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Tracking Greek corporate balance – sheets in and out of the pandemic: Improved ratings but “pockets” of financial distress will linger

Greek & Regional Economics Research (GREC) Team

Economic Research & Investment Strategy

February 2022

Agenda

1 Research motivation | Key Findings

2 Methodological Framework

3 Estimating the Balance Sheet Impact

4 Assessing Corporate Financial Distress

5 Stress-testing our Enterprise Rating System (ERS)

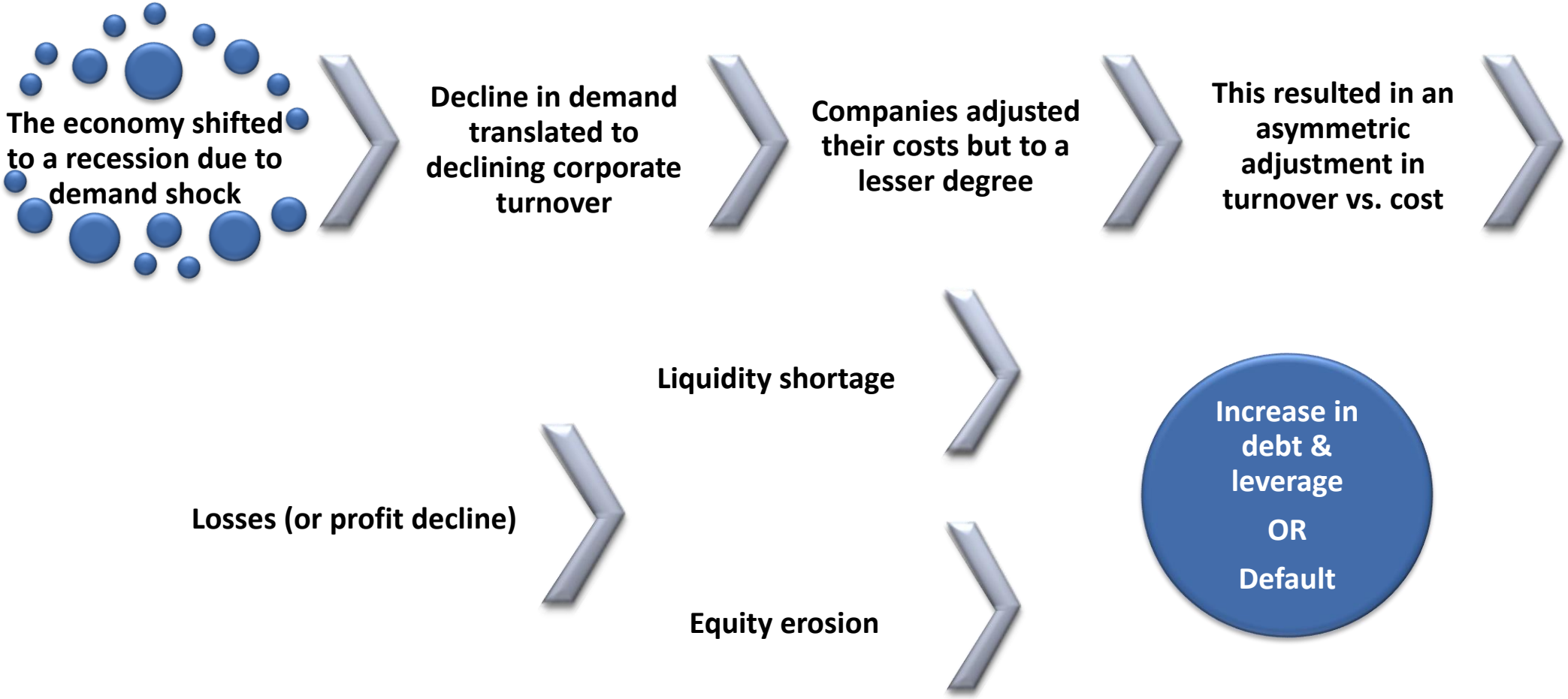
6 Appendices

From Pre-COVID-19 Stability to COVID-19 Recession

- ✓ Two years ago,* we made our first attempt to simulate the impact of the COVID-19-induced recession on the balance sheets of Greek corporations, with special emphasis on their profitability, liquidity and solvency. At that time, our assumptions regarding the impact of the recession and lockdowns on the turnover of various sectors of the Greek economy were guesses.
- ✓ Now that ELSTAT has published the final data regarding the sectoral breakdown of turnover data of the Greek economy for 2020, we have revisited our study using actual data on sectoral corporate turnover. In doing so, we simulated the impact of the turnover decline (and in some cases increase) on the balance sheets of 12,236 Greek corporations in our sample and now report our findings in terms of P&L, liquidity and capital impact.
- ✓ Additionally, we used our proprietary corporate rating model, the Enterprise Rating System (ERS), to estimate the COVID-related recession on the credit quality of Greek corporations.

* For more: Lekkos I., Vlachou P., *Estimating the Impact of the COVID-19 Recession on Greek Corporate Balance Sheets: Results from a Highly Stylized Model*, Piraeus Bank, Aug. 2020

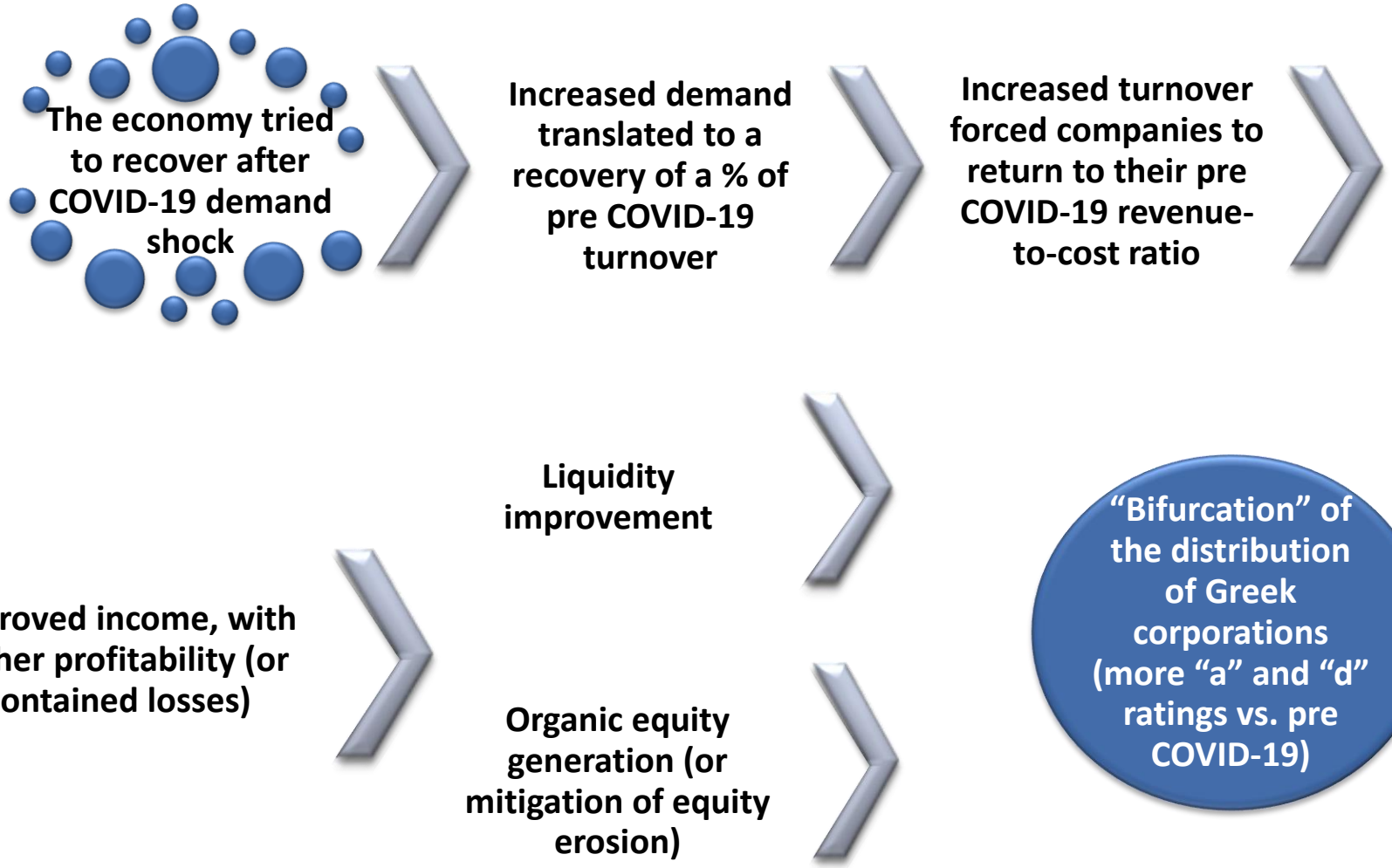
Year one: How did the macroeconomic demand shock transmit to corporate balance sheets?



Post-Pandemic Recovery

- ✓ Looking forward, we wanted to estimate the post-pandemic recovery of the Greek economy and the Greek corporate universe. Therefore, we again assumed a hypothetical level of sectoral turnover recovery and ran our equations the 'other way'—from recovery (i.e. turnover increase) to profitability and rating upgrades rather than from recession to losses and rating downgrades.
- ✓ We believe that our framework worked quite well, with one exception: liquidity. The liquidity position of Greek corporations was boosted in several active and passive ways that could not be captured by our methodology. Policies that have actively improved the liquidity position include subsidised and guaranteed bank loans and seven rounds of the so-called 'refundable advance'. Passively, liquidity pressures were alleviated via postponement of tax and social security obligations, loan repayment moratoria and employee furlough programmes.
- ✓ For all of the above reasons, our liquidity reflects potential funding needs in the absence of state support. As such, these data should be treated as a worst-case scenario (i.e. placing an upper limit on liquidity contraction) rather than a baseline scenario.
- ✓ Notably, the publication of the 2020 (let alone the 2021) corporate financial statements is still lacking for many firms. Hence, with our simulation analysis, we tried to bridge this informational gap and estimate the impact of the pandemic on business, leading to useful conclusions for the corporate universe.

Year two: How did the reversal of the transmission mechanism (from recession to recovery) allow corporations to heal their corporate balance sheets?



Key Findings I: Based on microsimulations of 12,236 Greek corporations

	2020	2021	2021 vs. pre COVID-19
Turnover	Declined by €11.5bn (-10.8%)	Recovered by €5.1bn (+5.4%)	Lower by €6.4bn (-6.1%)
EBITDA	Declined by €6.6bn (-64.5%)	Recovered by €5.8bn (+1.6x)	Lower by €811mn (-7.9%)
P&L distribution[1]	€4.6bn in losses by 59.6% of firms €5.3bn in profits by 40.4% of firms	€1bn in losses by 22.3% of firms €7.5bn in profits by 77.7% of firms	
Cash reserves	Increased by €3bn (+22.9%)	Increased by €7.4bn (+46.2%)	Higher by €10.4bn (+79.6%)
Cash shortfall	25.7% of firms faced a shortfall of €2.3bn	14.6% of firms faced a shortfall of €921mn	
Equity	Declined by €3.5bn (-6.1%)	Increased by €2.3bn (+4.2%)	Lower by €1.2bn (-2.1%)

[1]Net results, excluding depreciation and amortisation

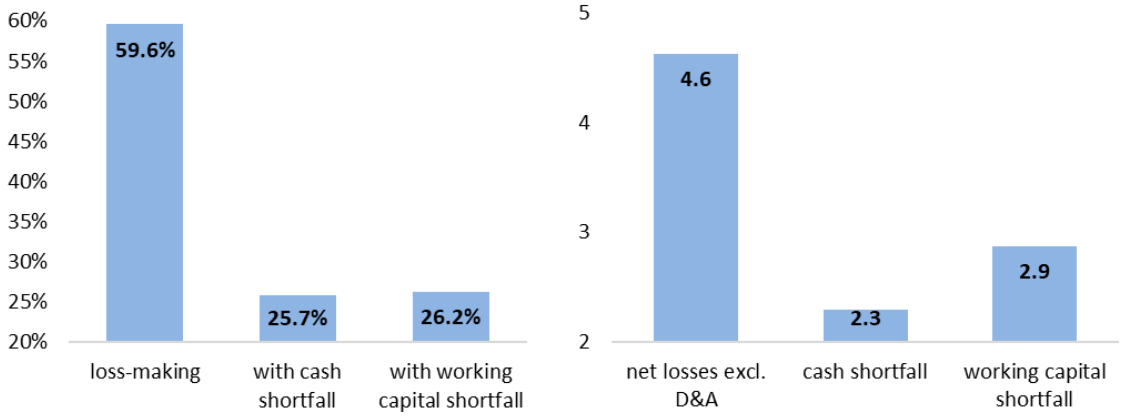
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Key Findings II: Assessing corporate financial distress

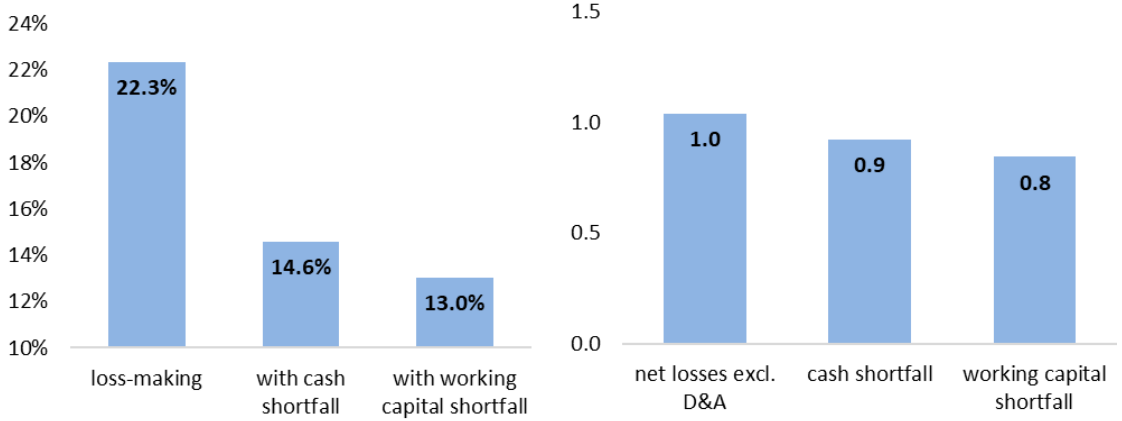
Loss-making Firms (as % of total)

Financial Shortfall (figures in €bn)

2020



2021



Notes: 1. If the starting working capital was negative, it was set at zero.
2. Working capital = current assets − current liabilities
3. D&A: Depreciation and amortisation.

Highlights

- ✓ In total, 59.6% of firms were estimated to have losses with €4.6 bn in net losses (excl. D&A).
- ✓ Of the 12,236 firms in our sample, 25.7% had a negative cash position (cash shortfall) of €2.3 bn.
- ✓ In our sample, 26.2% of firms recorded a working capital shortfall of €2.9 bn.

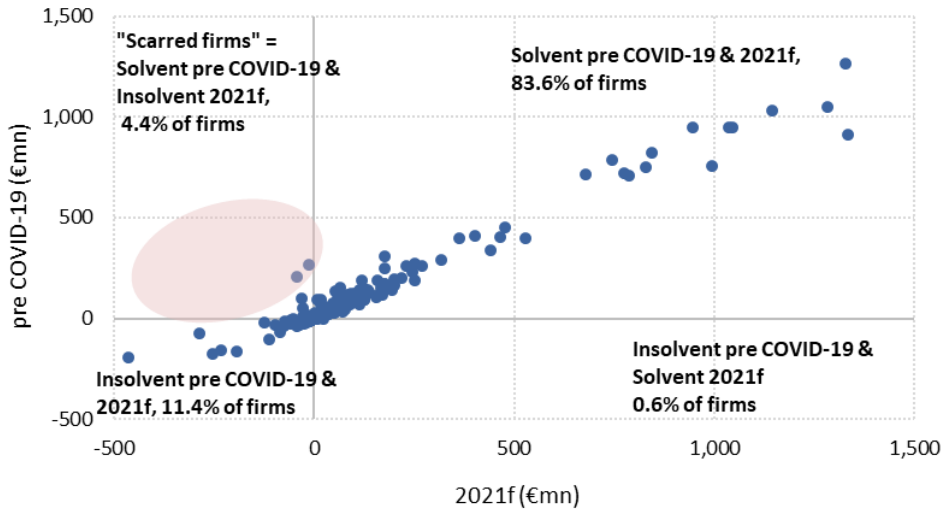
- ✓ In 2021, 22.3% of firms were estimated to have losses, with net losses (excl. D&A) of €1 bn. This trend marked an improvement compared with 2020 (at 59.6%) in terms of both level and share, signalling the gradual return of the companies to their pre-COVID-19 status.
- ✓ Of the 12,236 firms in our sample, 14.6% had a negative cash position (cash shortfall) of €921 mn.
- ✓ In our sample, 13% of the firms recorded a working capital shortfall of €843 mn.

Source: ICAP DATA.Prisma, ELSTAT, EC, Piraeus Bank Research

Key Findings III: Examining equity stress

- ✓ Despite the improved income and mitigated liquidity pressure in 2021 compared to 2020, firms were not left unscathed.
- ✓ In 2021, firms with negative equity were estimated to be 15.8%, up from 12% pre-COVID-19.
- ✓ The level of negative equity expanded by 96.7% in 2021 compared to the pre-COVID-19 period, resulting in a final equity gap of €5.3 bn.
  - In other words, we estimated an additional €2.6 bn equity gap by insolvent firms during the pandemic.
- ✓ In our sample, 4.4% of the firms were 'scarred' by the pandemic, given that they had positive equity pre-COVID-19 but negative in 2021.
- ✓ However, 83.6% of firms that were solvent pre-COVID-19 remained solvent in 2021.

