original ICAP database contains more than 80,500 Greek companies.

A3 Further Descriptive Statistics

Overall Sample Period				
	Small	Medium	Large	Total
Young	7.77	7.40	1.12	16.30
Mature	28.62	41.59	13.49	83.70
Total	36.39	48.99	14.62	100.00
Pre-crisis Period				
	Small	Medium	Large	Total
Young	8.23	9.51	1.44	19.18
Mature	24.66	41.94	14.22	80.82
Total	32.89	51.45	15.65	100
Crisis Period				
	Small	Medium	Large	Total
Young	7.15	4.54	0.70	12.39
Mature	33.98	41.11	12.51	87.61
Total	41.14	45.65	13.21	100

Notes: This table presents the shares of firms by age and size for the overall sample period (1999-2014), the pre-crisis period (1999-2008) and the crisis period (2009-2014).

Table A3: Shares (%) of Firms by Age and Size

		Whole Period (1998-2014)	Pre-crisis (1998-2008)	Crisis (2009-2014)	Decline due to the Crisis
All Firms	Obs	270,172	157,575	112,597	
	Mean	0.023	0.174	-0.189	-0.363
	Median	-0.011	0.033	-0.100	
	SD	0.759	0.671	0.822	
Young Firms	Obs	54,127	36,558	17,569	
	Mean	0.455	0.568	0.221	-0.347
	Median	0.166	0.208	0.051	
	SD	1.067	0.925	1.283	
Mature Firms	Obs	216,045	121,017	95,028	
	Mean	-0.086	0.055	-0.265	-0.320
	Median	-0.032	0.010	-0.114	
	SD	0.614	0.517	0.677	
Small Firms	Obs	92,532	48,174	44,358	
	Mean	-0.089	0.130	-0.327	-0.458
	Median	-0.032	0.034	-0.137	
	SD	0.765	0.601	0.849	
Medium Firms	Obs	124,585	75,356	49,229	
	Mean	-0.103	-0.006	-0.252	-0.247
	Median	-0.032	0.004	-0.114	
	SD	0.482	0.365	0.589	
Large Firms	Obs	37,169	22,923	14,246	
	Mean	-0.090	-0.028	-0.192	-0.164
	Median	-0.012	0.016	-0.077	
	SD	0.428	0.362	0.501	

Notes: This table presents some descriptive statistics (mean, median, standard deviation, and the number of observations) for the DHS growth rates of Greek firms, defined by formula (3.1) of the manuscript, by firm age and size. Age and size classifications are described in subsection 3.2.1 of the manuscript.

Table A4: Growth Rates of Greek Firms across the Age and Size Distributions

Young firms achieved significantly faster growth than their mature counterparts in both periods and the decline in their growth rates due to the crisis was only a little larger than for mature firms. The pattern is different for the comparison between small and large firms, with small firms displaying higher growth rates before the crisis relative to large firms, whereas the opposite is true during the crisis. Clearly, the crisis affected small firms' growth rates significantly more than those of large firms.

A4 Dealing with Zero Inventories

To understand the impact of demand shocks on firm growth, we need to determine their magnitude. However, when inventory levels are zero, we cannot accurately measure the demand shock. To address this issue, we have taken the following steps:

First, we excluded firms with four or more consecutive observations of zero inventory, as outlined in Section A2. This removal accounted for 8.5% of the originally available observations. After this adjustment, approximately 7.5% of our remaining sample observations still reported zero inventories.

Table A5 shows the proportion of zero inventory occurrences in each sector of economic activity (1-digit NACE Rev. 2), along with the overall share in the complete sample. We found that sectors focused on "service activities" have a higher incidence of zero inventory compared to those producing "material goods." To reduce the influence of zero inventories on estimating firm-level demand shocks, ζ_{it}, we estimated equation (3.3), which identifies demand shocks, and subsequently applied equation (3.4) separately for each 2-digit NACE Rev. 2 sector, totaling 96 sectors.

1-digit NACE Rev. 2 Sector	**Share of Zero Inventories**
Agriculture, forestry and fishing	2.9%
Mining and quarrying	2.7%
Manufacturing	0.8%
Energy; sewerage, waste management and remediation activities	18.5%
Construction	8.7%
Wholesale and retail trade; repair of motor vehicles and motorcycles	1.2%
Transportation and storage	31.4%
Accommodation and food service activities	7.8%
Information and communication	14.9%
Financial and insurance activities	29.4%
Real estate activities	30.1%
Professional, scientific and technical activities	39.2%
Services	22.2%
Economy	**7.5%**

Notes: This table presents the share of zero inventory observations for the whole sample and by sector of economic activity. Sectors have been defined according to European Commission's *Statistical Classification of Economic Activities in the European Community* NACE Rev. 2 (at the 1-digit level).

Table A5: Share of Zero Inventory Observations in each Sector of Economic Activity

Table A6 presents the number and percent of firms that have $s\%$ of their inventory observations being zero (not necessarily in consecutive years), while Table A7 reports the number and percentage of observations corresponding to firms with share $s\%$ of zero inventory observations. Our estimation sample contains 30,420 Greek firms covering 16 years (1999-2014) corresponding to 270,172 observations. The overwhelming majority of firms in our sample (88.4%) have no zero inventory observations at all throughout the sample, while 95% of firms have less than 30% of their available inventory observations being zero. Only 2.3% of firms have more than half of their inventory observations being zero, corresponding to 1.8% of the total number of observations in the sample.

Share of Zero Inventory Obs ($s\%$)	**Number of Firms with $s\%$ Zero Inventory Obs**	**Percentage of Firms with $s\%$ Zero Inventory Obs**	**Cumulative Percentage**
0%	26,893	88.41	88.41
0.1-10%	644	2.18	90.59
11-20%	781	2.57	93.16
21-30%	533	1.75	94.91
31-40%	324	1.07	95.97
41-50%	518	1.70	97.68
51-60%	58	0.19	97.87
61-70%	275	0.90	98.77
71-80%	148	0.49	99.26
81-90%	221	0.73	99.98
91%-93%	5	0.02	100
$> 93\%$	0	0.00	100
Total	**30,420**	**100**	

Notes: This table shows the number and percentage of firms with $s\%$ zero-inventory observations (not necessarily occurring in consecutive years).

Table A6: Firms with $s\%$ Zero-Inventory Observations

Therefore, all firms in the sample have some non-zero inventory observations, from which we can retrieve the exact magnitude of demand shocks. In the case of zero-inventory observations, following Kumar and Zhang (2019), we use the conditional lower bound of the demand shock, which is the magnitude of demand shock that exactly generates zero inventories, and it is equal to $\ln(1 + \lambda_i)$ from Equation (3.4) of the main paper.

To summarize, in order to deal with the zero-inventory observations in the sample, we have taken the following two steps. First, we dropped firms with 4 or more consecutive zero observations for inventories. This "cleaning" has led to a dataset in which all firms have some non-zero observations from inventories from which we can estimate the exact magnitude of demand shocks. Specifically, the overwhelming majority of firms in our sample (88.4%) have no zero observation at all, while only a few firms (2.3%) have more than half of their inventory observations being zero. Second, for the cases of zero-inventory observations, following Kumar and Zhang (2019), we use the conditional lower bound of the demand shock ($\ln(1+\lambda_i)$) from Equation (3.4)), which is the magnitude of demand shock that exactly generates zero inventories. Finally, since services-oriented economic sectors have a higher portion of zero inventory observations than material-goods sectors, we estimate equation (3.4) - that identifies demand shocks - separately for (2-digit NACE Rev. 2) sectors to mitigate sector-induced effects of zero inventories on demand shocks estimates.

Firm-level Share of Zero Inventory Obs (s%)	**Number of Obs corresponding to Firms with s% Zero Inventory Obs**	**Percentage of Obs corresponding to Firms with s% Zero Inventory Obs**	**Cumulative Percentage**
0	239,316	88.58	88.58
1-9%	8,722	3.23	91.81
10-19%	7,841	2.90	94.71
20-29%	4,459	1.65	96.36
30-39%	2,276	0.84	97.20
40-49%	2,779	1.03	98.23
50-59%	540	0.20	98.43
60-69%	1,630	0.60	99.03
70-79%	961	0.47	99.39
80-89%	1,591	0.59	99.98
90%-93%	57	0.02	100
>93%	0	0	100
Total	**270,172**	**100**	

Notes: This Table presents the number and portion of observations corresponding to firms with s% zero observations for inventories (not necessarily consecutive).

Table A7: Observations corresponding to Firms with s% Zero-Inventory Observations

A5 Further Statistics for Demand Shocks

Figure A3 presents the distributions of estimated demand shocks, $\hat{\zeta}_{i,t}$, for each of the six joint age-size categories of firms (defined in Section 3.2.1 of the manuscript) across the pre-crisis (1998-2008) and crisis (2009-2014) periods. Firm-specific demand Shocks are derived from estimating Equation (3.3) of the manuscript.

We performed a series of two-sample Kolmogorov-Smirnov tests (Kolmogorov, 1933; Smirnov, 1933) to provide concrete statistical evidence on the differences in the distribution of the firm-specific demand shocks, $\hat{\zeta}_{it}$, between the pre-crisis (1999-2008) and the crisis (2009-2014) periods. Figures 3(c) of the main manuscript and A3 here indicate that the two distributions are different. We performed the Kolmogorov-Smirnov test for all firms in the sample, as well as by two-dimensional firm type related to age and size (young-small, young-medium, young-large, mature-small, mature-medium, and mature-large).

Firm Type	**Smaller Group**	**Distance**	**P-value**
All Firms	1	0.001	0.885
	2	-0.077	0.000
Young-Small	1	0.002	0.945
	2	-0.066	0.000
Young-Medium	1	0.007	0.673
	2	-0.047	0.000
Young-Large	1	0.029	0.383
	2	-0.039	0.185
Mature-Small	1	0.002	0.804
	2	-0.113	0.000
Mature-Medium	1	0.001	0.956
	2	-0.060	0.000
Mature-Large	1	0.001	0.972
	2	-0.023	0.000

Notes: This table provides a statistical comparison of the distribution of firm-level demand shocks, $\hat{\zeta}_{i,t}$, between the pre-crisis period (group 1) and the crisis period (group 2) using a two-sample non-parametric Kolmogorov-Smirnov test (Kolmogorov, 1933; Smirnov, 1933). The comparison is conducted for all firms in the sample, as well as separately by firm type based on age and size categories (young-small, young-medium, young-large, mature-small, mature-medium, and mature-large). The first line of the test evaluates the hypothesis that $\hat{\zeta}_{i,t}$ values in group 1 are smaller than those in group 2, while the second line tests the opposite hypothesis - that $\hat{\zeta}_{i,t}$ values in group 1 are larger than those in group 2.

Table A8: Statistical Differences between the Pre-crisis and Crisis Distributions of Firm-specific Demand Shocks $\hat{\zeta}_{it}$

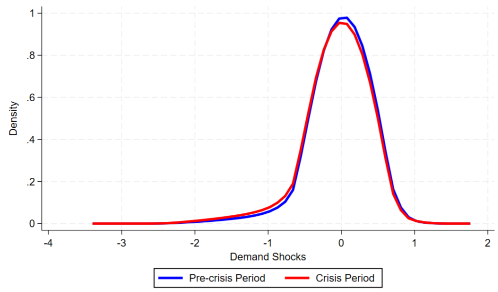
Table A8 reports the results for these non-parametric Kolmogorov-Smirnov tests. We start our analysis with the test for all firms in the sample. The first line tests the hypothesis that demand shocks, $\hat{\zeta}_{it}$, during the pre-crisis period (group 1) are lower (more adverse) than those during the crisis period (group 2). The approximate asymptotic p-value is 0.885, which rejects the hypothesis. The second line tests the hypothesis that group 1 (pre-crisis) contains larger values for $\hat{\zeta}_{it}$ than for group 2 (crisis). The approximate asymptotic p-value for this difference is 0.000, providing evidence for the hypothesis. Therefore, the Kolmogorov-Smirnov test verifies that there was a "statistically significant" shift of $\hat{\zeta}_{it}$'s distribution towards lower (more adverse) demand shocks during the Greek Depression, as Figure 3c of the main paper illustrates.

Moreover, a two-sample Kolmogorov-Smirnov test performed for each age/size-related firm category allows us to reach the same conclusion for all two-dimensional firm types apart from that of young-large firms, as Table A8 demonstrates. There was a shift of $\hat{\zeta}_{it}$'s distribution towards lower (more adverse) demand shocks during the Greek Depression for each firm type except for that of young-large firms whose distribution does not appear to have shifted due to the crisis.

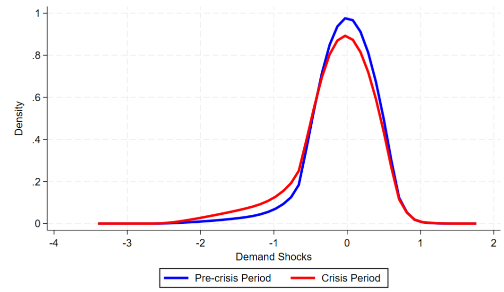
In addition, we have calculated some extra descriptive statistics for the estimated demand shocks $\hat{\zeta}_{it}$ by time period (pre-crisis and during crisis) and firm type (young-small, young-medium, young-large, mature-small, mature-medium, and mature-large). We have also performed t-tests for mean- differences of $\hat{\zeta}_{it}$'s between the two periods by firm type. Table A9 summarizes these statistics and results.

Overall, the distribution of demand shocks is left-skewed and leptokurtic, though these features became less pronounced during the crisis. Except for young-large firms, all firm types experienced, on average, lower (more adverse) demand shocks during the Greek Depression, as shown by t-test results. The negative shift in demand shocks was more significant for small firms than for large ones-regardless of age- and for mature firms compared to young firms - regardless of size. This is the *distribution effect*.

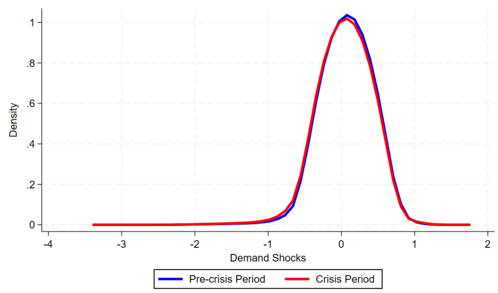
In the main paper, we explain that to assess the role of demand shocks in the disproportionately large decline in growth rates for young or small firms during the crisis, we must also consider the varying impact of the Greek Depression across age and size groups on the sensitivity of firms' growth to demand shocks (*sensitivity effect*).



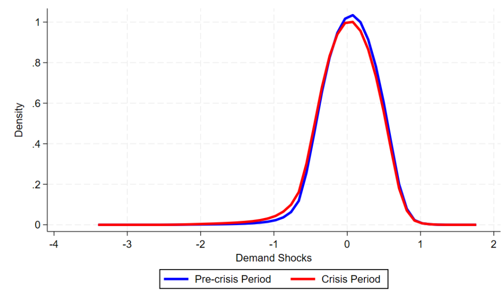
(a) Young-Small Firms



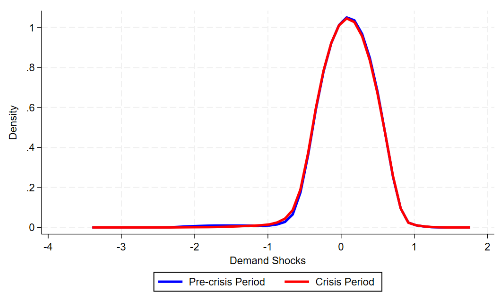
(b) Mature-Small Firms



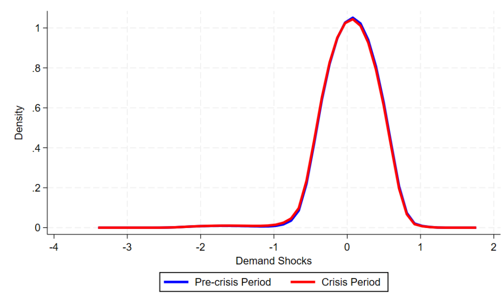
(c) Young-Medium Firms



(d) Mature-Medium Firms



(e) Young-Large Firms



(f) Mature-Large Firms

Figure A3: Distributions of Estimated Demand Shocks by two-dimensional Age-Size Categories of Firms

Notes: This figure presents the distributions of demand shocks for each of the six firm categories based on age and size (defined in Section 3.2.1 of the manuscript), derived from estimating Equation (3.3), across the pre-crisis (1998-2008) and crisis (2009-2014) periods.