Pre COVID-19 vs 2021 granular equity *(€mn)*



- ✓ We define a firm as **solvent**, when it has positive equity.
- ✓ We define a firm as **insolvent**, when it has negative equity, in other words it has an equity gap.
- ✓ We define a firm as "**scarred**", when it has a negative post COVID-19 equity from positive pre COVID-19 equity.
- ✓ Outliers are trimmed in graph, but they are included in the calculations. Each dot of the scatterplot represents an enterprise.

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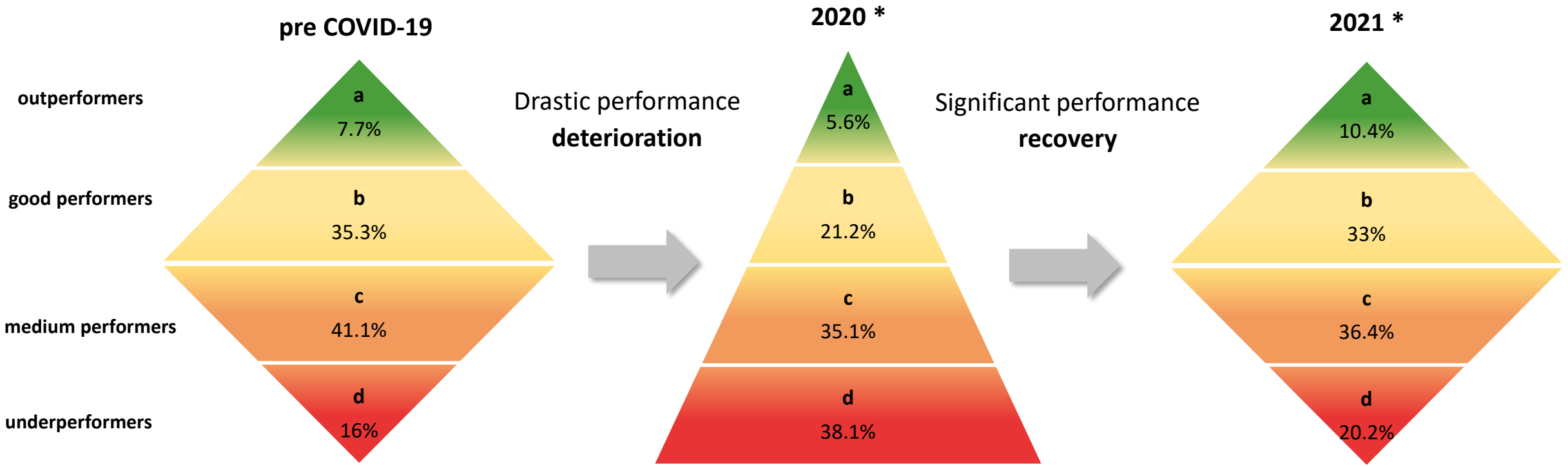
Source: ICAP DATA.Prisma, ELSTAT, IMF, Piraeus Bank Research

Key Findings IV: Stress testing our ERS

- ✓ In 2020, a massive number of companies saw a deterioration in their ratings.
- ✓ After the macro improvement of 2021, most companies returned to their pre-COVID-19 ratings.
- ✓ However, we recorded a higher concentration at the edges of the distribution in 2021 compared to pre-COVID-19 (i.e. to 'a' and 'd' ratings).

Enterprise Breakdown by ERS Rating

Out of 12,236 enterprises



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* For rating purposes, ratios outside acceptable boundaries were treated as if they were on upper or lower boundaries.

Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

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Methodological Framework* from 1st year of pandemic (2020) to 2nd year (2021)

From pre COVID-19 growth to 2020 recession:

- ✓ The methodology developed in this study allows us to translate a macroeconomic shock (due to COVID-19-related social distancing measures) to an estimate regarding the decline in turnover (or sales) for each of the major sectors of the Greek economy.
- ✓ Taking the reduced revenues as a given, we then assume that in 2020 companies also adjust their cost base by a fraction of the decline in turnover.
- ✓ The combination of these two hypotheses allows us to model the impact of the COVID-related recession on companies' entire balance sheets, in the sense that the asymmetric nature of their income and cost adjustment leads to losses, which affect the liquidity and capital position of each company.
- ✓ Faced with a liquidity shortfall and despite equity depletion, companies need credit support from banks, suppliers and the state.

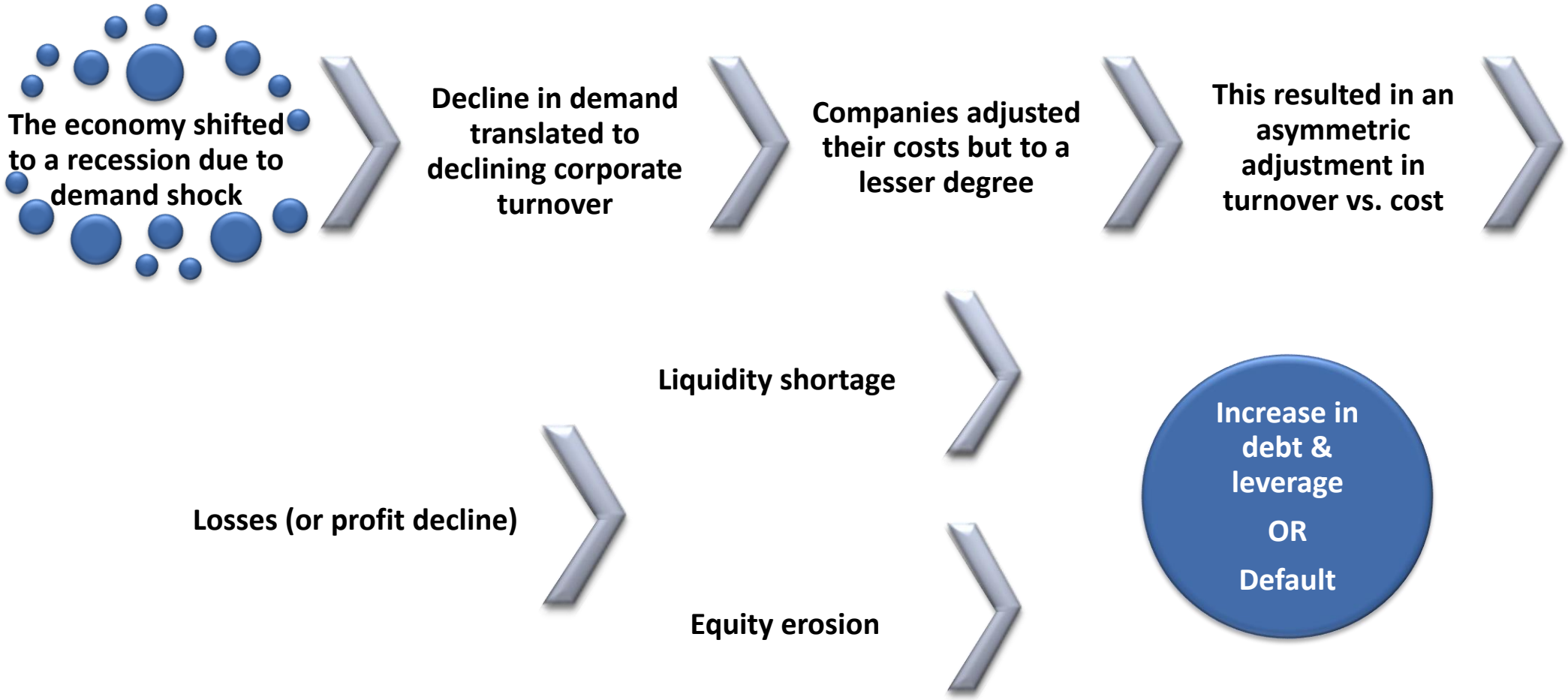
From 2020 recession to 2021 recovery:

- ✓ In our next step, we wanted to estimate firms' way to recovery after the initial shock of the pandemic. For our 2021 scenario, we made the assumption that all enterprises continue to operate and survive the 2020 demand shock.
- ✓ It is assumed that they are able to recover a percentage of 2020 estimated turnover loss and that the operating revenue to operating expenses ratio come back to the pre COVID-19 relevant ratio.
- ✓ Last, we run the model the "other-way" to estimate the impact of recovery on the P&L and balance-sheet of Greek firms.

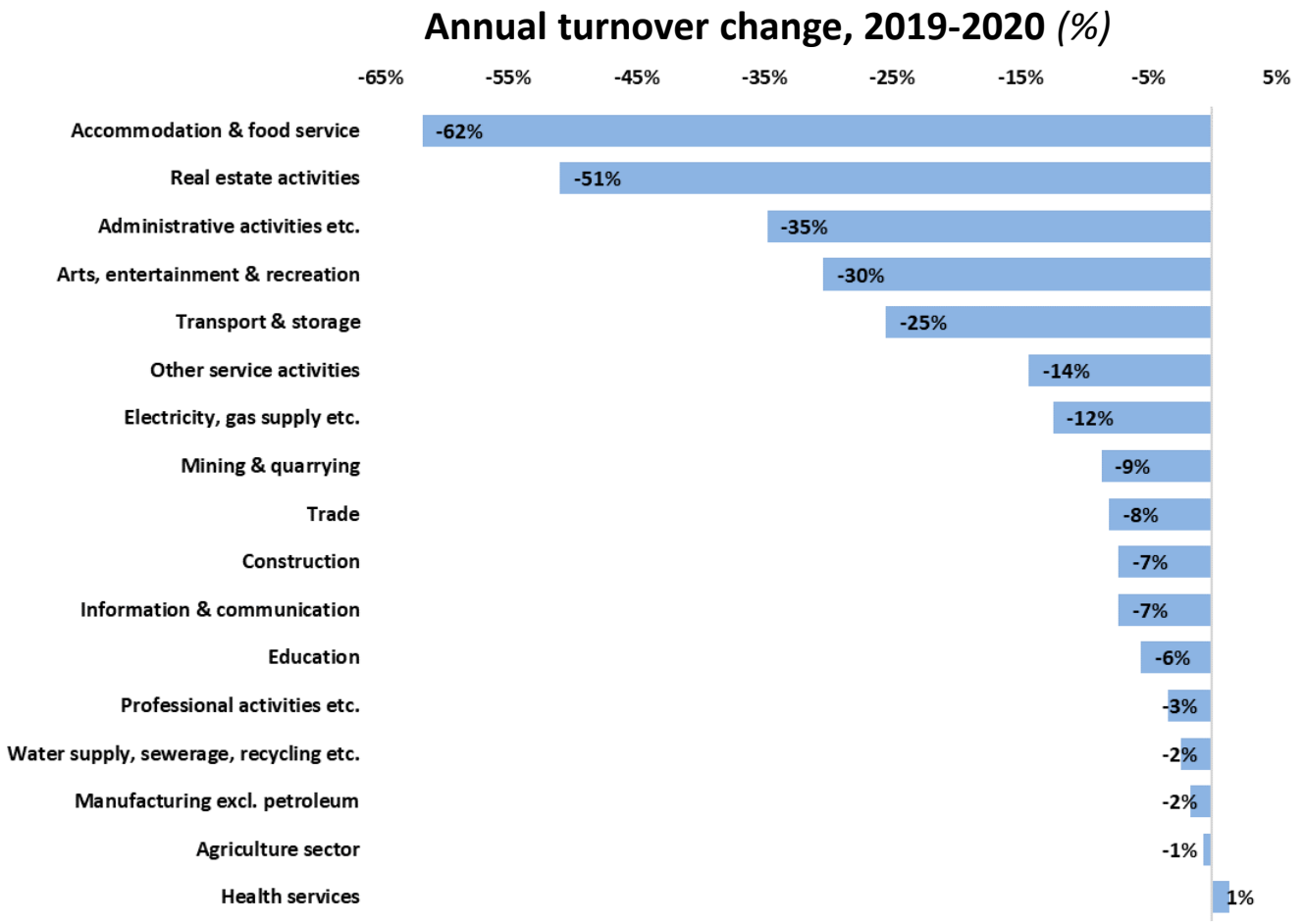
* The detailed equation framework is provided in the Appendix I. Our transmission mechanism simulation is built on the research of European Commission, OECD and IMF:

- ✓ EC Working Document, *Identifying Europe's recovery needs*, May 2020;
- ✓ OECD, *Corporate sector vulnerabilities during the Covid-19 outbreak: Assessment and policy responses*, May 2020
- ✓ Ebeke C. et al. (2021), *Corporate Liquidity and Solvency in Europe during COVID-19: The Role of Policies*, IMF Working Paper WP/21/56.

Year one: How did the macroeconomic demand shock transmit to corporate balance sheets?



Implemented Demand Shock on 2020 Sectoral Sales and Cost Adjustment Assumption



✓ **Assumption: Operating expenses are adjusted by half of operating revenue change**

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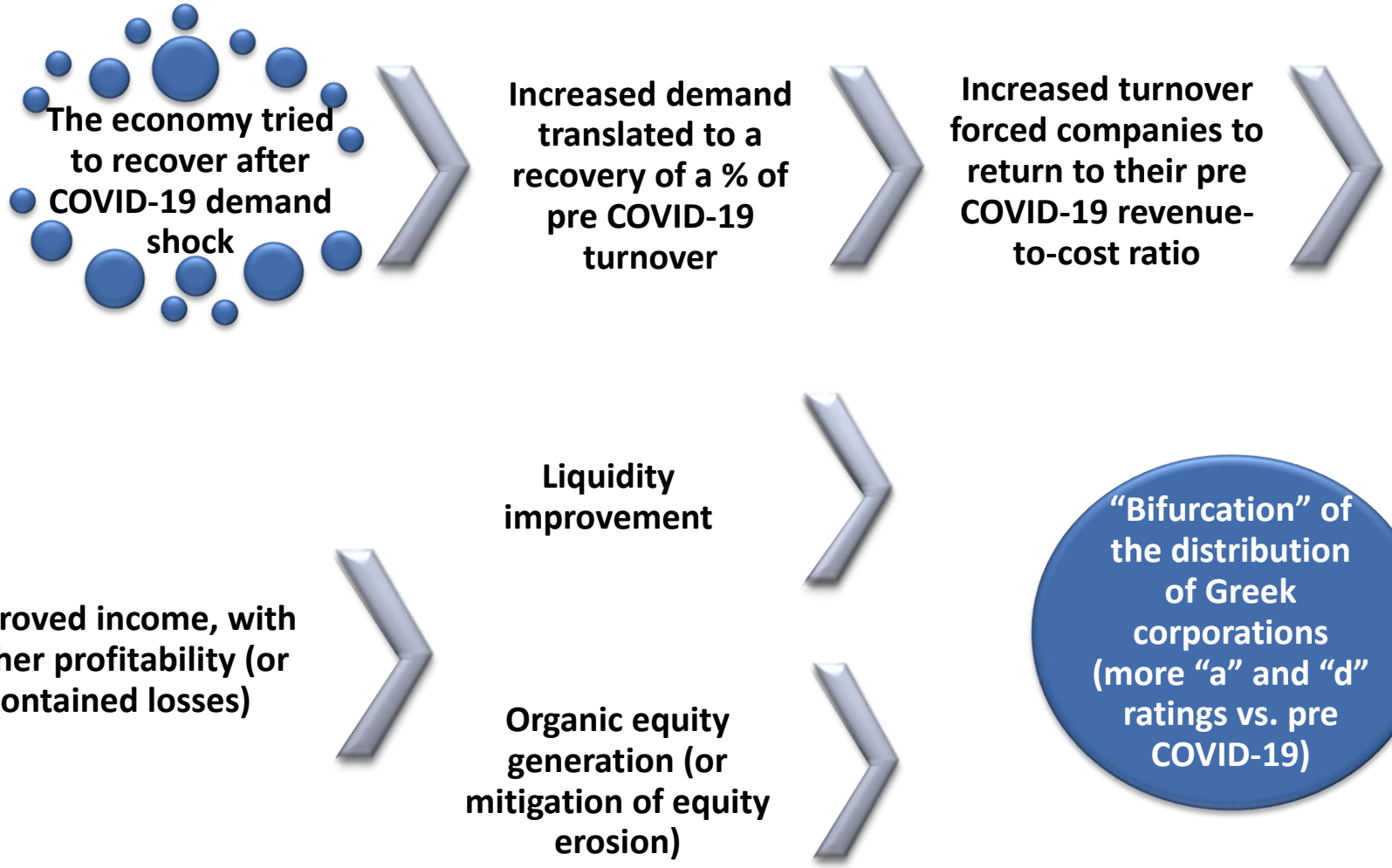
The graph presents the changes on section aggregate level, based on the sectors we examined and we had available data. In our analysis, we implemented the changes per two-digit NACE rev. 2 analysis expect for retail sector (per four-digit NACE rev. 2 analysis). The detailed implemented annual changes are provided in Appendix II.

Source: ELSTAT, Piraeus Bank Research

Year two: How did the reversal of the transmission mechanism (from recession to recovery) allow corporations to heal their corporate balance sheets?



2021 Scenario: Main assumptions of the 2021 rebound scenario

- ✓ **Tourism** related sectors recover 60% of their 2020 turnover loss.
- ✓ Subsectors with **positive 2020** turnover growth retain 40% of their 2020 turnover gains.
- ✓ **Non suspended subsectors** and some subsectors of education with negative 2020 turnover change recover 20% of their 2020 turnover loss.
- ✓ **Suspended subsectors** and automotive fuel retail trade recover 50% of their 2020 turnover loss.
- ✓ **2021 operating revenue to operating expenses ratio is the same with the pre COVID-19 relevant ratio.**

- ✓ **Tourism definition**: Sectors of water transport, air transport, accommodation, beverage and food services, travel agencies.
- ✓ **Sectors of education** with 20% turnover loss recovery: secondary education, post-secondary non-tertiary education, educational support activities.

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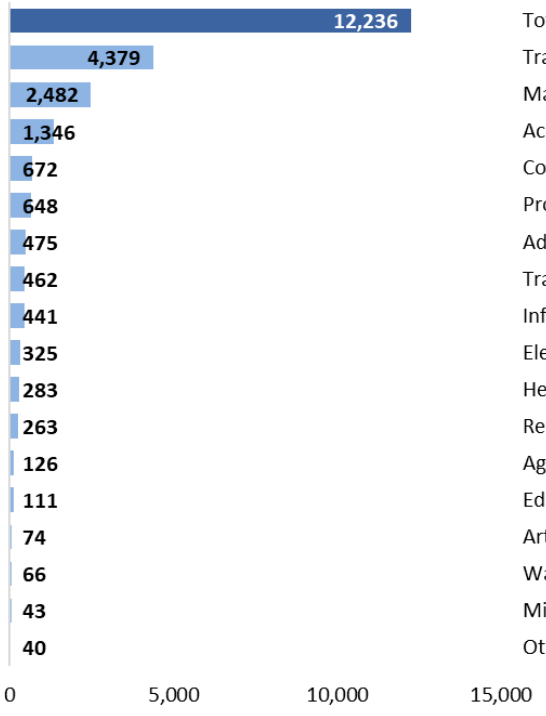
Source: ELSTAT, Piraeus Bank Research

Enterprise Sample Description

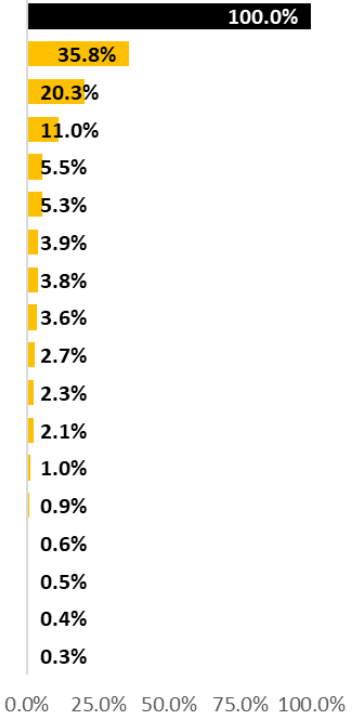
Main Assumptions

- ✓ We examined all non-financial sectors of economic activity according to the NACE rev. 2 classification, excluding manufacture of petroleum products[1].
- ✓ For the sample selection of our analysis, we used the methodological framework of the internally developed Enterprise Rating System (ERS), published in September 2019 report[2].
- ✓ The data reference year is 2018. We assumed that in 2019, financial conditions were not drastically different from 2018, and we refer to them as pre COVID-19 conditions.

Firms by Sector



Share of Firms by Sector



[1] In our analysis, we treated the manufacture of petroleum products (NACE rev. 2 code 19) as an outlier and we excluded it. The sector is very volatile, influenced indirectly by factors related to the pandemic. In our initial sample of 2018 ERS, the sector is of high financial magnitude, consisted of only 23 firms. When it was included, it changed significantly the whole picture of COVID-19 effect against the rest sectors.

[2] For more: Lekkos I., Vlachou P., *Enterprise Rating System (ERS): Separating wheat from chaff – increased percentage of underperformers versus medium performers*, Piraeus Bank, Sept. 2019

Source: ICAP DATA.Prisma, Piraeus Bank Research

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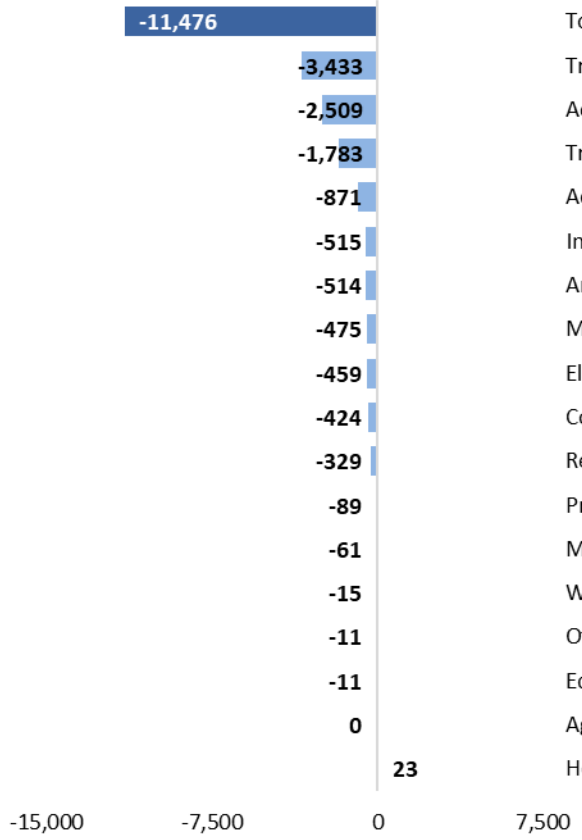
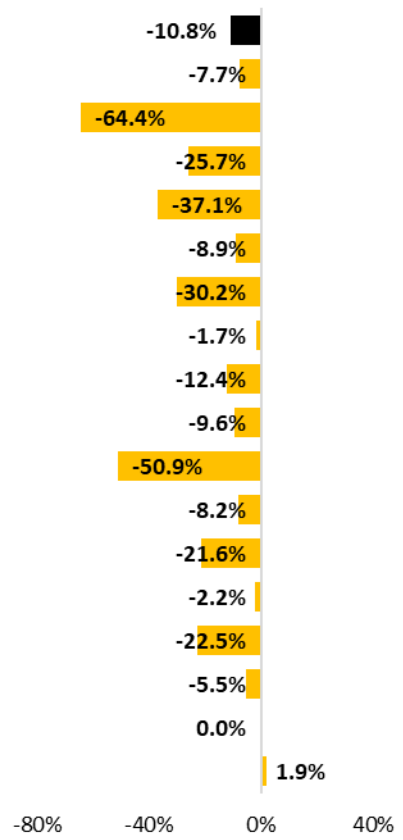
Turnover - 2020 Scenario: The impact of our methodology on the sample of 12,236 Greek Corporations

✓ The demand shock pointed to a **€11.5bn (-10.8%) decline in turnover** compared to the pre COVID-19 levels.

€-11.5bn 2020 turnover decline due to COVID-19 *(figures in €mn)*



% Turnover decline due to COVID-19



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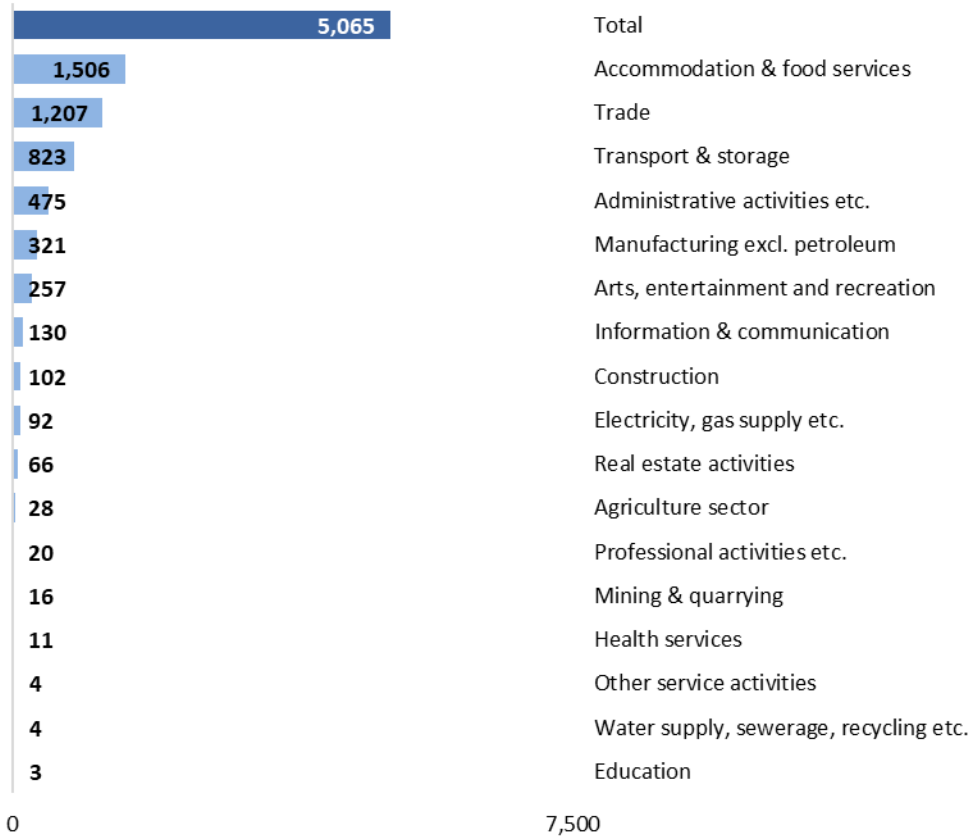
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

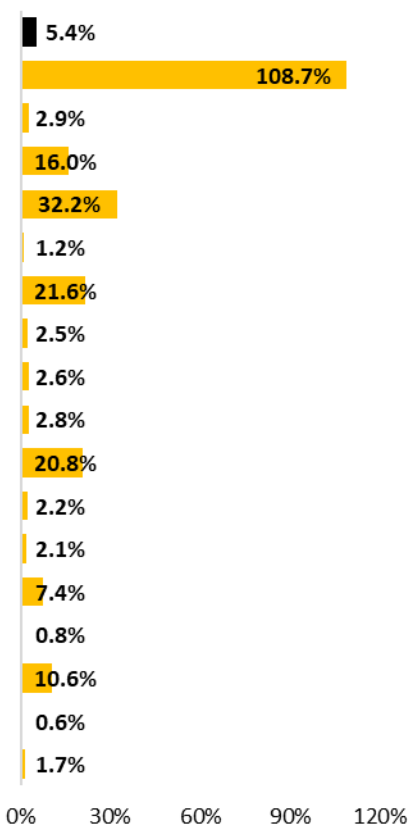
Turnover - 2021 Scenario: The impact of our methodology on the sample of 12,236 Greek Corporations

✓ The 2021 Scenario assumptions led to a **€5.1bn (+5.4%) increase in turnover** compared to 2020.

€5.1bn 2021 turnover improvement vs 2020 *(figures in €mn)*



% Turnover change, 2020-2021



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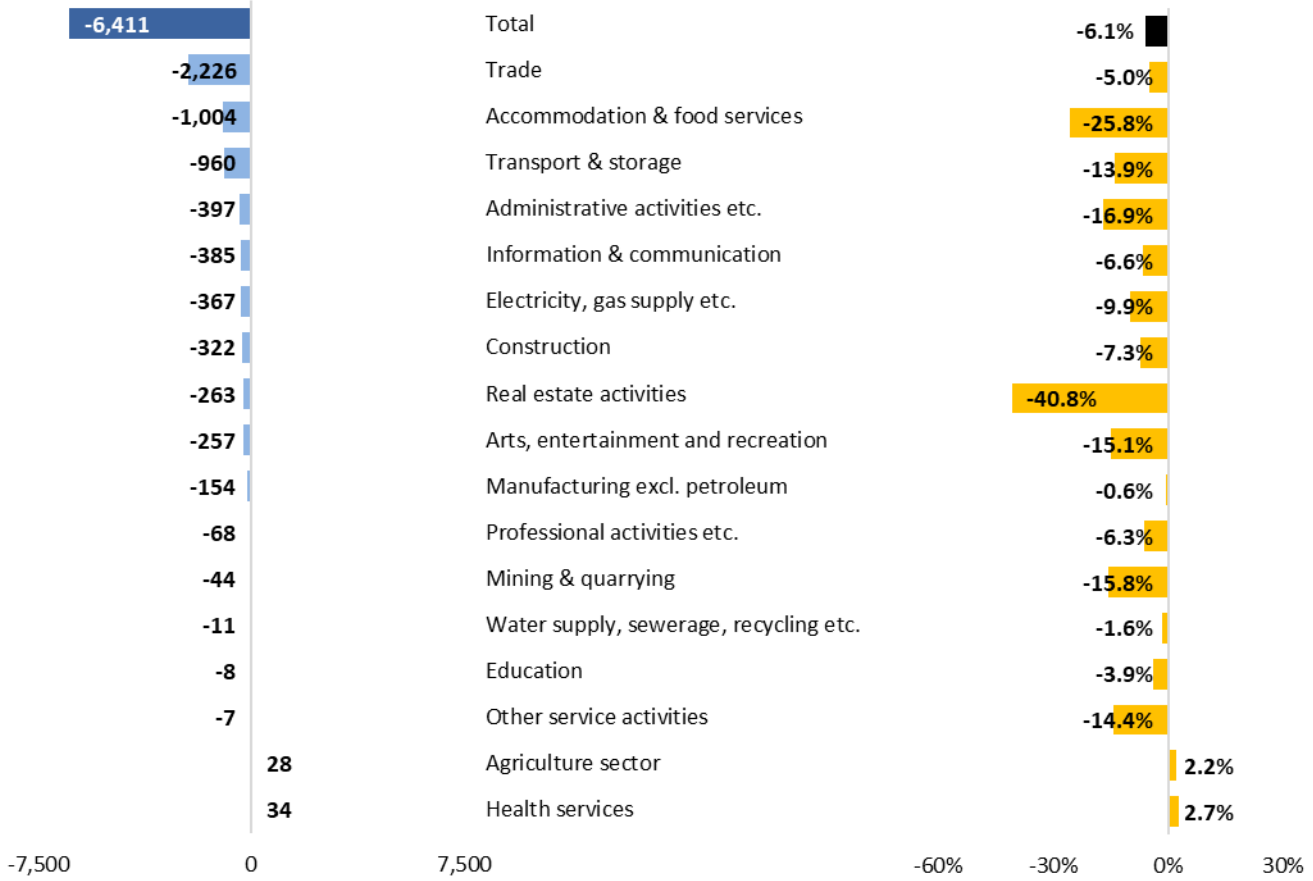
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Turnover - 2021 Scenario: In 2021, corporates remained with a **€6.4bn negative turnover gap in 2021 compared to pre COVID-19 levels.**

€6.4bn 2021 turnover loss vs pre COVID-19 *(figures in €mn)*



% Turnover decline, pre COVID-19 vs 2021

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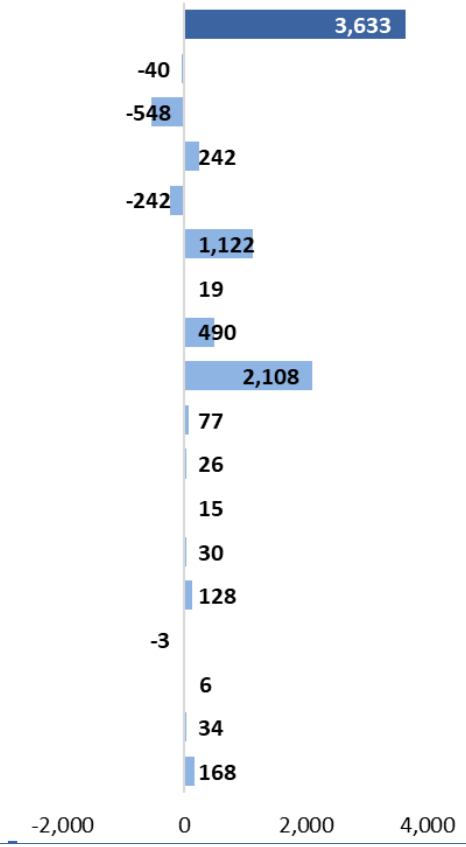
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

EBITDA - 2020 Scenario: €6.6bn less profits in 2020 than in the pre COVID-19 period

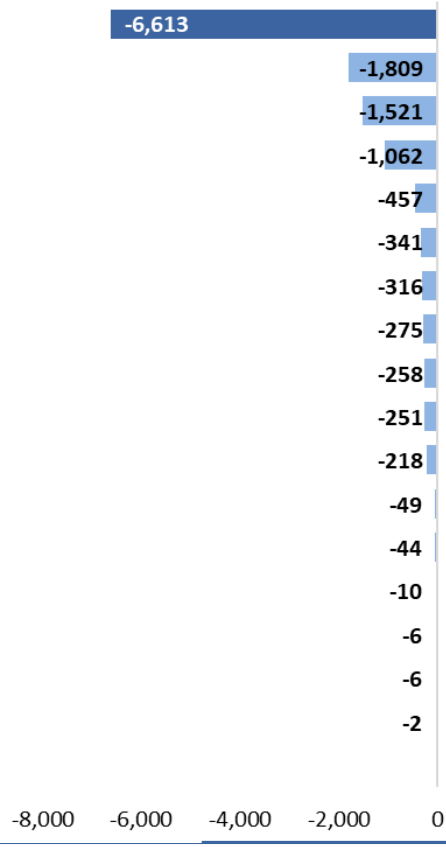
- ✓ The aggregate level of EBITDA in 2020 remained positive, due to manufacturing (excl. petroleum) and ICT.
- ✓ Trade as well as tourism related sectors, such as accommodation and food services and transport and storage, witnessed the strongest EBITDA shrinkage.