		Pre-crisis Period (1999-2008)	Crisis Period (2009-2014)	Mean Difference
All Firms	Obs	157,575	112,597	*Difference*
	Mean	0.013	-0.059	-0.072
	Median	0.088	0.023	*t-statistic*
	SD	0.286	0.387	55.365
	Skewness	-3.505	-2.903	*P-value*
	Kurtosis	22.404	17.875	0.000
Young-Small	Obs	12,052	7,711	*Difference*
	Mean	-0.028	-0.081	-0.053
	Median	0.017	0.000	*t-statistic*
	SD	0.341	0.412	9.812
	Skewness	-2.965	-2.796	*P-value*
	Kurtosis	15.780	12.861	0.000
Young-Medium	Obs	13,931	4,897	*Difference*
	Mean	0.068	0.046	-0.022
	Median	0.081	0.069	*t-statistic*
	SD	0.222	0.249	5.896
	Skewness	-3.109	-2.986	*P-value*
	Kurtosis	25.583	22.610	0.000
Young-Large	Obs	2,104	756	*Difference*
	Mean	0.079	0.082	0.002
	Median	0.106	0.109	*t-statistic*
	SD	0.226	0.193	-0.235
	Skewness	-4.234	-2.363	*P-value*
	Kurtosis	33.034	17.882	0.593
Mature-Small	Obs	36,122	36,647	*Difference*
	Mean	-0.067	-0.186	-0.118
	Median	0.007	0.000	*t-statistic*
	SD	0.364	0.511	35.995
	Skewness	-3.024	-2.112	*P-value*
	Kurtosis	15.082	7.487	0.000
Mature-Medium	Obs	61,425	44,332	*Difference*
	Mean	0.043	0.003	-0.040
	Median	0.055	0.038	*t-statistic*
	SD	0.215	0.270	26.959
	Skewness	-2.811	-2.837	*P-value*
	Kurtosis	22.035	17.274	0.000
Mature-Large	Obs	20,819	13,490	*Difference*
	Mean	0.052	0.040	-0.012
	Median	0.073	0.066	*t-statistic*
	SD	0.234	0.241	4.409
	Skewness	-4.506	-4.189	*P-value*
	Kurtosis	36.056	30.949	0.000

Notes: This table presents some descriptive statistics (mean, median, standard deviation, skewness, kurtosis, and the number of observations) for the estimated demand shocks, described in Equation (3.4) of the manuscript, by firm age and size for the pre-crisis (1998-2008) and crisis (2009-2014) periods. In the last column, we report the results of t-tests on the equality of means between the two periods (against the alternative that average demand shocks during the pre-crisis period are higher than those during the Greek Depression).

Table A9: Descriptive Statistics for Estimated Demand Shocks by Firm Age and Size

B Methodological Details and Supplementary Analyses

B1 The Rajan and Zingales (1993) Measure for Financing Constraints

In our baseline analysis, we used financial leverage (the debt-to-assets ratio) entering the crisis as a proxy for the credit constraints that firms may have faced during the crisis. As an alternative proxy for financing constraints, we construct an industry-level measure for external financial dependence, which was originally proposed by Rajan and Zingales (1998).

We follow the procedures described in Cetorelli and Strahan (2006). In particular, we define external financial dependence (EFD hereafter) as the proportion of capital expenditures financed with external funds, i.e.:

$$EFD_{j,t} = \frac{\sum_t CapEx_{j,i,t} - \sum_t CF_{j,i,t}}{\sum_t CapEx_{j,i,t}} \tag{B.1}$$

where $CapEx_{j,i,t}$ and $CF_{j,i,t}$ denote "capital expenditures" and "operating cash flows" of firm i in sector j and year t. A value of EFD smaller than zero indicates that a firm has more cash flow than capital expenditures and thus tends to have internal funds available. A value greater than zero indicates that a firm might be financially constrained as capital expenditures exceed available cash flow and therefore the firm needs to raise additional funds to finance its investment.

Capital expenditures are defined as follows:

$$CapEx_{i,t} = \Delta(FTA)_{i,t} + Depr_{i,t} \tag{B.2}$$

where $\Delta(FTA)_{i,t}$ denotes net change in fixed tangible assets and $Depr_{i,t}$ stands for depreciation expense listed in the income statement. Moreover, (operating) cash flows, net of changes in inventories, accounts receivable and accounts payable, are defined as follows:

$$CF_{i,t} = NI_{i,t} + DA_{i,t} + \Delta WC_{i,t} \tag{B.3}$$

where $NI_{i,t}$ and $DA_{i,t}$ denote net income and depreciation & amortization respectively, while $\Delta WC_{i,t}$ denotes the change in working capital (i.e. the difference between current assets and current liabilities) of firm i in year t.

After constructing the EFD ratio for each firm for the pre-crisis period, we use the median value for all firms in each 2-digit NACE2 category as our measure of external finance needs for that industry. Finally, we separate all sectors in the economy into composite sectors of high - and low - EFD, which are defined as those above and below the median external financial dependence measure (over all sectors), respectively. For our analysis, we create a dummy variable "high-EFD" which receives the value 1 if a sector is highly dependent on external finance (financially constrained) and 0 otherwise. This variable allows us to separate *financially constrained firms during the crisis* (i.e. firms belonging to a sector with high external financial dependence during the pre-crisis period) and firms that were *not financially constrained during the crisis.*

B2 Dealing with Endogenous Selection and Sampling Bias

Bias may arise from endogenous firm selection - such as decisions to start or close a business - or from the sampling design and procedure of our dataset, which is not a census. To address this issue, we apply the methodology of Olley and Pakes (1996). Selection into the sample introduces a bias term in equation (4.1) of the manuscript as follows:[9]

$$g_{i,t} = \sum_{k=1}^{K}[\beta_{1,k}\Gamma^k_{i,t} + \beta_{2,k}(\Gamma^k \times cr)_{i,t}] + \sum_{s=1}^{S}\gamma_s I_{s,i} + \sum_{c=1}^{C}\delta_c L_{c,i} + E[\xi^{(1)}_{i,t} \mid X_{i,t}, y_{i,t} = 1]. \tag{B.4}$$

Here $X_{i,t}$ is the set of explanatory variables in econometric specification (B.4), and $y_{i,t}$ is an indicator function that equals 1 if firm i is active and included in our ICAP sample in period t, and 0 otherwise. This indicator represents a firm's disappearance from the sample either as a result of shutdown (endogenous attrition) or ICAP's inability to collect data on it (sampling bias).

The last term in equation (B.4) is the *bias term* due to endogenous selection and sampling. Following Olley and Pakes (1996), we model this *bias term* as a function of the probability of being included in the dataset at period t. Specifically:

$$E[\xi^{(1)}_{i,t} \mid X_{i,t}, y_{i,t} = 1] \approx h(\hat{P}_{i,t}). \tag{B.5}$$

We approximate the function $h(.)$ using a first-order polynomial and estimate the probability of being in the dataset during period t, $\hat{P}_{i,t}$, using the following binary choice model:

$$\begin{aligned} Pr(y_{i,t} = 1) = \Phi\Bigg(&\omega_0 + v(\ln age_{i,t}, \ln size_{i,t}, \hat{\zeta}_{i,t}, FC_{i,t}, cr_t, legalform_i; \omega) \\ &+ \sum_{s=1}^{S}\kappa_s I_{s,i} + \sum_{c=1}^{C}\lambda_c L_{c,i} + \mu_{i,t}\Bigg) \end{aligned} \tag{B.6}$$

where $v(.)$ includes: 1) a third order polynomial in the continuous variables, $\ln age_{i,t}$ (firm age), $\ln size_{i,t}$ (sales-based firm size), and $\hat{\zeta}_{i,t}$ (estimated demand shocks), 2) a set of categorical variables, $FC_{i,t}$ (indicator for being financially constrained during the crisis), cr_t (the crisis indicator), and a firm-specific categorical variable $legalform_i$ indicating the firm's legal form (SA or Ltd), and 3) interactions of the categorical variables with the continuous variables. We assume normal disturbances, i.e. $\mu_{i,t} \sim N(0, \sigma^2_\mu)$.

The selection equation (B.6) differs from the growth equation (4.1) of the manuscript in important ways. First, in functional form: the selection equation uses a third-order polynomial for firm age and size (continuous variables), while the growth equation contains these as categorical

[9]The same methodology is applied to correct for sampling and selection bias in equations (4.2) and (4.3) as well.

variables in linear terms. Second, there is an exclusion restriction: the selection equation includes an indicator for firm legal form, which is not in the sales growth equation (see Cefis et al., 2022 for justification). The fact that firm age and size are included as categorical variables in the growth equation may also be seen as a form of exclusion restriction - part of the variation in these two variables is excluded.

Following Olley and Pakes (1996), we augment the set of regressors in equation (4.1) of the manuscript with the predicted probability of a firm observation being included in the sample, $\hat{P}_{i,t}$, obtained from the estimation of selection equation (B.6) to correct for endogenous selection and sampling bias.

In Section 5.4 of the manuscript, we assess the robustness of the Olley and Pakes (1996) approach by re-estimating econometric specifications (4.1) - (4.3) of the manuscript using the Heckman (1979) model for selection bias correction. More specifically, following Wooldridge (2010) who generalized Heckman's (1979) methodology for panel data, we approximate the *bias term* in equation (4.1) of the manuscript as:

$$E[\xi^1_{i,t} \mid X^{(1)}_{i,t}, y_{i,t} = 1] \approx \gamma_1 IMR_{i,t} \tag{B.7}$$

where γ_1 is a constant and $IMR_{i,t}$ is the inverse Mills ratio given by:

$$IMR_{i,t} = \frac{\varphi_{i,t}}{\Phi_{i,t}} \tag{B.8}$$

where $\Phi_{i,t}$ and $\varphi_{i,t}$ represent the survival probability of firm i in year t and its probability density, respectively. Under suitable assumptions, we can obtain consistent estimates of these quantities by using the Probit model (B.6). To correct for endogenous selection and sampling bias, we then add the Inverse Mills Ratio to the set of regressors in equation (4.1) of the manuscript. We follow exactly the same methodology to correct for sampling and selection bias in equations (4.2) and (4.3) of the manuscript as well.