Pre COVID-19 EBITDA *(figures in €mn)*

2020 EBITDA *(figures in €mn)*



EBITDA change, pre COVID-19 vs 2020 *(figures in €mn)*



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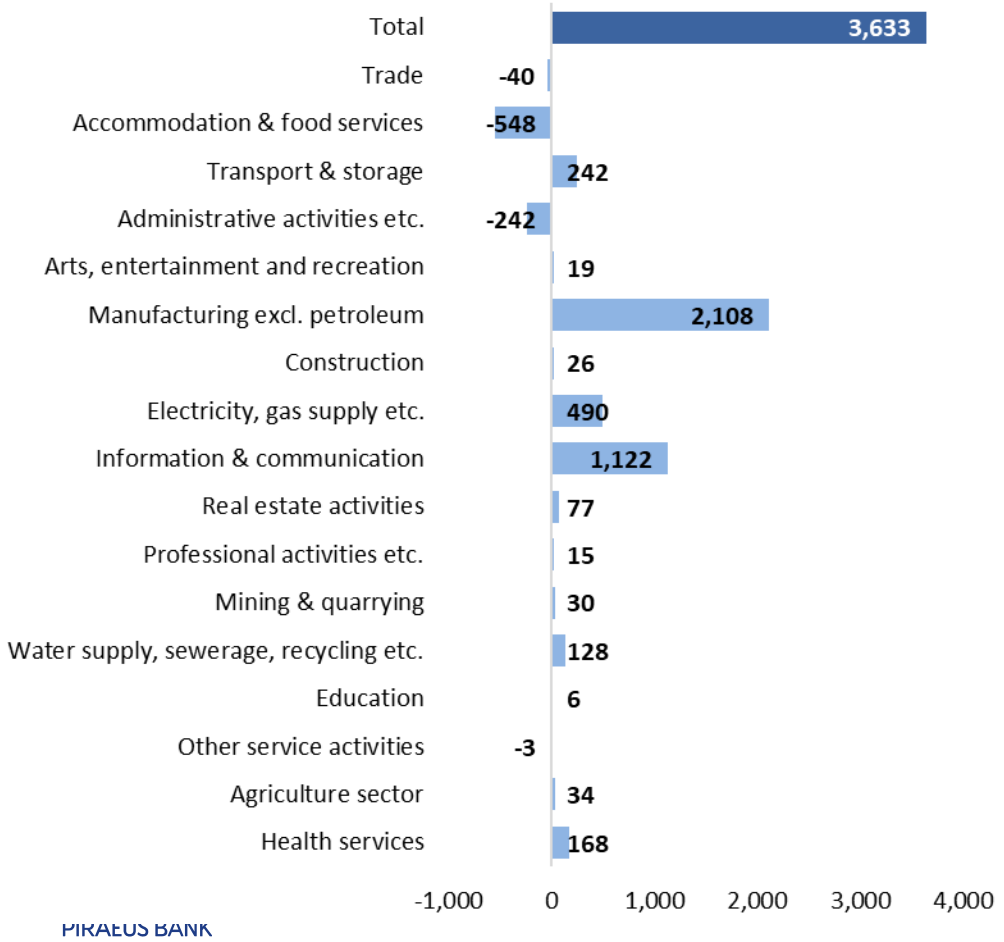
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

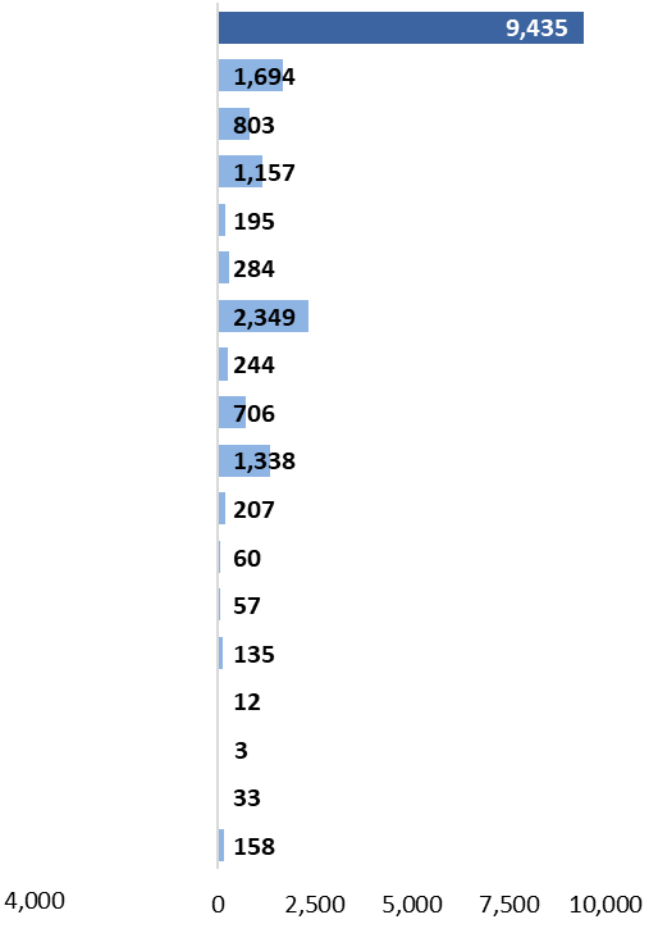
EBITDA - 2021 Scenario: All sectors were back to positive EBITDA levels

✓ Having reached record low levels due to the COVID-19 impact, trade and sectors linked to tourism achieved the biggest improvement in their EBITDA levels in 2021.

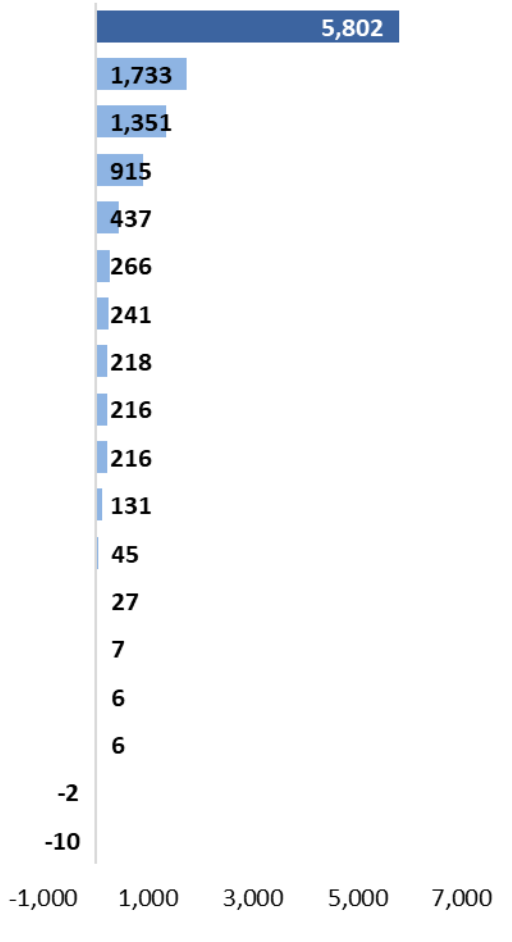
2020 EBITDA *(figures in €mn)*



2021 EBITDA *(figures in €mn)*



EBITDA change, 2020-2021 *(figures in €mn)*



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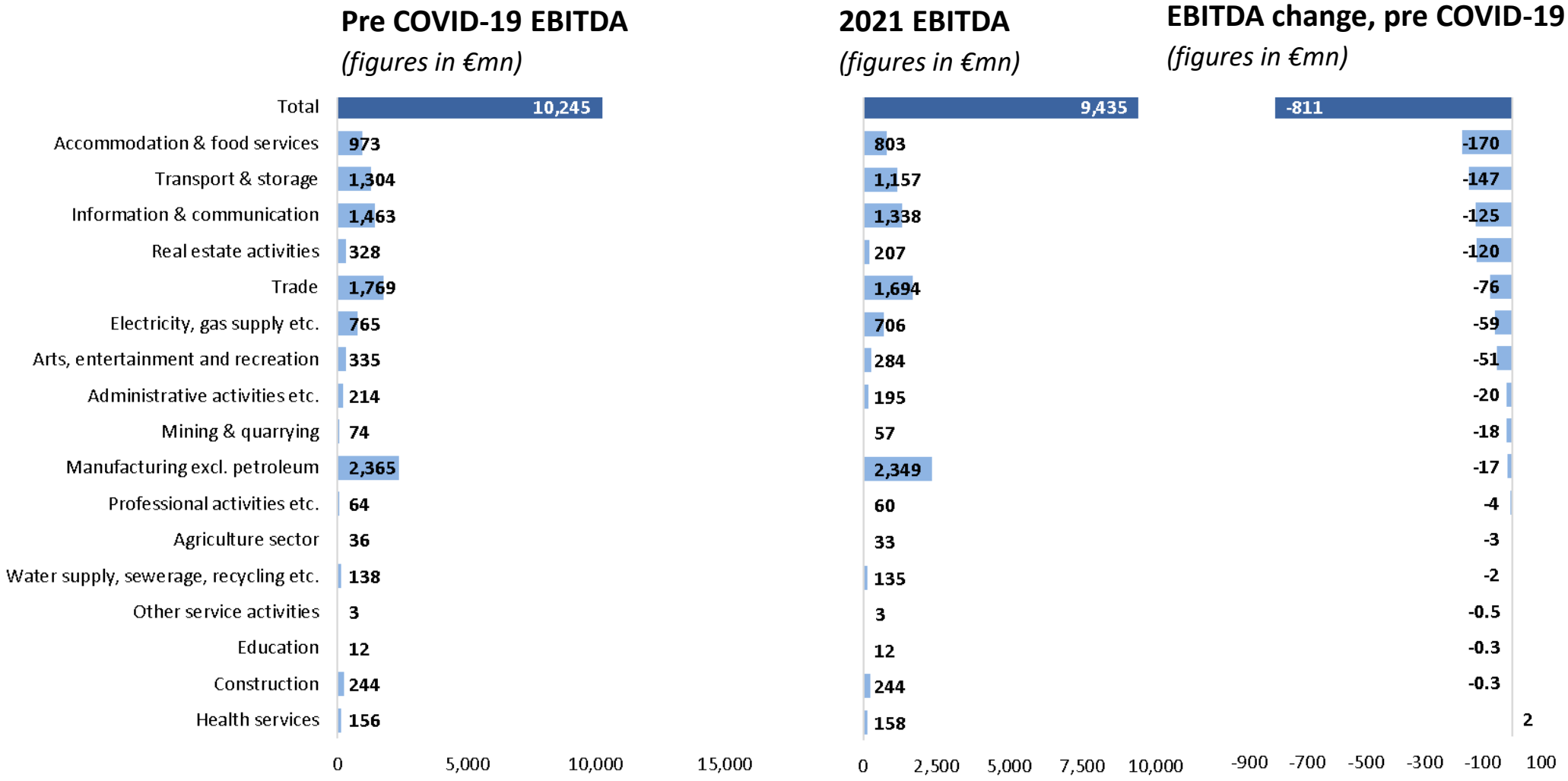
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Most of the sectors did not yet return to pre COVID-19 profit (EBITDA) levels in 2021



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Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

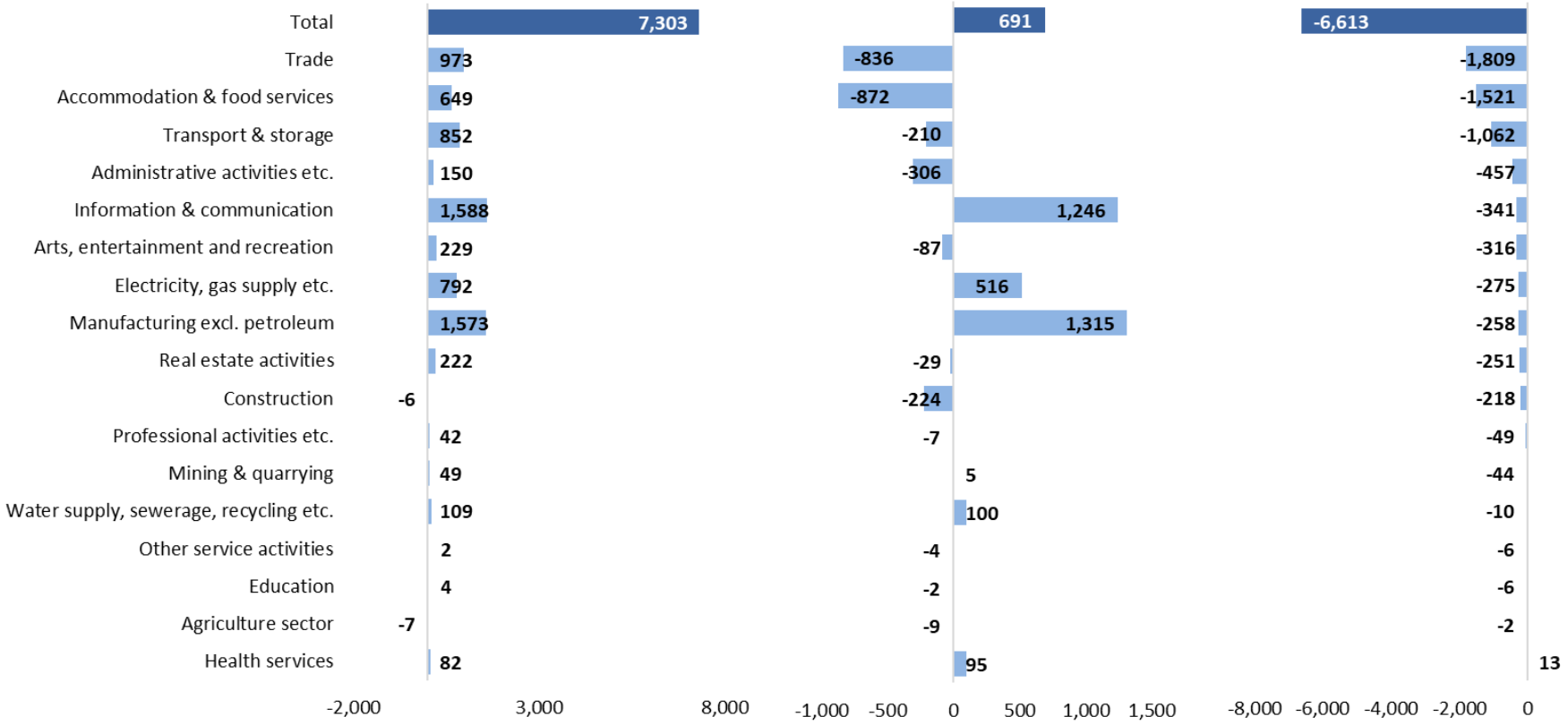
Net Results - 2020 Scenario: marginal net profits of €691mn in 2020

- ✓ All sectors, except for health services, saw a decline in net profits (excl. D&A).
- ✓ The marginal net profits were mainly due to the resilience of manufacturing (excl. petroleum), ICT and energy (electricity, gas supply etc.) sectors.

Pre COVID-19 Net Results excl. D&A *(figures in €mn)*

2020 Net Results excl. D&A *(figures in €mn)*

Net Results excl. D&A change[1], pre COVID-19 vs 2020 *(figures in €mn)*



- ✓ D&A: Depreciation and amortisation.

1. We implemented the 2020 €6.6bn operating loss adjustment on net results excl. D&A. The change in net results (excl. D&A) equals the respective one in EBITDA. Based on methodology all the adjustments were made in operating income level and all the other income factors remain unchanged (see Appendix I-c).

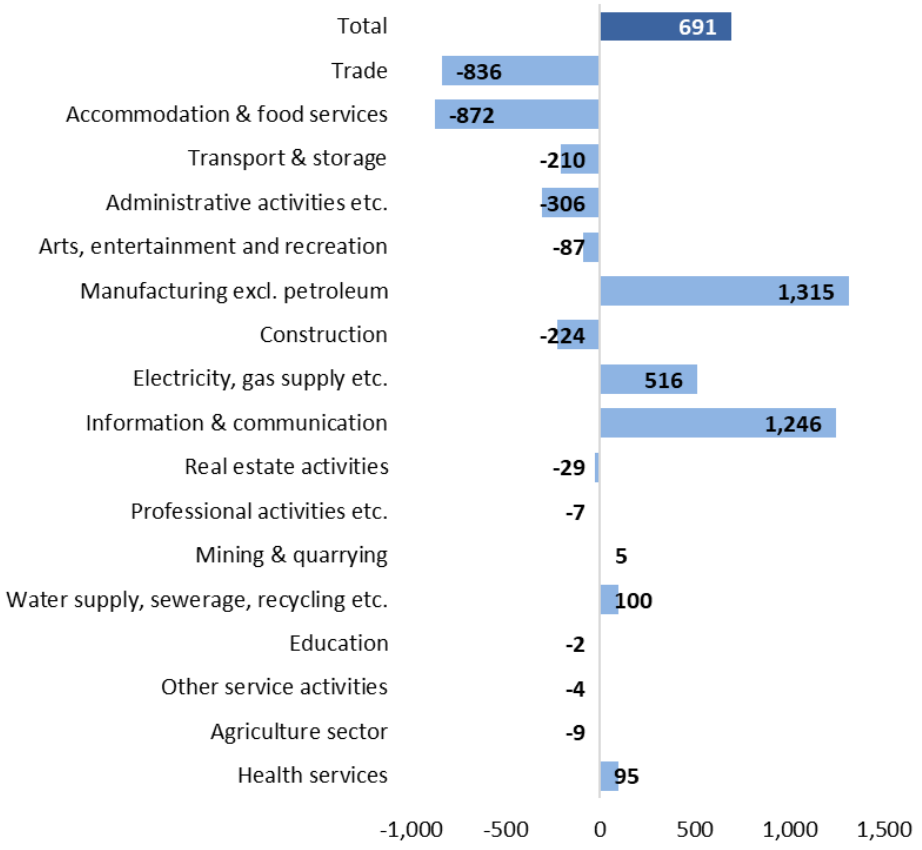
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Net Results - 2021 Scenario: a significant net profit (excl. D&A) rebound in 2021 at €6.5bn

✓ Still a negative gap of €811mn compared to the pre COVID-19 levels.

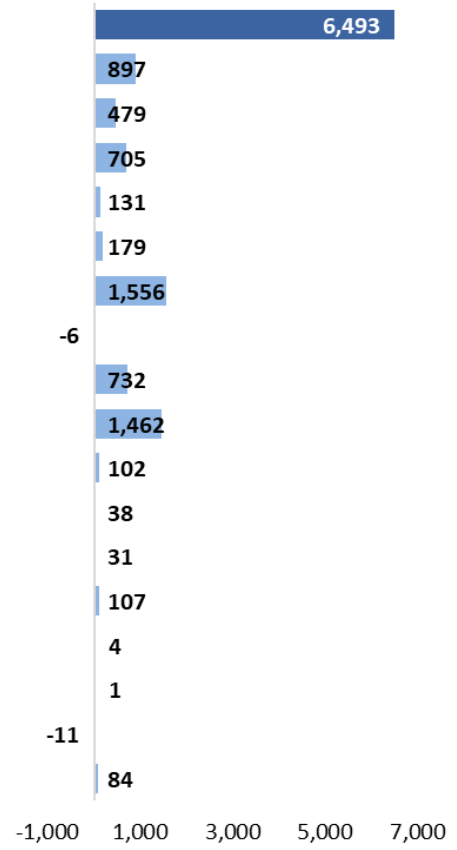
2020 Net Results excl. D&A

(figures in €mn)



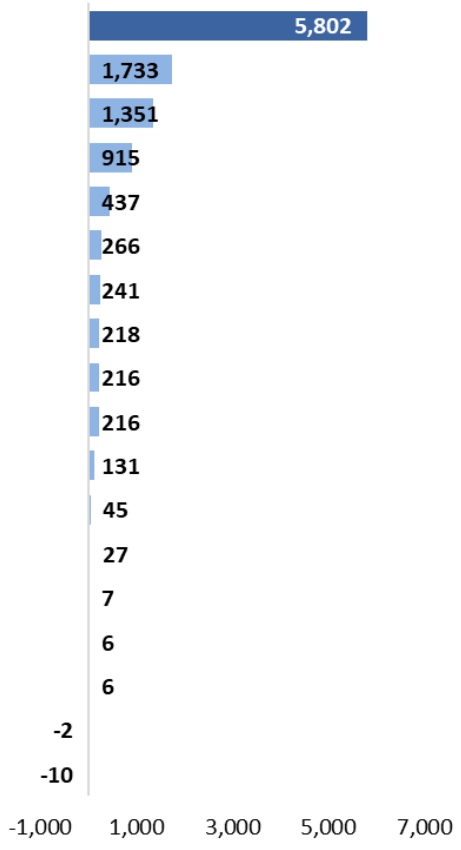
2021 Net Results excl. D&A

(figures in €mn)



Net Results excl. D&A change[1], 2020-2021

(figures in €mn)



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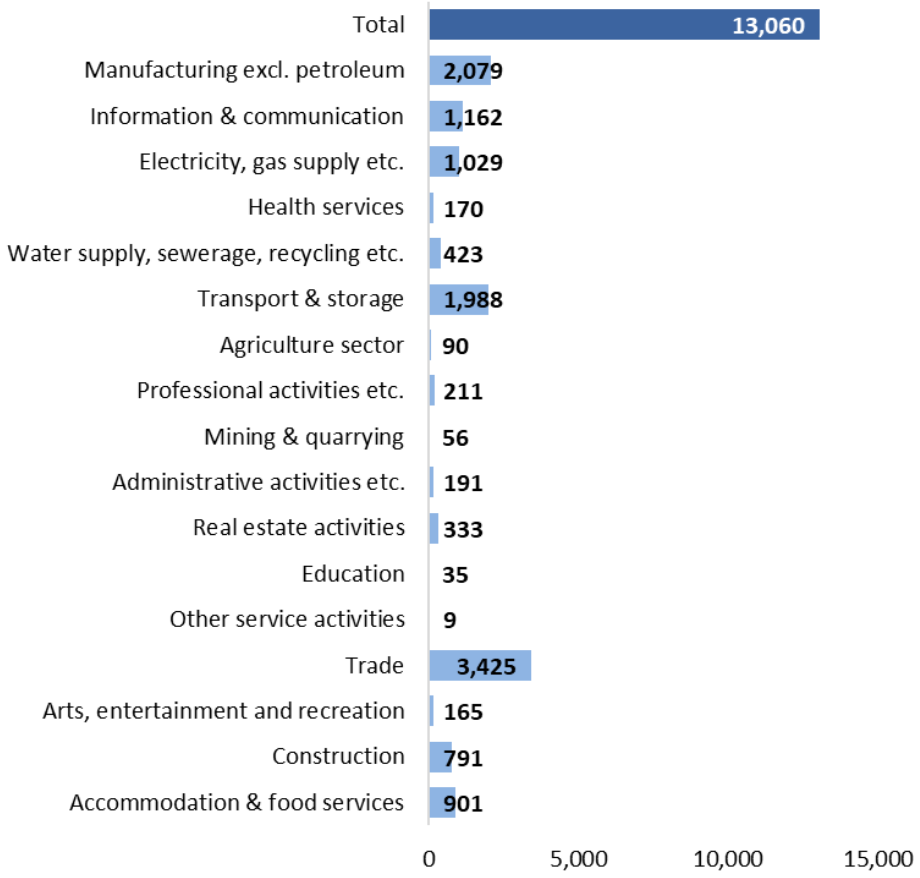
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

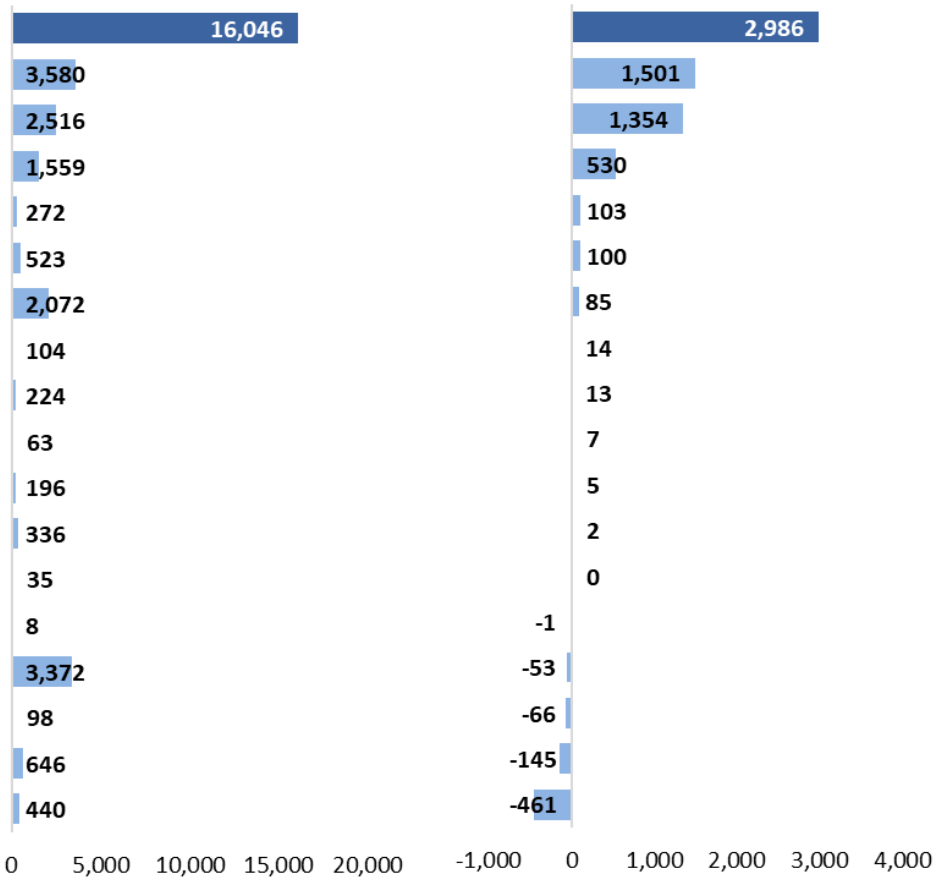
Cash Reserves - 2020 Scenario: Cash reserves were estimated to increase by €3bn

- ✓ Manufacturing (excl. petroleum), ICT and energy related sectors managed to retain a cash surplus.
- ✓ On the contrary, the mobility restriction measures had a negative impact on the cash buffer of accommodation and food services, arts and entertainment, construction and trade.

Pre COVID-19 Cash *(figures in €mn)*



2020 cash *(figures in €mn)*



Cash change pre COVID-19 vs 2020 *(figures in €mn)*

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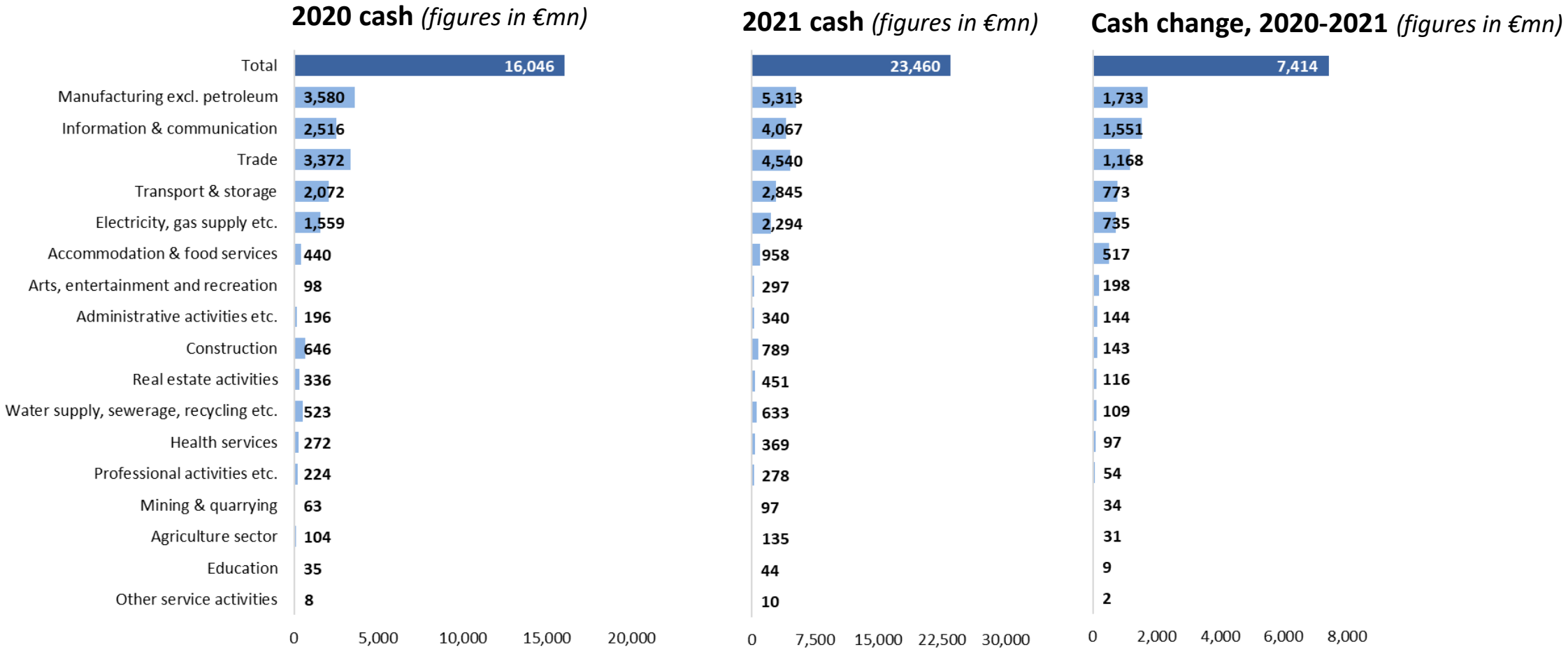
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Cash Reserves - 2021 Scenario: an increase in cash reserves by €7.4bn (+46.2% on an annual basis)

✓ All sectors seemed to be better off in terms of cash reserves.



PIRAEUS BANK

Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

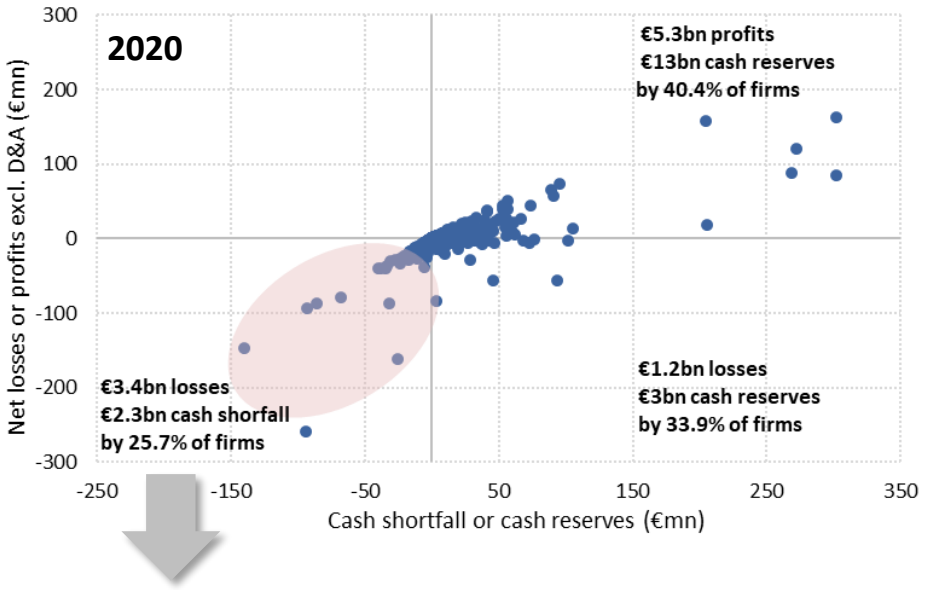
Looking the firm-level data…

From Net losses (excl. D&A) ➡ To Cash shortfall ➡ Need of credit support = Additional liabilities

2020: ***25.7% of total were loss-making*** and could not cover €2.3bn losses by their cash buffer, leaving them with an initial liquidity gap.

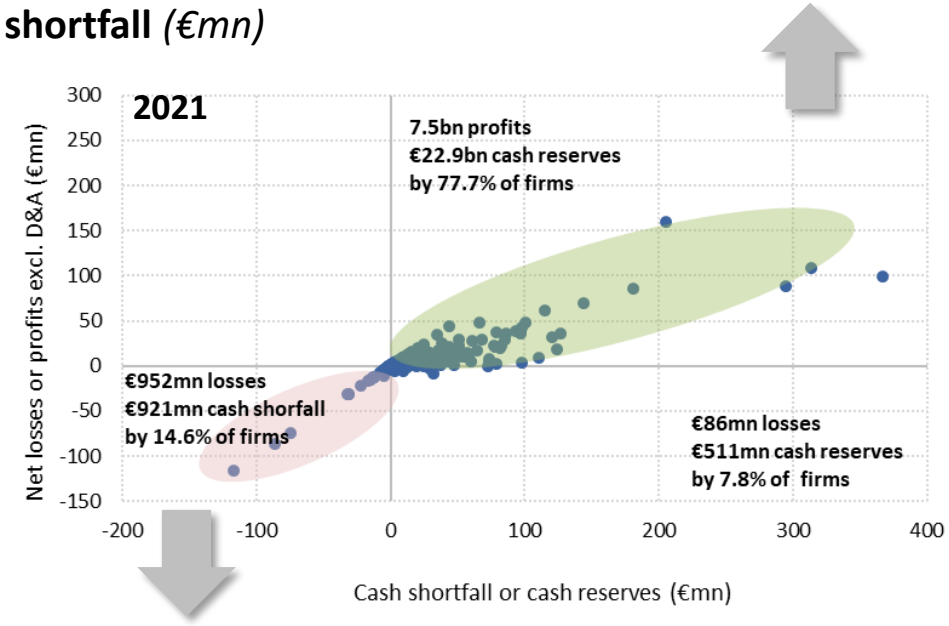
2021: ***77.7% of total were profitable firms*** – generating up to €7.5bn profits, which enhanced their cash reserves of €22.9bn.

Granular net results excl. D&A and cash reserves or shortfall *(€mn)*



From only €691mn total profits in 2020

To €6.5bn total profits in 2021



The ***€2.3bn of cash shortfall*** created an equal amount of additional liabilities.

However, a ***14.6% of loss making firms*** remained illiquid after their cash erosion, and were burdened with an ***additional €921mn of liabilities*** in total.

✓ Outliers are trimmed in graphs, but they are included in the calculations. Each dot of the scatterplots represents an enterprise.

✓ D&A: Depreciation and amortisation

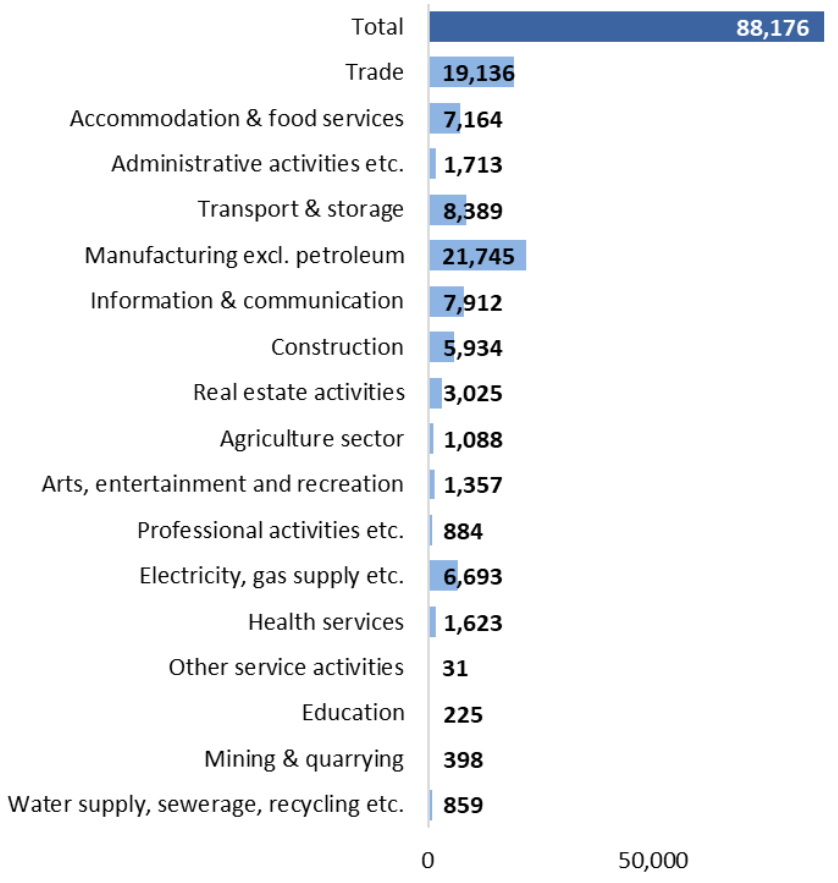
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Liabilities - 2020 Scenario: additional liabilities of €2.3bn in 2020

- ✓ Despite the increased cash reserves on an aggregated basis, looking at the firm-level data, it seems that additional liabilities of €2.3bn were generated.
- ✓ Trade and accommodation and food services, generated the strongest cash shortfall and consequently the highest increase in liabilities.