B3 Aggregate Implications of Firm-level Results

B3.1 Calculation of Aggregate Implications

In Section 6 of the manuscript, following the methodology of Chodorow-Reich (2014) and Siemer (2019), we use the firm-level findings from Section 4 and Appendix B of the manuscript to derive aggregate implications of the observed excess decline in growth rates for young and small firms during the Greek Depression. Specifically, we conduct three counterfactual exercises: (1) examining the aggregate impact of the crisis-induced excess growth decline in young and small firms, (2) assessing the role of unexpected demand shocks (UDS), and (3) evaluating the influence of financing constraints (FCs).

We perform these counterfactual exercises within a partial equilibrium framework:

Assumption 1 (Partial equilibrium): The total effect on gross output is the sum of direct sales effects from individual firms.

To capture additional impacts from price and wage adjustments, however, a general equilibrium model would be required. Such a model would account for firms of varying age and size that face binding credit constraints and experience both aggregate and idiosyncratic demand shocks.

Under Assumption 1, we proceed with the first counterfactual exercise, assuming that during the crisis, all firms in the category under examination (young, small, young or small) experienced the same growth decline as the least affected group, namely mature-large firms. Section 4.3 of the manuscript and Table B of the in-paper Appendix B (column 1) present the estimated impacts of the Greek financial crisis on firms of type k, denoted $\hat{\theta}_k^{\mathrm{Cr}}$, which we refer to as the *crisis effect*. We define the counterfactual growth rate of a firm i of type j as:

$$\widetilde{g}_{i,t}^{k} = \hat{g}_{i,t}^{k} - \hat{\theta}_k^{Cr} + \hat{\theta}_{ml}^{Cr} \tag{B9}$$

where $\hat{g}_{i,t}^{j}$ denotes the predicted growth rate of firm i of type k in year t, derived from the econometric specification (4.3) of the manuscript. Here, $\hat{\theta}_k^{\mathrm{cr}}$ represents the estimated *crisis effect* specific to firms of type k, while $\hat{\theta}_{ml}^{\mathrm{cr}}$ denotes the crisis effect for mature-large firms. Both estimates are calculated from model (4.3) of the manuscript, with additional details provided in the in-paper Appendix B.

By definition, the counterfactual growth rate for mature-large firms aligns with their fitted growth rate. Additionally, for all firm types, the counterfactual growth rate is set equal to the fitted growth rate for pre-crisis years (1998-2008). This counterfactual approach aims to first neutralize the type-specific crisis impact on firm growth, then substitute the crisis effect with that observed for mature-large firms.

Using formula (B9), we calculate the aggregate impact of the growth decline across firm types k. To isolate the aggregate effect of the excess decline specifically for young firms, we apply formula (B9) only to firm types $k \in \{$young-small, young-medium, young-large$\}$, setting the counterfactual growth rates for all mature firms (across sizes) to their fitted values. Similarly, to estimate the aggregate effect for small firms, we apply the formula only to types $k \in \{$young-small, mature-small$\}$, while setting the counterfactual growth rates of medium and large firms (regardless of age) to their fitted values. Finally, to estimate the aggregate effect for young or small firms, we apply the formula only to types $k \in \{$young-small, young-medium, young-large, mature-small, $\}$, while setting the counterfactual growth rates of medium and large firms (regardless of age) to their fitted values.[10]

[10] To compute counterfactual growth rates, we use the differences between estimates of $\hat{\theta}_k^{Cr}$ (for exercise 1) or $\hat{\theta}_k^{UDS}$ (for exercise 2) or $\hat{\theta}_k^{FV}$ and $\hat{\theta}_k^{UDS,FV}$ (for exercise 3) for young firms (conditional on size) or small firms (conditional on age) and those for mature-large firms. Among these, the differentials for $\hat{\theta}_k^{FV}$ and $\hat{\theta}_k^{UDS,FV}$ between young-large and mature-large firms were not statistically significant (the estimates of these differences were -0.021[0.058] and 0.045[0.059], respectively; standard errors in brackets). This indicates that financing constraints (FCs) - either directly or indirectly via UDS - had a similar impact on these two groups. Consequently, the differentials for $\hat{\theta}_k^{FV}$

After constructing the counterfactual growth rates, we create the counterfactual sales series as follows:

$$\widetilde{s}_{i,t} = M(\widetilde{g}_{i,t}, \widetilde{s}_{i,t-1}) \tag{B10}$$

where, as in Chodorow-Reich (2014), M denotes the mapping from symmetric annual growth rates to the end-period t level of sales:

$$M[x,y] = \frac{1+0.5x}{1-0.5x}y \tag{B11}$$

In order to calculate the counterfactual sales series for the years of the Greek financial crisis (2009-2014), we use as initial value the real value of sales in the year before the start of the crisis: $\widetilde{s}_{i,t_0} = s_{i,2008}$. Similarly, the fitted value end-period sales level can be computed as: $\widehat{s}_{i,t} = M(\widehat{g}_{i,t}, \widehat{s}_{i,t-1})$.

The aggregate effect of the excess decline in the firm category under examination (young, small, young or small) can be calculated as follows:

$$\frac{\sum_{i\epsilon k}(\widetilde{s}^k_{i,2014} - \widehat{s}^k_{i,2014})}{\sum_i (s_{i,2009} - s_{i,2014})} \tag{B12}$$

This is the cumulative crisis impact in 2014, the last year of our sample.

The estimates for the aggregate effects for young, for small, and for young or small firms, based on formula (B12), are reported in Table 5 (Panel A) of the manuscript.

In the same spirit, we can compute the contribution of unexpected demand shocks (exercise 2) and financing constraints (exercise 3) in the aggregate effect of the growth decline in young and in small firms. To do so, we need to make two extra assumptions.

> **Assumption 2 (Low-leverage firms are not financially constrained):** Firms entering the crisis with low financial leverage (those with 2008 leverage below the median of the distribution) are unconstrained and financing constraints affect firms only through high leverage entering the crisis.

As in Chodorow-Reich (2014), in order to get aggregate implications, we need to assume the existence of an unconstrained category of firms. Assumption 2 provides conservative aggregate results. If low-leverage firms were also financially vulnerable and thus exposed (even to a lower degree than high-leverage firms) to economic shocks during the Greek Depression, then our estimates may understate the true aggregate effect of credit constraints during the crisis.

Second, due to the presence of entry and exit in our dataset, we make the following additional assumption for the calculation of aggregate implications, following Siemer (2019):

> **Assumption 3:**

and $\hat{\theta}_k^{UDS,FV}$ between young-large and mature-large firms were set to zero when calculating the aggregate impact of FCs on young firms during the crisis.

(a) (No unexpected demand effect on start-ups): Unexpected demand shocks did not affect start-ups or potential start-ups.

(b) (No financial vulnerability effect on start-ups): Financial vulnerability, indicated by credit constraints, did not affect start-ups or potential start-ups.

Assumption 3 is required for two reasons. First, potential entrants are not observed and any effect of unexpected demand shocks and financing constraints on changes in the decisions of entrants can not be taken into account to compute aggregate implications. Second, while entrants are observed, they get assigned a growth rate of $+2$, the upper bound of the DHS growth rate. Entrants are, by construction, at the upper bound of the DHS growth rate and thus cannot be assigned a higher growth rate in a counterfactual. Taking effects on start-ups into account would require an empirical model of start-up decisions, something that is beyond the scope of this paper. Assumption 3 means that the calculated aggregate effects of unexpected demand shocks and credit constraints are likely understated. Unexpected demand shocks and financial vulnerability (due to credit constraints) possibly affected negatively entrants as well as potential entrants.

In Online Appendix B3.2, we evaluate the impact of Assumptions 1 - 3 that we made. The three assumptions taken together may have led to an understatement of the true effect of financing constraints on sales growth during the crisis, and to an understatement in the contribution of financing constraints to the excess responsiveness of young (versus mature) and of small (versus large) firms to the crisis.

Given Assumptions 1 and 3a, we proceed to the second counterfactual exercise, aimed at calculating the contribution of demand shocks (UDS) to the aggregate effect of the excess decline in growth rates of young and of small firms. In this exercise, we assume that the adverse effects of UDS on young (small) firms were similar to those experienced by mature-large firms (the least impacted group).

To execute this exercise, we repeat the steps outlined in the first counterfactual exercise, as shown in equations (B9)-(B12), with one modification: for the computation of the counterfactual growth rates, we use the estimates $\hat{\theta}_k^{\text{UDS}}$ (reported in Table B of the in-paper Appendix B, column 2) instead of $\hat{\theta}_k^{\text{Cr}}$. In Section 4.3 of the manuscript, we argued that the estimates $\hat{\theta}_k^{\text{UDS}}$ capture the impact of adverse UDS effects on the growth decline of firms of type k during the Greek Depression, referred to as the *crisis effect due to UDS*.

The estimates for the aggregate effects of UDS on the growth reductions of young and of small firms, calculated using formula (B12), are presented in Table 5 of the manuscript, Panel B.

Given Assumptions 1, 2, and 3b, we proceed to the final counterfactual exercise, which consists of two parts. In the first part, we aim to determine the portion of the aggregate effect of the excess decline in young and in small firms that can be attributed to their financial vulnerability. To do this, we repeat the steps from the first counterfactual exercise, as outlined in equations (B9)-(B12), with two modifications.

First, for the computation of the counterfactual growth rates, we use the estimates $\hat{\theta}_k^{\mathrm{FV}}$ (reported in Table B, column 3, in-paper Appendix B) in place of $\hat{\theta}_k^{\mathrm{Cr}}$. These estimates, $\hat{\theta}_k^{\mathrm{FV}}$, capture the effect of financial vulnerability (as implied by financing constraints) on the growth decline of firms of type k during the Greek Depression, referred to as the *crisis effect due to FV*. Second, we compute the counterfactual growth rates using formula (B9) exclusively for financially constrained firms (either young or small), setting the counterfactual growth rates of financially unconstrained firms (regardless of age and size) to their fitted values. The estimates for this exercise are presented in Table 5 of the manuscript, Panel C.

In the second part, we aim to isolate the portion of the aggregate effect of the excess decline in young and small firms that can be attributed to the heightened sensitivity of these firms to UDS due to their financial vulnerability. To accomplish this, we replicate the analysis from the first part with one modification: for the computation of the counterfactual growth rates, we use the estimates $\hat{\theta}_k^{\mathrm{FV,UDS}}$ (reported in Table B, column 4, in-paper Appendix B) in place of $\hat{\theta}_k^{\mathrm{FV}}$. These estimates, $\hat{\theta}_k^{\mathrm{FV,UDS}}$, capture the differential impact of UDS between financially constrained and unconstrained firms, referred to as the *crisis effect due to UDS and FV*. The results for this exercise are presented in Table 5 of the manuscript, Panel D.

B3.2 Discussion of the Assumptions Used in Section 6

In Section 6 of the main paper, we performed some counterfactual exercises to evaluate the aggregate implications of our firm-level results (obtained in Section 4 and in-paper Appendix B). Following Chodorow-Reich (2014) and Siemer (2019), we made the three important assumptions in the context of the counterfactual exercises, presented briefly in Section 6 of the manuscript and in detail in Online Appendix B3.1.

Assumption 1 is needed since assessing the impact of price and wage adjustments on these results would require a general equilibrium (GE) model with firms that are heterogeneous in age and size, face potentially binding credit constraints, and are subject to both aggregate and idiosyncratic uncertainty. Building such a model is beyond the scope of this paper. We will try below to give some tentative indications how the implications of such a model might differ from the partial equilibrium (PE) aggregate analysis that we employ. Following the reasoning in Chodorow-Reich (2014), as financial constraints tighten and affect sales for some firms, some resources may reallocate from financially constrained firms to unconstrained ones, induced by relative price changes. Thus, PE calculations of the impact of credit constraints may be overstated. However, this effect is likely small as, due to price stickiness, relative price changes are unlikely to have occurred much during the Greek crisis, as we argued in Section 3.2.2 of the manuscript (see specifically footnote 16). A consideration that leads to possibility of understatement in the PE analysis is that low-leverage firms may also be credit constrained but to a lesser degree, as the credit-supply shock had systemic nature. On the latter, see the discussion below regarding Assumption 2. Thus, on net, any GE effects are likely to be subdued. Note also that any spillover growth effect from aggregate demand shocks should be captured already through our conditioning on the demand shock variables, $\hat{\zeta}_{i,t}$.

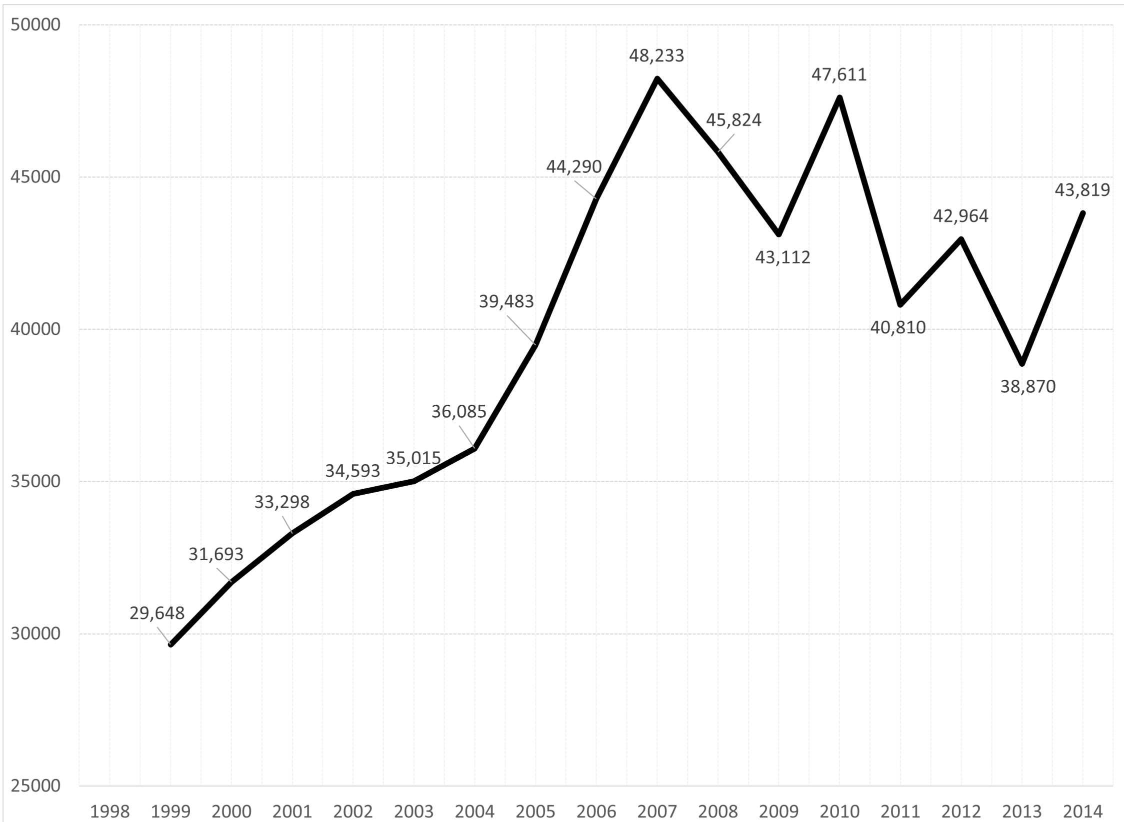
As in Chodorow-Reich (2014), in order to get aggregate implications, we need to assume the existence of an unconstrained category of firms. Assumption 2 provides conservative results in aggregate. If low-leverage firms were also financially vulnerable and thus exposed (even to a lower degree than high-leverage firms) to economic shocks during the Greek Depression, then our estimates may have understated the true effect of credit constraints on sales growth during the crisis. A key question is to what extent this potential understatement affects differentially young vs. mature and small vs. large firms. We see in Table B1 below that that low-leverage firms constitute a higher proportion of the young rather than the mature category, and similarly for the small rather than the large category of firms. So, young firms' growth may have been more impeded by credit constraints than estimated and similarly for small firms' growth. The implication is that the contribution of credit constraints to the excess responsiveness of young (versus mature) and of small (versus large) firms to the crisis may have been higher than estimated.

	High-Leverage	**Low-Leverage**
All Firms	51.3%	48.7%
Young	39.9%	60.1%
Mature	45.4%	54.6%
Small	32.6%	67.4%
Medium	54.4%	45.6%
Large	61.6%	38.4%

Notes: This Table presents the leverage distribution for all observations in our dataset, by firm age and size. Firms with leverage in 2008 equal to or higher than the 2008 median are considered to have high leverage and otherwise low leverage.