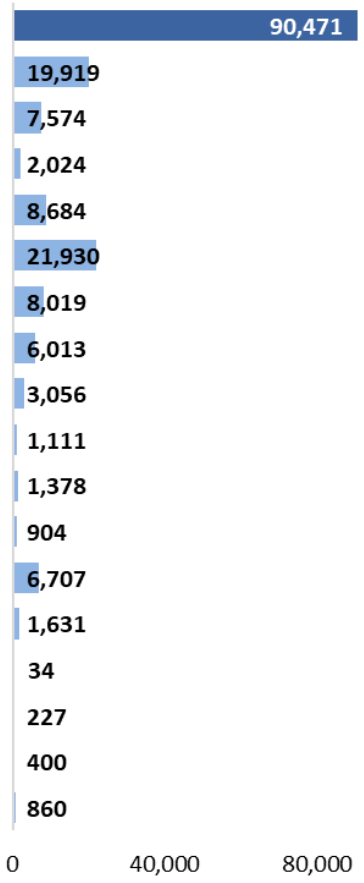
Pre COVID-19 Liabilities

(figures in €mn)



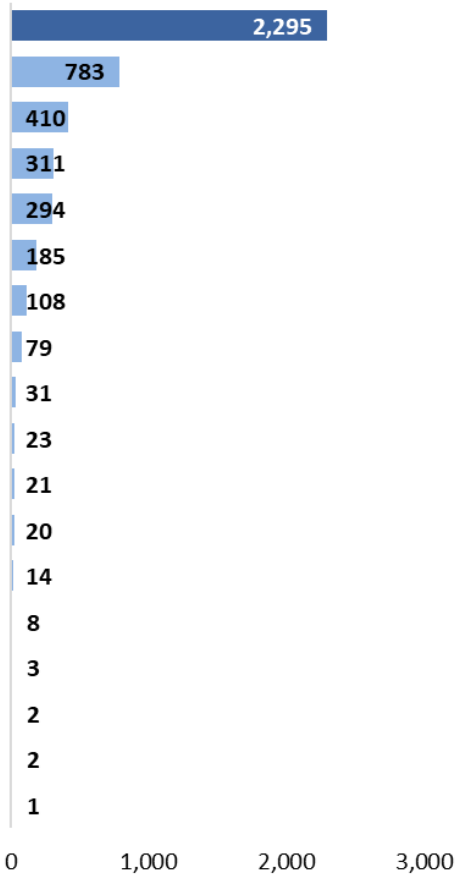
2020 liabilities

(figures in €mn)



Additional liabilities pre COVID-19 vs 2020

(figures in €mn)



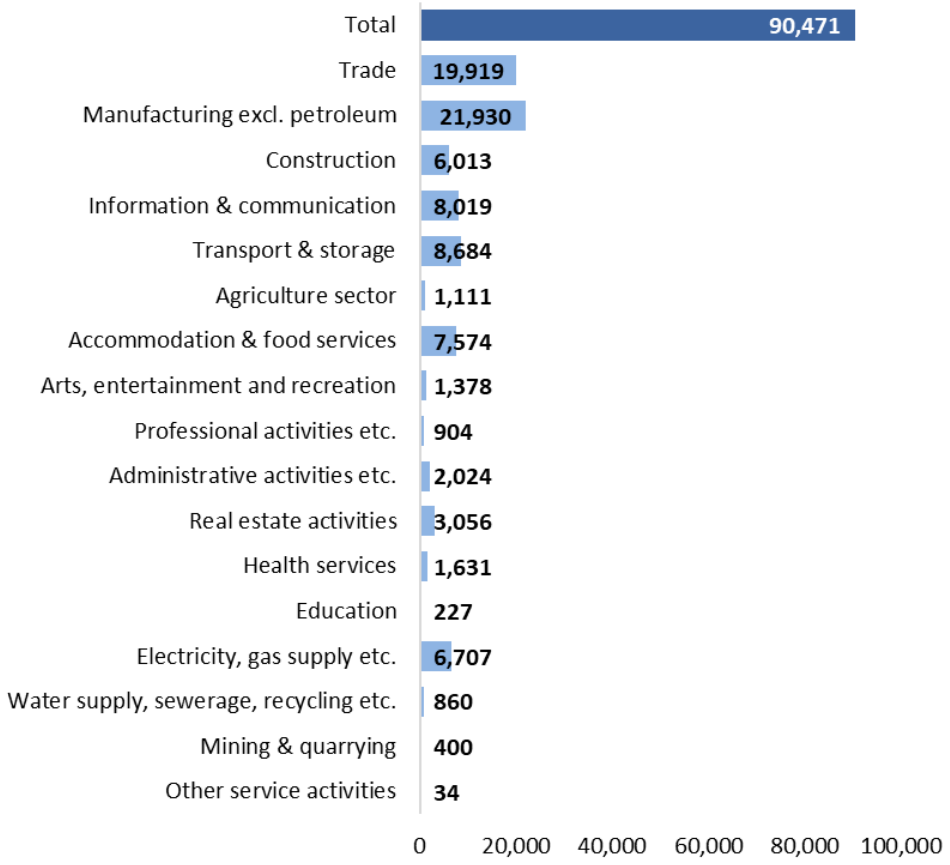
PIRAEUS BANK

Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

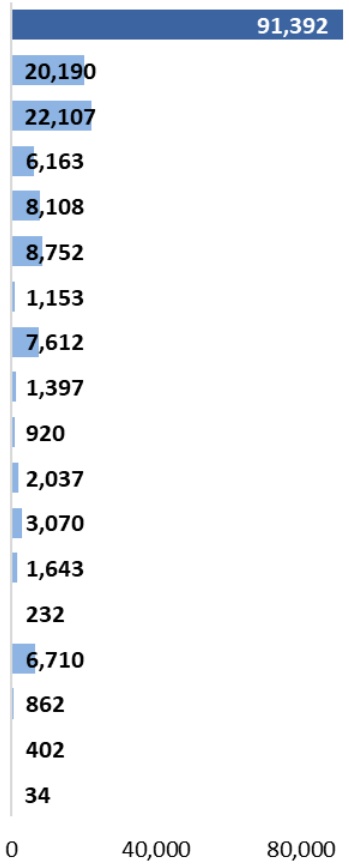
Liabilities - 2021 Scenario: additional liabilities of €921mn were generated

- ✓ Looking at the firm-level data a further increase of liabilities was estimated.
- ✓ During the two years of pandemic 2020-2021, total additional liabilities of €3.2bn were required.

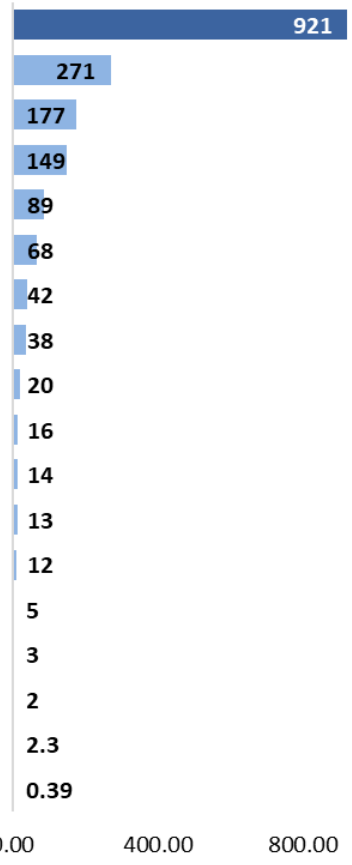
2020 liabilities
(figures in €mn)



2021 liabilities
(figures in €mn)



Additional liabilities 2020-2021
(figures in €mn)

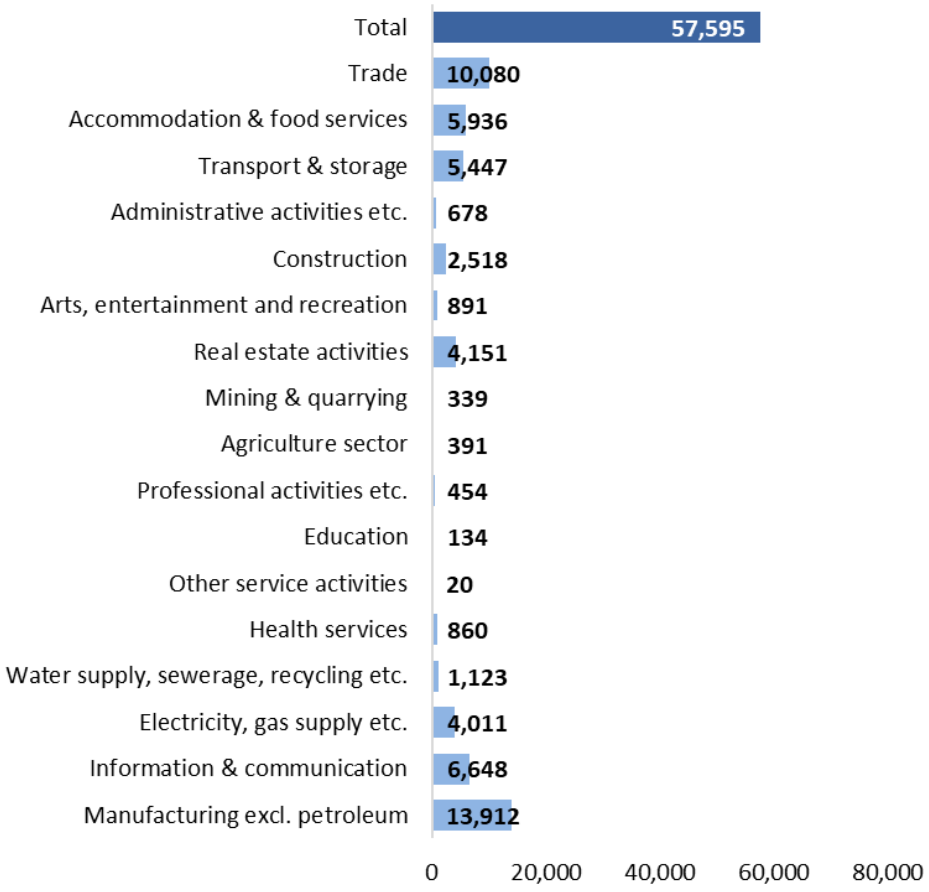


PIRAEUS BANK

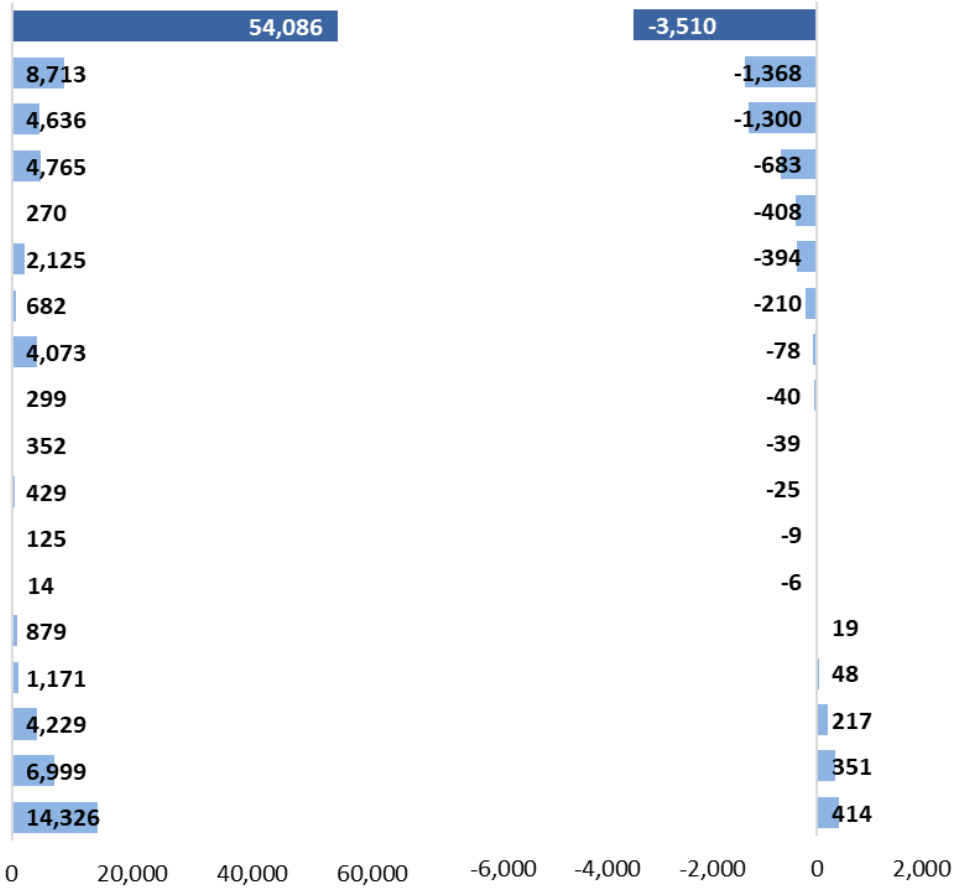
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Equity - 2020 Scenario: a decline of €3.5bn in 2020, mainly due to trade and tourism related services.

Pre COVID-19 equity
(figures in €mn)



2020 equity
(figures in €mn)



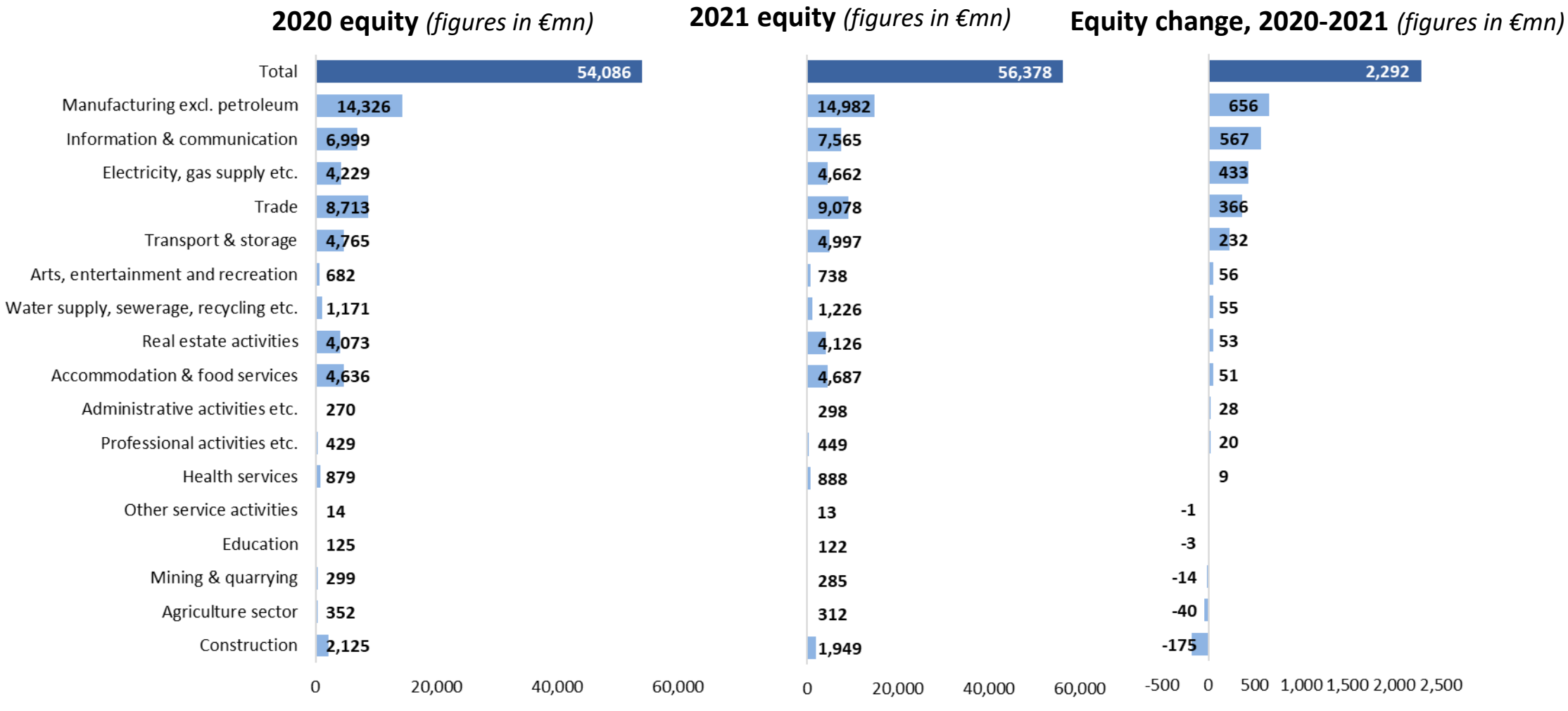
Equity change pre COVID-19 vs 2020
(figures in €mn)

PIRAEUS BANK

Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Equity - 2021 Scenario: an €2.3bn increase in equity

- ✓ This improvement was mainly linked to manufacturing (excl. petroleum), ICT and energy related sectors (electricity, gas supply etc.)
- ✓ However, in 2021 equity remained 2.1% below the pre COVID-19 levels.