Table B1: Leverage Distribution by Age and Size

Turning to Assumption 3, this is required for two reasons (the discussion below follows closely Siemer (2019)). First, potential entrants are not observed and any effect of unexpected demand shocks and financing constraints on changes in the decisions of entrants can not be taken into account to compute aggregate implications. Second, while entrants are observed, they get assigned a growth rate of $+2$, the upper bound of the Davis et al.'s (1996) measure for a firm's growth rate. Entrants are, by construction, at the upper bound of the DHS growth rate and thus cannot be assigned a higher growth rate in a counterfactual. Taking effects on start-ups into account would require an empirical model of start-up decisions, something that is beyond the scope of this paper. Assumption 3 means that the calculated aggregate effects of unexpected-demand shocks and credit constraints are likely understated. Unexpected demand shocks and credit contraints possibly affected negatively entrants as well as potential entrants. Figure B1 presents the patterns of firm creation during the period 1998-2014, obtained from the national business register (the "General Electronic Commercial Registry - G.E.MI."). As we can see, starting in 2008 there is a downward trend in firm entry, reaching its trough in 2013 (-15.2% compared to 2008, the last pre-crisis year). Assumption 3 abstracts from this *drop-in-entry* effect, and likely leads to an understatement of the aggregate implications of credit constraints and demand shocks during the crisis.



Notes: The Figure presents the patterns of firm entries during the period 1998-2014, obtained from the national business register (the "General Electronic Commercial Registry - G.E.MI.").

Figure B1: Firm Entries 1998-2014

We can summarize the above discussion as follows. The three assumptions taken together may have led to an understatement of the true effect of credit constraints on sales growth during the crisis, and to an understatement in the contribution of credit constraints and demand shocks to the excess responsiveness of young (versus mature) and of small (versus large) firms to the crisis.

C Regression Results

C1 Firm-level Estimation Results from Section 4.1 of Manuscript

	Coefficient	SE
$\Gamma^k_{i,t}$		
$k = young - small$	0.364	0.007
$k = young - medium$	0.094	0.005
$k = young - large$	0.073	0.009
$k = mature - small$	0.157	0.005
$k = mature - medium$	0.041	0.003
cr_t	-0.101	0.005
$(\Gamma^k \times cr)_{i,t}$		
$k = young - small$	-0.224	0.014
$k = young - medium$	-0.092	0.012
$k = young - large$	-0.069	0.026
$k = mature - small$	-0.144	0.007
$k = mature - large$	-0.036	0.006
$\hat{P}_{i,t}$	2.049	0.025
Constant	-2.111	0.023

Notes: This table presents the estimation results from econometric specification (4.1) in Section 4.1 of the manuscript. Firms are classified into six age-size groups, k ={young-small, young-medium, young-large, mature-small, mature-medium, mature-large}. $\Gamma^k_{i,t}$ represents indicator variables for these six groups. Firms classified as small are in the lower half of the size distribution, medium-sized firms are in the 51st to 90th percentiles, and large firms fall in the upper decile, as defined in Section 3.2.1 of the manuscript. The omitted base/reference category is mature-large firms. The variable cr_t is an indicator for the Greek Depression period (2009-2014). $\hat{P}_{i,t}$ denotes the selection correction term, described in Section 4.1 and in Online Appendix B2. The estimation includes industry and location fixed effects. Standard errors (SE) are clustered by firm.

Table C1: Estimation Results for Model (4.1)

Table C1 reports the estimation results for model (4.1) of the manuscript. Two key observations emerge. First, the correction term for endogenous selection and sampling bias, $\hat{P}_{i,t}$, is statistically significant, supporting the validity of our correction strategy. Second, in estimating model (4.1), we used the mature-large group as the base/reference category. Consequently, all estimated coefficients for the interaction terms $(\Gamma^k \times cr)_{i,t}$ represent the decline in growth rates of type-k firms during the crisis relative to decline in growth rates of the reference group (quantified by the cr_t indicator coefficient).

Table C2 reports the total decline in growth rates due to the crisis for each firm type k without comparison to the reference category. For each category k, this total decline is calculated by adding the coefficient of the relevant interaction term $(\Gamma^k \times cr)_{i,t}$ to the base category's coefficient (i.e., the cr_t coefficient). The decline for "all firms" indicates the average growth rate reduction across the age-size distribution, estimated via the marginal effect at means. These findings correspond with Figure 6 in the manuscript.

	Estimate	**SE**
All Firms	-0.182	0.003
Young-Small	-0.325	0.013
Young-Medium	-0.193	0.005
Young-Large	-0.170	0.025
Mature-Small	-0.245	0.005
Mature-Medium	-0.137	0.003
Mature-large	-0.101	0.005

Notes: This table reports the estimated decline in growth rates due to the crisis for each firm category. For each category, k, this decline is calculated as the sum of the estimated coefficient for the interaction term $(\Gamma^k \times cr)_{i,t}$ plus the coefficient of the base category (i.e., that of the cr_t indicator). The "all firms" row presents the average growth rate decline across the age-size distribution, obtained as the marginal effect at means.

Table C2: Estimated Growth Decline due to the Crisis by Age-Size Category of Firms

Finally, in Table C3, we calculate the differential impact of the crisis by age (size) conditional on size (age), shown as the pairwise differences in responses across firm types. For example, the first table entry is calculated as the difference in the estimates between young-small and young-medium firms.

Size Effect Conditional on Age			
	Young	Mature	
Small vs Medium	-0.132	-0.107	
	(0.016)	(0.006)	
Small vs Large	-0.155	-0.144	
	(0.028)	(0.007)	
Age Effect Conditional on Size			
	Small	Medium	Large
Young vs Mature	-0.080	-0.055	-0.069
	(0.013)	(0.011)	(0.026)

Notes: This table presents the differential impact of the crisis by age (size) conditional on size (age), calculated as the pairwise differences in responses across different firm types. All pairwise differences are estimated as marginal effects at means. Standard errors are calculated using the Delta Method (Dorfman, 1938).

Table C3: Estimated Differences in Growth Decline due to the Crisis by Age-Size Categories

C2 Firm-level Estimation Results from Section 4.2 of Manuscript

Table C4 reports the estimation results for model (4.2) of the manuscript. Three key observations emerge. First, the coefficient on the correction term for endogenous selection and sampling bias, $\hat{P}_{i,t}$, is statistically significant, supporting the validity of our correction approach. Second, the coefficient for the financial vulnerability indicator, $FC_{i,t}$, is also significant.

Third, in estimating model (4.2), the mature-large group serves as the base/reference category. Consequently, each estimated coefficient for interaction terms $(\Gamma^k \times \hat{\zeta} \times cr)_{i,t}$ represents the change in sensitivity of growth rates to demand shocks during the crisis for each firm type k, relative to this change in the reference category (as captured by the $\hat{\zeta} \times cr_{i,t}$ coefficient). The total sensitivity change for each category k (not relative to mature-large firms) is calculated by adding the coefficient of each $(\Gamma^k \times \hat{\zeta} \times cr)_{i,t}$ term to the base category's $\hat{\zeta} \times cr_{i,t}$ coefficient. These absolute sensitivity changes are reported as the *sensitivity effect* in Table 4 of the manuscript.

We use the expressions in Appendix B of the paper to calculate the *combined effect* of adverse demand shocks on firm growth during the Greek Depression (comprising the *sensitivity effect* and the *distribution effect*). This *combined effect* is presented in Table 4 of the manuscript for each age-size firm category.

To assess the differential impact of demand shocks during the Greek Depression by age (size) conditional on size (age), we provide in Table C5 the pairwise differences in combined effects across firm types. For example, the first table entry is calculated as the difference in the estimates between young-small and young-medium firms.

Size Effect of Demand Shocks Conditional on Age			
	Young	Mature	
Small vs Medium	-0.130	-0.110	
	(0.016)	(0.006)	
Small vs Large	-0.154	-0.144	
	(0.028)	(0.007)	
Age Effect of Demand Shocks Conditional on Size			
	Small	Medium	Large
Young vs Mature	-0.070	-0.050	-0.060
	(0.013)	(0.011)	(0.026)

Notes: This table presents the differential impact of the adverse effects of demand shocks during the Greek Depression by age (size) conditional on size (age), calculated as the pairwise differences in the combined effect (comprising the sensitivity and the distribution effects) of demand shocks across different firm types. All pairwise differences are estimated as marginal effect at means. Standard errors are calculated using the Delta Method (Dorfman, 1938).

Table C5: Estimated Differences in the Combined Effect of Demand Shocks by Age-Size Categories

	Coefficient	SE
$\hat{\zeta}_{i,t}$	0.236	0.030
cr_t	-0.103	0.005
$(\hat{\zeta} \times cr)_{i,t}$	0.009	0.032
$\Gamma^k_{i,t}$		
$k = young - small$	0.389	0.007
$k = young - medium$	0.088	0.006
$k = young - large$	0.077	0.011
$k = mature - small$	0.201	0.005
$k = mature - medium$	0.044	0.004
$(\Gamma^k \times \hat{\zeta})_{i,t}$		
$k = young - small$	0.014	0.040
$k = young - medium$	0.066	0.041
$k = young - large$	-0.160	0.061
$k = mature - small$	0.067	0.033
$k = mature - medium$	0.124	0.034
$(\Gamma^k \times cr)_{i,t}$		
$k = young - small$	-0.216	0.014
$k = young - medium$	-0.096	0.013
$k = young - large$	-0.098	0.029
$k = mature - small$	-0.135	0.007
$k = mature - medium$	-0.027	0.006
$(\Gamma^k \times \hat{\zeta} \times cr)_{i,t}$		
$k = young - small$	0.035	0.052
$k = young - medium$	0.061	0.066
$k = young - large$	0.298	0.152
$k = mature - small$	-0.103	0.035
$k = mature - medium$	-0.036	0.037
$FC_{i,t}$	0.029	0.002
$\hat{P}_{i,t}$	1.956	0.026
Constant	-2.047	0.023

Notes: This table presents the estimation results from the econometric specification (4.2) in Section 4.2 of the manuscript. Firms are classified into six age-size groups, k = {young-small, young-medium, young-large, mature-small, mature-medium, mature-large}. $\Gamma^k_{i,t}$ denotes indicator variables for these six groups. Definitions of age and size categories appear in Section 3.2.1 of the manuscript. The omitted reference category is mature-large firms. $\hat{\zeta}_{i,t}$ represents estimated firm-level demand shocks (see Section 3.2.2). cr_t is an indicator for the Greek Depression period (2009-2014). $\hat{P}_{i,t}$ represents the selection correction term, discussed in Section 4.1 and Appendix A. $FC_{i,t}$ indicates financially constrained firms during the crisis (defined in Section 3.2.3). The estimation includes industry and location fixed effects, with standard errors (SE) clustered by firm.

Table C4: Estimation Results for Model (4.1)

C3 Firm-level Estimation Results from Section 4.3 of Manuscript

Table C6: Estimation Results for Model (4.3)

	Coefficient	**SE**
cr_t	-0.258	0.017
$\hat{\zeta}_{i,t}$	0.242	0.038
$(\hat{\zeta} \times cr)_{i,t}$	0.083	0.056
$FC_{i,t}$	0.074	0.012
$(FC \times \hat{\zeta})_{i,t}$	0.018	0.052
$(FC \times cr)_{i,t}$	-0.158	0.025
$(FC \times \hat{\zeta} \times cr)_{i,t}$	-0.100	0.083
$\Gamma^k_{i,t}$		
$k = young - small$	-0.290	0.012
$k = young - medium$	-0.288	0.021
$k = young - large$	-0.189	0.010
$k = mature - small$	-0.338	0.009
$k = mature - medium$	-0.375	0.011
$(\Gamma^k \times FC)_{i,t}$		
$k = young - small$	-0.026	0.015
$k = young - medium$	-0.062	0.027
$k = young - large$	0.027	0.014
$k = mature - small$	-0.014	0.013
$k = mature - medium$	-0.038	0.014
$(\Gamma^k \times \hat{\zeta})_{i,t}$		
$k = young - small$	0.026	0.058
$k = young - medium$	-0.307	0.063
$k = young - large$	0.050	0.041
$k = mature - small$	0.096	0.043
$k = mature - medium$	-0.112	0.052
$(\Gamma^k \times FC \times \hat{\zeta})_{i,t}$		
$k = young - small$	0.040	0.077
$k = young - medium$	0.340	0.128
$k = young - large$	0.014	0.058
$k = mature - small$	0.027	0.058
$k = mature - medium$	0.277	0.075
$(\Gamma^k \times cr)_{i,t}$		
$k = young - small$	0.134	0.026

$k = young - medium$	0.126	0.056
$k = young - large$	0.061	0.018
$k = mature - small$	0.174	0.017
$k = mature - medium$	0.200	0.018
$(\Gamma^k \times FC \times cr)_{i,t}$		
$k = young - small$	0.039	0.035
$k = young - medium$	0.090	0.068
$k = young - large$	0.040	0.027
$k = mature - small$	0.074	0.026
$k = mature - medium$	0.092	0.027
$(\Gamma^k \times \hat{\zeta} \times cr)_{i,t}$		
$k = young - small$	-0.127	0.122
$k = young - medium$	-0.320	0.316
$k = young - large$	-0.162	0.059
$k = mature - small$	-0.159	0.063
$k = mature - medium$	-0.072	0.068
$(\Gamma^k \times FC \times \hat{\zeta} \times cr)_{i,t}$		
$k = young - small$	0.240	0.149
$k = young - medium$	0.599	0.367
$k = young - large$	0.055	0.088
$k = mature - small$	0.183	0.091
$k = mature - medium$	0.045	0.104
$\hat{P}_{i,t}$	1.935	0.026
Constant	-1.658	0.025

Notes: This table presents the estimation results from econometric specification (4.3) in Section 4.3 of the manuscript. Firms are classified into six age-size groups, k = {young-small, young-medium, young-large, mature-small, mature-medium, mature-large}. $\Gamma^k_{i,t}$ denotes indicator variables for these six groups. Definitions of age and size categories appear in Section 3.2.1 of the manuscript. The omitted reference category is mature-large firms. $\hat{\zeta}_{i,t}$ represents estimated firm-level demand shocks (see Section 3.2.2). cr_t is an indicator for the Greek Depression period (2009-2014). $FC_{i,t}$ indicates financially constrained firms during the crisis (defined in Section 3.2.3). $\hat{P}_{i,t}$ represents the selection correction term, discussed in Section 4.1 and Appendix A of the main paper. The estimation includes industry and location fixed effects, with standard errors (SE) clustered by firm.

Table C6 reports the estimation results for model (4.3) of the manuscript. Two observations emerge. First, we used the mature-large group as the base/reference category in the estimation. Second, the correction term for endogenous selection and sampling bias, $\hat{P}_{i,t}$, is statistically significant, supporting the validity of our correction strategy.

Based on the material in Appendix B of the main paper, we estimate the two effects presented in Figure 6 of the manuscript. First, we estimate the total difference in the crisis effect on firms' growth rates between financially vulnerable and not-vulnerable firms (black bars in the figure). Second, by focusing only on terms that interact with the demand shocks, $\hat{\zeta}_{i,t}$, we estimate the part of the difference attributable to unexpected demand shocks (gray bars in the figure).[11] We present the estimates for these two effects along with their standard errors in Table C7.

	Total Impact of FV		**FV Impact Through UDS**	
	Estimate	**SE**	**Estimate**	**SE**
All Firms	-0.092	0.005	-0.025	0.005
Young-Small	-0.162	0.025	-0.096	0.025
Young-medium	-0.127	0.022	-0.061	0.022
Young-Large	-0.027	0.058	0.040	0.058
Mature-Small	-0.124	0.010	-0.057	0.010
Mature-Medium	-0.089	0.006	-0.022	0.006
Mature-large	-0.006	0.010	-0.006	0.010

Notes: This table reports estimates for two effects of Financial Vulnerability (FV). First, the total difference in the crisis effect on firms' growth rates between financially vulnerable and not firms (Total Impact of FV). Second, the part of the difference attributable to unexpected demand shocks (Impact Through UDS). See published Appendix B for more details. Estimates are based on the marginal effects at means. Standard errors are calculated using the Delta Method (Dorfman, 1938).

Table C7: Estimates Used in Figure 6 of the Manuscript

C4 Firm-level Estimation Results from Section 5 of the Manuscript

In this appendix, we report the estimation results for the five sensitivity exercises we performed to assess the validity of our baseline firm-level results, as described in Section 5 of the manuscript.

In the first exercise, we examine whether our results are robust to using an alternative measure for financing constraints. In the second exercise, we examine whether our results are robust to using an alternative measure for firm growth rates. In the third exercise, we explore whether our results are robust to using firm (instead of industry and location) fixed effects in our econometric specifications. In the fourth exercise, we examine whether our results are robust to using a different method for correcting selection bias. Finally, we examine the robustness of our results to different cutoff definitions for the age, size, and leverage indicators.

Tables C8, C9, and C10 report the results obtained from models (4.1), (4.2), and (4.3) of the manuscript, respectively. As we can see, the results from all sensitivity exercises are quite close to the baseline results.

[11] See published Appendix B for more details.