PIRAEUS BANK

Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Agenda

1 Research motivation | Key Findings

2 Methodological Framework

3 Estimating the Balance Sheet Impact

4 Assessing Corporate Financial Distress

5 Stress-testing our Enterprise Rating System (ERS)

6 Appendices

How corporate distress ebbs and flows during the pandemic…

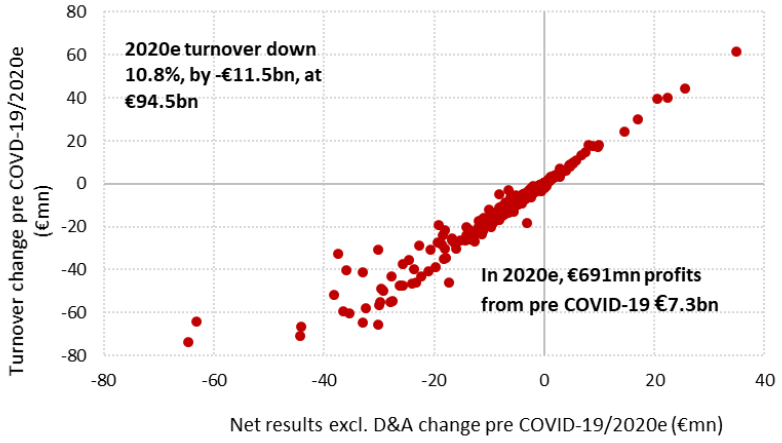
2020 10.8% turnover decline, reduced net profits to only €691mn (net profits excl. D&A).

2021 5.4% turnover increase, improved profitability to €6.5bn, but still below the pre COVID-19 level of €7.3bn.

Granular turnover and net results excl. D&A *(€mn)*

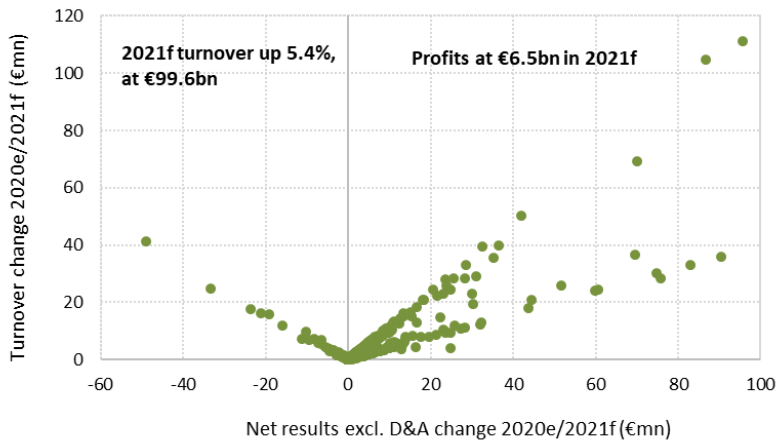
2020: 59.6% firms are loss-making from 78.9% pre COVID-19 profitable.

pre COVID-19 vs 2020

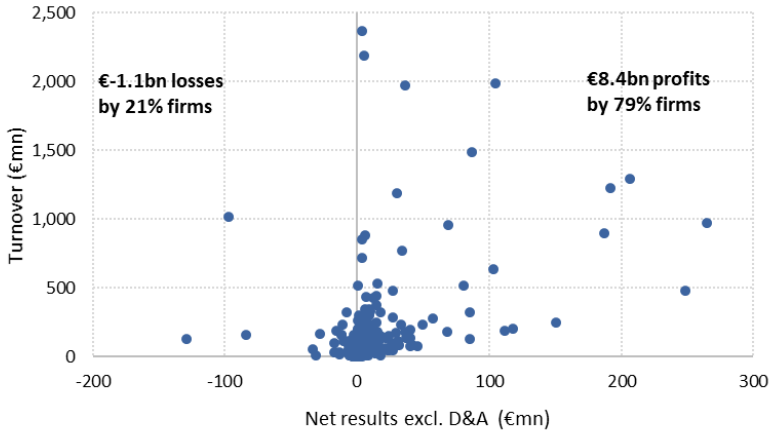


2021: 5.4% turnover increase leads to 77.7% profitable firms.

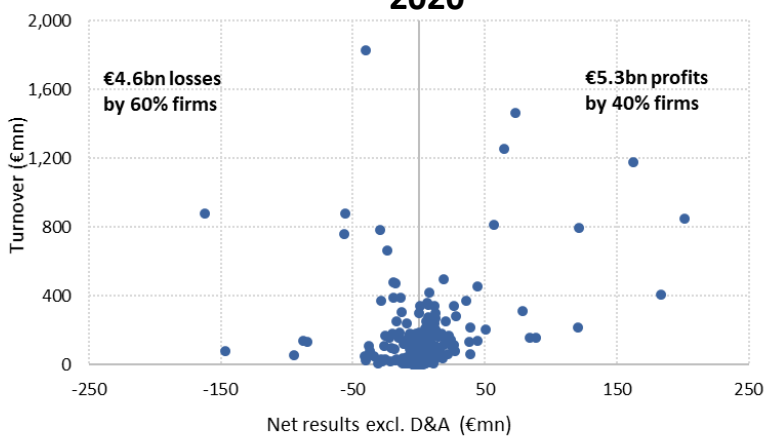
2020 vs 2021



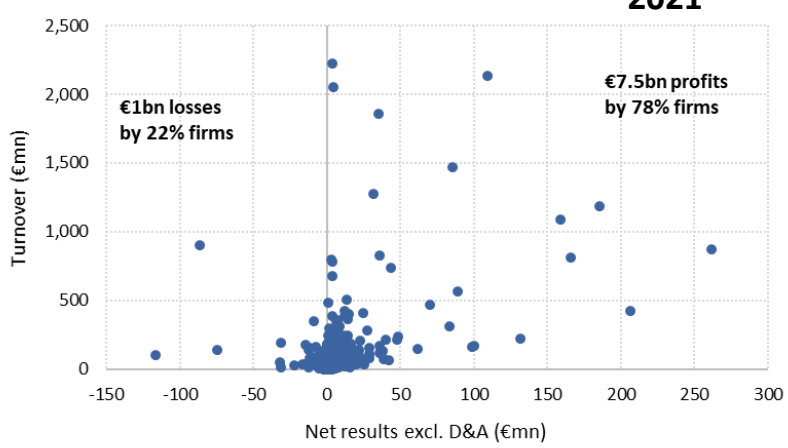
pre COVID-19



2020



2021



PIRAEUS BANK ✓ Outliers are trimmed in graphs, but they are included in the calculations. Each dot of the scatterplots represents an enterprise.

✓ D&A: Depreciation and amortisation

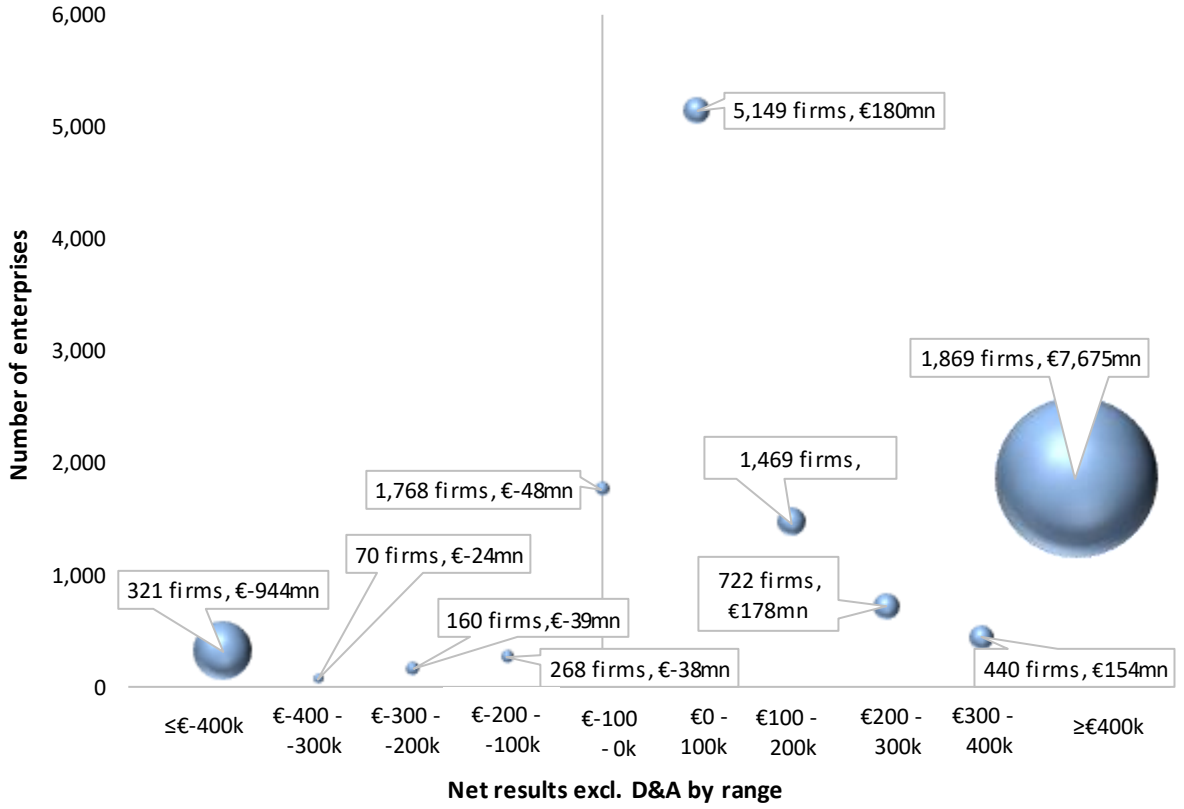
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Delving into Results* Distribution for pre COVID-19 and 2020

pre COVID-19

2,587 out of 12,236 firms: €1.1bn losses

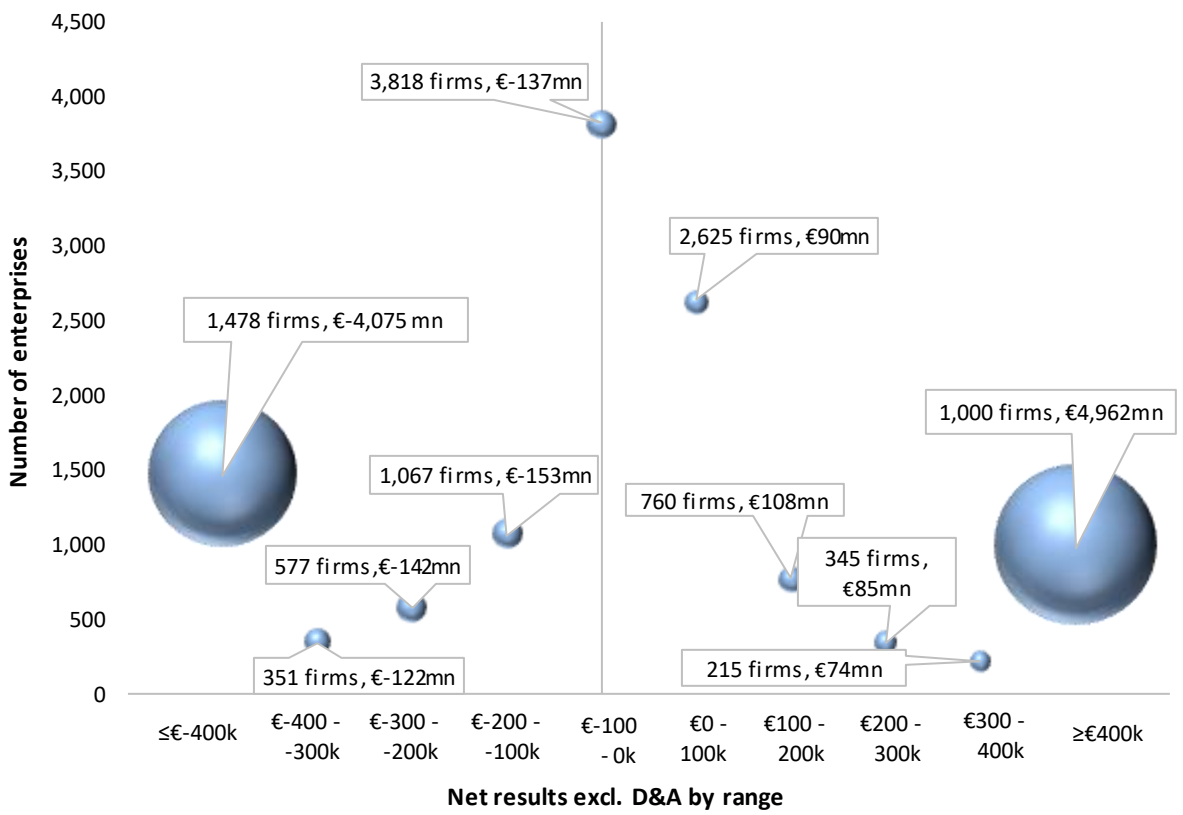
9,649 out of 12,236 firms: €8.4bn profits



2020

7,291 out of 12,236 firms: €4.6bn losses

4,945 out of 12,236 firms: €5.3bn profits



* Net profits or losses, excluding depreciation and amortisation (D&A)

✓ Bubble size: sum of results, excluding D&A of firms by each range, in €mn.

PIRAEUS BANK

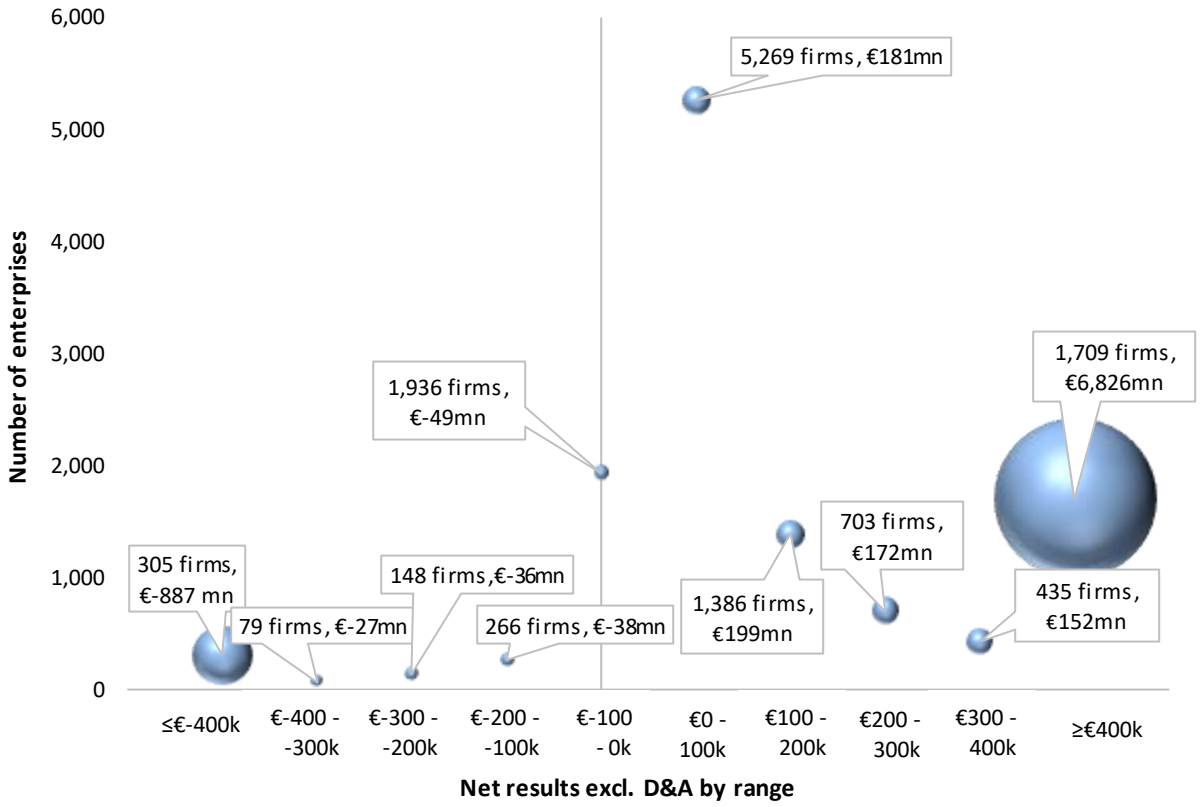
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Delving into Results * Distribution for 2021

2021

2,734 out of 12,236 firms: €1bn losses

9,502 out of 12,236 firms: €7.5bn profits



* Net profits or losses, excluding depreciation and amortisation (D&A)

✓ Bubble size: sum of net results, excluding D&A of firms by each range, in €mn.