Firm Type	Baseline Results	Robustness Check I	Robustness Check II	Robustness Check III	Robustness Check IV	Robustness Check V
All Firms	-0.182	same as baseline	-0.133	-0.201	-0.192	-0.174
	(0.003)		(0.003)	(0.003)	(0.003)	(0.003)
Young-Small	-0.325	same as baseline	-0.212	-0.276	-0.335	-0.395
	(0.013)		(0.016)	(0.020)	(0.013)	(0.018)
Young-medium	-0.193	same as baseline	-0.133	-0.252	-0.204	-0.227
	(0.005)		(0.011)	(0.015)	(0.011)	(0.012)
Young-Large	-0.170	same as baseline	-0.126	-0.258	-0.182	-0.167
	(0.025)		(0.024)	(0.036)	(0.025)	(0.007)
Mature-Small	-0.245	same as baseline	-0.205	-0.252	-0.256	-0.270
	(0.005)		(0.007)	(0.006)	(0.005)	(0.008)
Mature-Medium	-0.137	same as baseline	-0.100	-0.164	-0.147	-0.169
	(0.003)		(0.003)	(0.004)	(0.003)	(0.005)
Mature-large	-0.101	same as baseline	-0.036	-0.130	-0.108	-0.100
	(0.005)		(0.006)	(0.005)	(0.005)	(0.003)

Notes: In this table, we present the results for the five robustness check exercises described in Sections 5.1 to 5.5 of the manuscript for econometric specification (4.1). Model (4.1) provides estimates for the decline in firms' growth rates due to the Greek Depression (i.e., the *crisis effect*). The "Baseline Results" column reports the baseline firm-level results for econometric specification (4.1) as presented in Figure 5 of the manuscript and in Table C2 of the Online Appendix C2. Since the model does not contain a variable for financial conditions, the "Robustness Check I" column is the same as the baseline results. In the second exercise ("Robustness Check II" column), we repeat our analysis using the "log-differences" measure for firm growth rates, as described in Section 5.2. In the third exercise ("Robustness Check III" column), we repeat our analysis controlling for firm (instead of industry and location) fixed effects, as described in Section 5.3. In the fourth exercise ("Robustness Check IV" column), we apply Heckman's (1979) method to correct for sampling bias, as described in Section 5.4. In the last exercise ("Robustness Check V" column), we repeat our analysis using different thresholds for age, size, and leverage indicators, as described in Section 5.5. Standard errors are clustered by firm and presented in parentheses.

Table C8: Robustness Checks for Model (4.1) Presented in Figure 5 of the Paper

Firm Type	Baseline Results	Robustness Check I	Robustness Check II	Robustness Check III	Robustness Check IV	Robustness Check V
All Firms	-0.089	same as baseline	-0.112	-0.068	-0.092	-0.090
	(0.003)		(0.003)	(0.003)	(0.003)	(0.003)
Young-Small	-0.216	same as baseline	-0.207	-0.164	-0.236	-0.391
	(0.013)		(0.016)	(0.020)	(0.013)	(0.020)
Young-medium	-0.086	same as baseline	-0.100	-0.133	-0.104	-0.130
	(0.011)		(0.010)	(0.034)	(0.011)	(0.013)
Young-Large	-0.062	same as baseline	-0.087	-0.124	-0.077	-0.074
	(0.025)		(0.024)	(0.015)	(0.025)	(0.007)
Mature-Small	-0.146	same as baseline	-0.190	-0.152	-0.157	-0.181
	(0.005)		(0.006)	(0.006)	(0.005)	(0.008)
Mature-Medium	-0.036	same as baseline	-0.077	-0.045	-0.043	-0.076
	(0.003)		(0.003)	(0.003)	(0.003)	(0.004)
Mature-large	-0.001	same as baseline	-0.011	-0.012	-0.002	-0.007
	(0.005)		(0.006)	(0.005)	(0.005)	(0.003)

Notes: In this table, we present results for the five robustness check exercises, described in sections 5.1-5.5 of the manuscript, for the "Combined Effect" in the last column of Table 4 in the Paper. The "Baseline Results" column contains those reported in Table 4 (last column) of the manuscript. Since the model does not contain a variable for financial conditions, the "Robustness Check I" column is the same as the baseline results. In the second exercise ("Robustness Check II" column), we repeat our analysis utilizing the "log-differences" measure for firm growth rates, as described in Section 5.2. In the third exercise ("Robustness Check III" column), we repeat our analysis controlling for firm (instead of industry and location) fixed effects, as described in Section 5.3. In the fourth exercise ("Robustness Check IV" column), we repeat our analysis using Heckman's (1979) method for correcting the sampling bias, as described in Section 5.4. In the last exercise ("Robustness Check V" column), we repeat our analysis using different thresholds for age, size and leverage indicators, as described in Section 5.5. Calculations use marginal effects at the means, and standard errors are calculated using the Delta Method (Dorfman, 1938).

Table C9: Robustness Checks for Combined Effect in Third Column of Table 4 in the Paper

Firm Type	Baseline Results	Robustness Check I	Robustness Check II	Robustness Check III	Robustness Check IV	Robustness Check V
All Firms	-0.025	-0.023	-0.049	-0.051	-0.024	-0.014
	(0.005)	(0.005)	(0.006)	(0.006)	(0.005)	(0.007)
Young-Small	-0.096	-0.162	-0.127	-0.091	-0.095	-0.066
	(0.025)	(0.025)	(0.032)	(0.039)	(0.025)	(0.020)
Young-medium	-0.061	-0.105	-0.032	-0.086	-0.058	-0.024
	(0.022)	(0.021)	(0.022)	(0.032)	(0.022)	(0.015)
Young-Large	0.040	0.039	-0.054	0.132	0.041	0.045
	(0.058)	(0.052)	(0.055)	(0.097)	(0.058)	(0.030)
Mature-Small	-0.057	-0.109	-0.119	-0.070	-0.055	-0.032
	(0.010)	(0.010)	(0.013)	(0.012)	(0.010)	(0.007)
Mature-Medium	-0.022	-0.016	-0.028	-0.031	-0.022	-0.016
	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)
Mature-large	-0.006	-0.009	-0.027	-0.007	-0.006	-0.002
	(0.010)	(0.010)	(0.012)	(0.011)	(0.010)	(0.008)

Notes: In this table, we present results for the five robustness check exercises, described in sections 5.1-5.5 of the manuscript, for the estimates presented in Figure 6 of the paper for "FV Impact Through UDS". This is the difference in the impact of unexpected demand shocks (UDS) on the decline in firms' growth rates due to the Greek Depression between financially vulnerable and non-vulnerable firms. The "Baseline Results" column reports the baseline firm-level results as they were reported in Figure 6 of the manuscript (gray bars) and in Table C7 (last two columns) of Online Appenidix C3. In the first exercise ("Robustness Check I" column), we repeat our analysis using the Rajan and Zingales (1998) industry-level measure for external financial dependence as an alternative proxy for financial conditions, as we described in Section 5.1 of the manuscript. In the second exercise ("Robustness Check II" column), we repeat our analysis utilizing the "log-differences" measure for firm growth rates, as described in Section 5.2. In the third exercise ("Robustness Check III" column), we repeat our analysis controlling for firm (instead of industry and location) fixed effects, as described in Section 5.3. In the fourth exercise ("Robustness Check IV" column), we repeat our analysis using Heckman's (1979) method for correcting the sampling bias, as described in Section 5.4. In the last exercise ("Robustness Check V" column), we repeat our analysis using different thresholds for age, size and leverage indicators, as described in Section 5.5. Calculations use marginal effects at the mean, and standard errors are calculated using the Delta Method (Dorfman, 1938).

Table C10: Robustness Checks for "FV Impact Through UDS" Presented in Figure 6 of the Paper

C5 Firm-level Estimation Results from Section 2.2.4 of the Manuscript

	$\hat{\zeta}_{i,t}$	
(a) Shocks		
	Random Walk	**AR (1)**
EBITDA	6.17e-11 (3.31e-11)	1.57e-10 (6.03e-11)
Debt/Assets	6.04e-06 (2.42e-06)	6.03e-06 (2.41e-06)
Short-tem Debt/Assets	6.07e-06 (2.43e-06)	6.09e-06 (2.44e-06)
Long-term Debt/Assets	-1.44e-04 (1.91e-04)	-5.13e-04 (3.934e-04)
Liquidity	1.43e-12 (4.38e-13)	2.32e-12 (7.19e-13)
FinExp/Debt	9.26e-07 (4.50e-07)	1.04e-06 (5.00e-07)
(b) Indicators		
Enter the Crisis with High Leverage	-0.048 (0.059)	
Rajan and Zingales' (1998) Index	0.036 (0.046)	

Table C11: Correlations of $\hat{\zeta}_{i,t}$ with Demand Shocks, Financial Shocks and Related Indicators

Notes: This Table presents correlations between $\hat{\zeta}_{i,t}$, defined by Equation (3.4) of the manuscript, and a set of indicators and shocks to variables that proxy for demand or financial conditions, described in Section 3.2.4. The indicators are the two measures for financing constraints during the crisis described in Section 3.2.2 of the manuscript: a firm-level indicator for firms that entered the crisis with high leverage and the industry-level Rajan and Zingales (1998) index for firms belonging to sectors with high external financial dependence before the start of the crisis. The variables are: leverage (measured as total or short-term or long-term debt to assets), liquidity, interest expenses (FinExp) over total debt, and EBITDA. For these variables, we estimate random walk and AR(1) shocks. We interpret lower shocks to leverage or liquidity and higher shocks to the average interest rate as adverse financial shocks. For conformity and ease of comparison among financial shocks, we multiply interest rate shocks by -1. We interpret a higher shock to EBITDA as a positive demand shock. We obtain estimates for the correlation between $\hat{\zeta}_{i,t}$ and the aforementioned indicators and shocks through simple linear regressions. Standard errors are in parentheses.

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