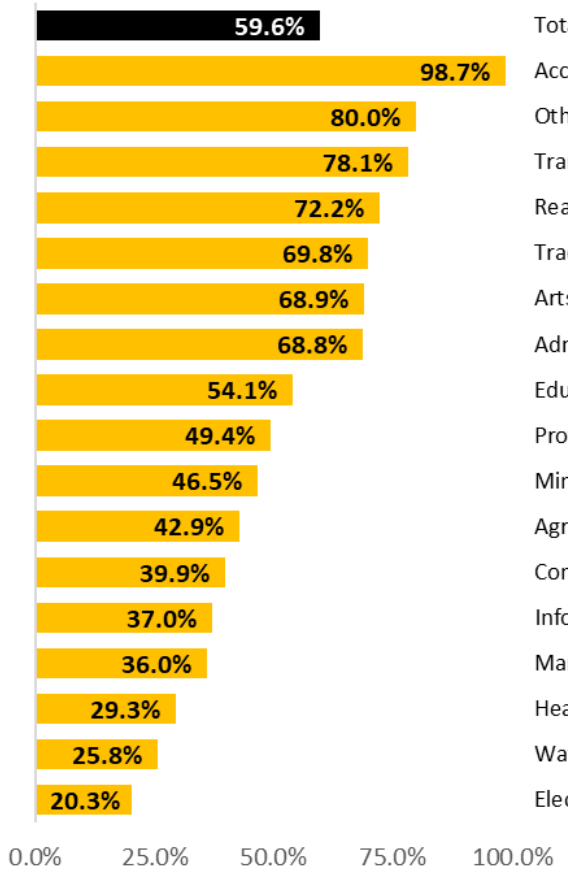
PIRAEUS BANK

Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

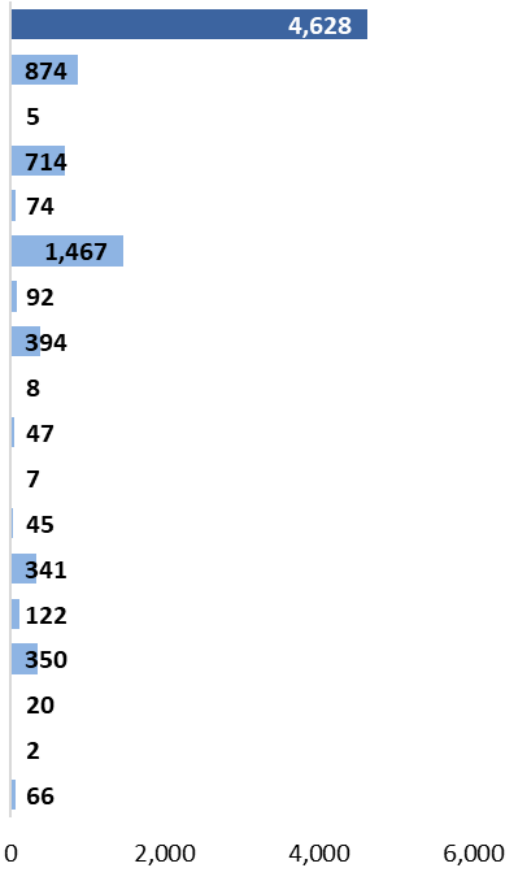
2020 - Assessing Corporate Distress: Loss Distribution by Sector

- ✓ Almost all firms in the accommodation and food service sector were estimated to be loss-making (98.7%).
- ✓ However, the most highest level of losses came from trade, at €1.5bn, accounting to 31.7% of total losses.

% Loss-making Firms within each Sector



Net losses excl. D&A, *(figures in €mn)*



PIRAEUS BANK

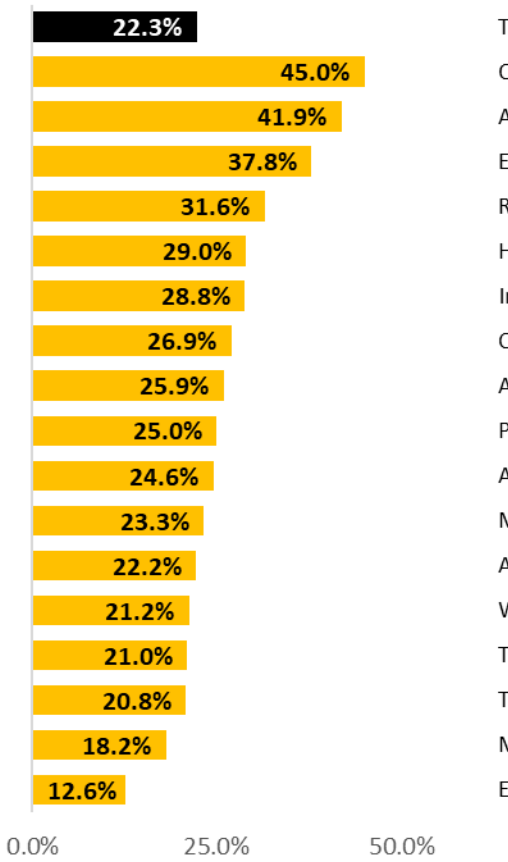
- ✓ D&A: Depreciation and amortisation.

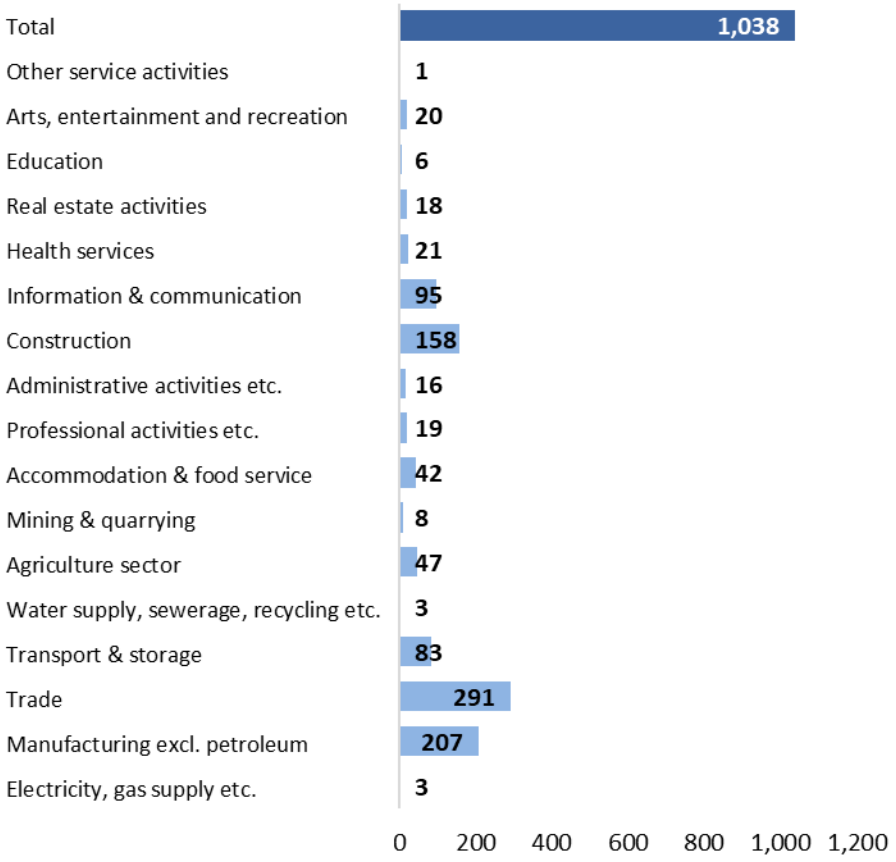
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

2021 - Assessing Corporate Distress: Loss Distribution by Sector

✓ Despite the profitability improvement, trade continued to have the highest level of losses, accounting for 28.1% of total losses.

% Loss-making Firms within each Sector





Net losses excl. D&A, *(figures in €mn)*

✓ D&A: Depreciation and amortisation.

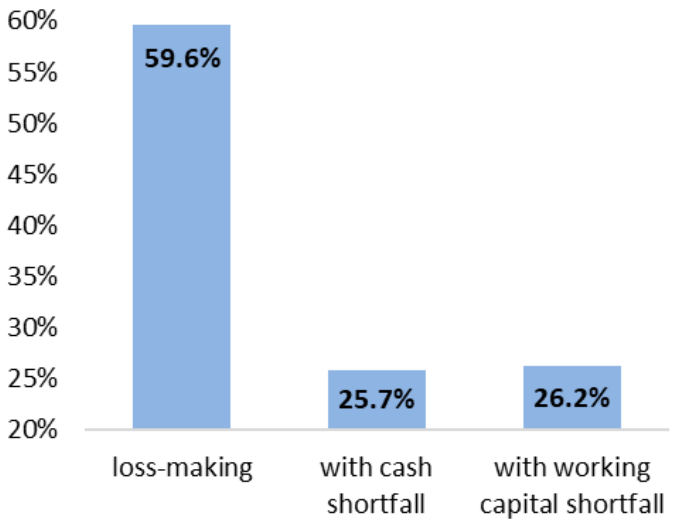
Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

2020 - Assessing Corporate Distress: 59.6% of corporates in our sample were estimated to experience some sort of financial " distress" in terms of losses.

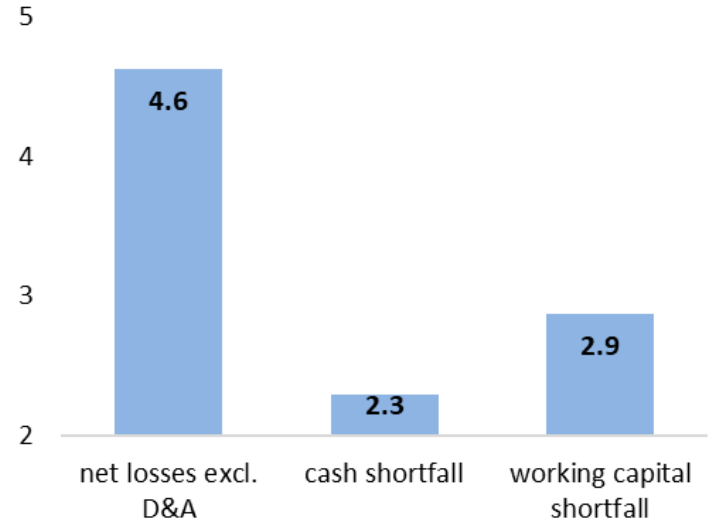
Highlights

- ✓ In total, 59.6% of firms were estimated to have losses with €4.6 bn in net losses (excl. D&A).
- ✓ Of the 12,236 firms in our sample, 25.7% had a negative cash position (cash shortfall) of €2.3 bn.
- ✓ In our sample, 26.2% of firms recorded a working capital shortfall of €2.9 bn.

Loss-making Firms (as % of total)



Financial Shortfall (figures in €bn)



Notes: 1. If the starting working capital was negative, it was set at zero.
2. Working capital = current assets − current liabilities
3. D&A: Depreciation and amortisation

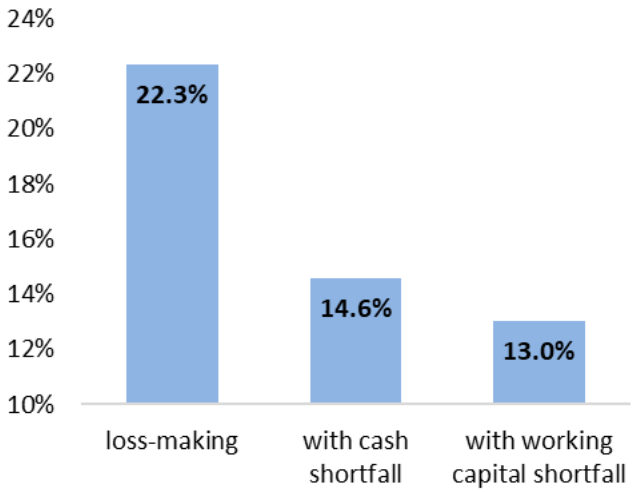
Source: ICAP DATA.Prisma, ELSTAT, EC, Piraeus Bank Research

2021 Scenario - Assessing Corporate Distress: In 2021 the share of loss – making firms (22.3%) declined close to its pre COVID-19 levels (21.1%).

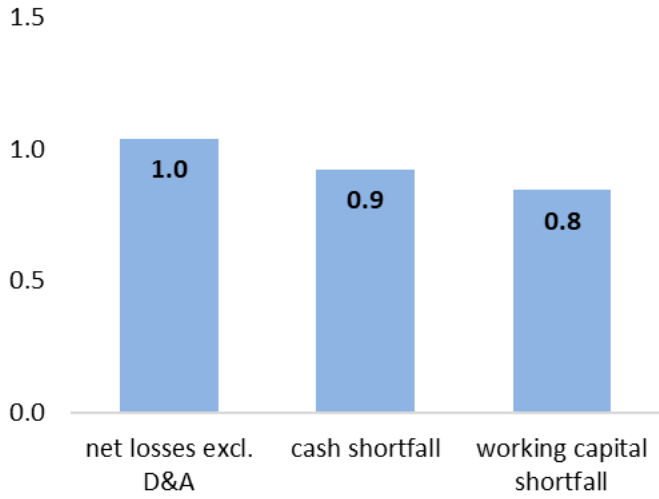
Highlights

- ✓ In 2021, 22.3% of firms were estimated to have losses, with net losses (excl. D&A) of €1 bn. This trend marked an improvement compared with 2020 (at 59.6%) in terms of both level and share, signalling the gradual return of the companies to their pre-COVID-19 status.
- ✓ Of the 12,236 firms in our sample, 14.6% had a negative cash position (cash shortfall) of €921 mn.
- ✓ In our sample, 13% of the firms recorded a working capital shortfall of €843 mn.

Loss-making Firms (as % of total)



Financial Shortfall (figures in €bn)



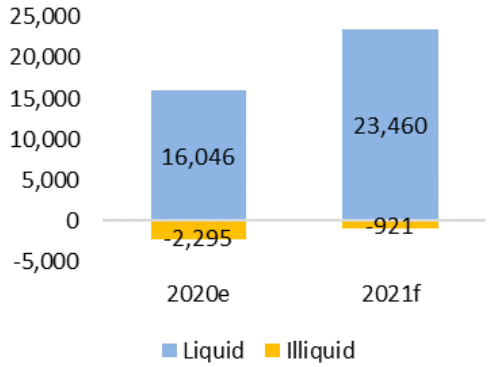
Notes: 1. If the starting working capital was negative, it was set at zero.
2. Working capital = current assets – current liabilities
3. D&A: Depreciation and amortisation

Source: ICAP DATA.Prisma, ELSTAT, EC, Piraeus Bank Research

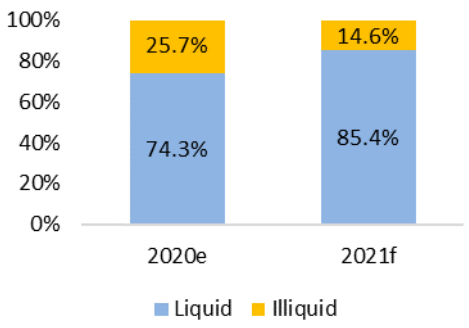
Delving into corporate financial distress under no policy intervention scenario: Examining liquidity stress

- ✓ Our simulation results suggested a substantial increase in liabilities, due to an estimated cumulative cash shortfall of €3.2bn (€2.29 bn in 2020 and €0.9 bn in 2021).
- ✓ 13% of firms turned from cash distressed in 2020 to liquid in 2021 due to their improved income.
- ✓ However, the liquidity condition for 1.8% of firms deteriorated from 2020 to 2021.

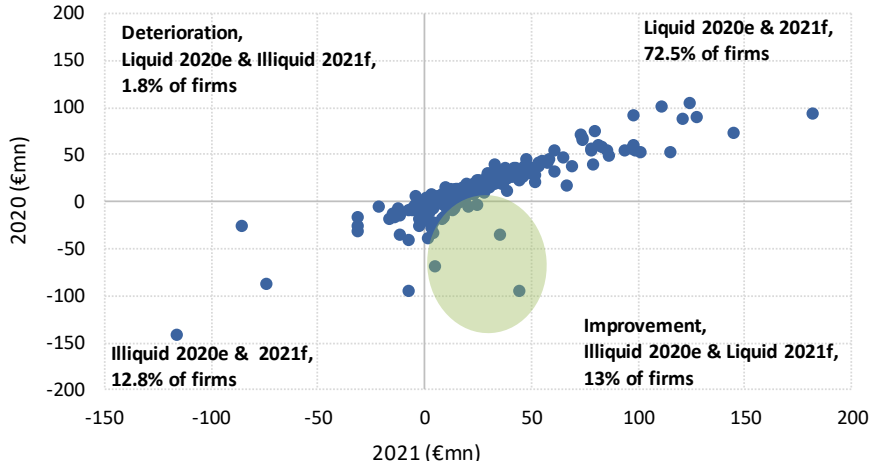
Cash buffer or shortfall *(€mn)*



Liquid vs illiquid firms



2020 vs 2021 granular cash buffer or shortfall *(€mn)*



- ✓ We define a firm as **liquid** which has a cash buffer.
- ✓ We define a firm as **illiquid**, when its net losses, excluding depreciation and amortisation cannot be covered by its first line of defence, the cash reserves. So, the firm has a liquidity gap, defined by the level of cash shortfall.
- ✓ Outliers are trimmed in scatterplot, but they are included in the calculations. Each dot of the scatterplot represents an enterprise.

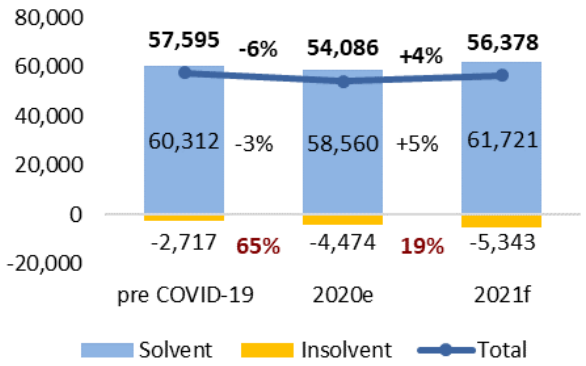
PIRAEUS BANK

Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

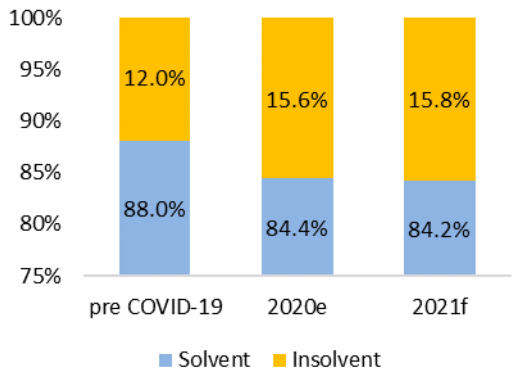
Delving into corporate financial distress under no policy intervention scenario: Examining equity stress

- ✓ Despite the improved income and mitigated liquidity pressure in 2021 compared to 2020, firms were not left unscathed.
- ✓ In 2021, insolvent firms were estimated to be 15.8%, up from 12% pre-COVID-19.
- ✓ The level of negative equity expanded by 96.7% in 2021 compared to the pre-COVID-19 period, resulting in a final equity gap of €5.3 bn.
  - In other words, we estimated an additional €2.6 bn equity gap by insolvent firms during the pandemic.
- ✓ In our sample, 4.4% of the firms were 'scarred' by the pandemic, given that they were solvent pre-COVID-19 but insolvent in 2021.
- ✓ However, 83.6% of firms that were solvent pre-COVID-19 remained solvent in 2021.

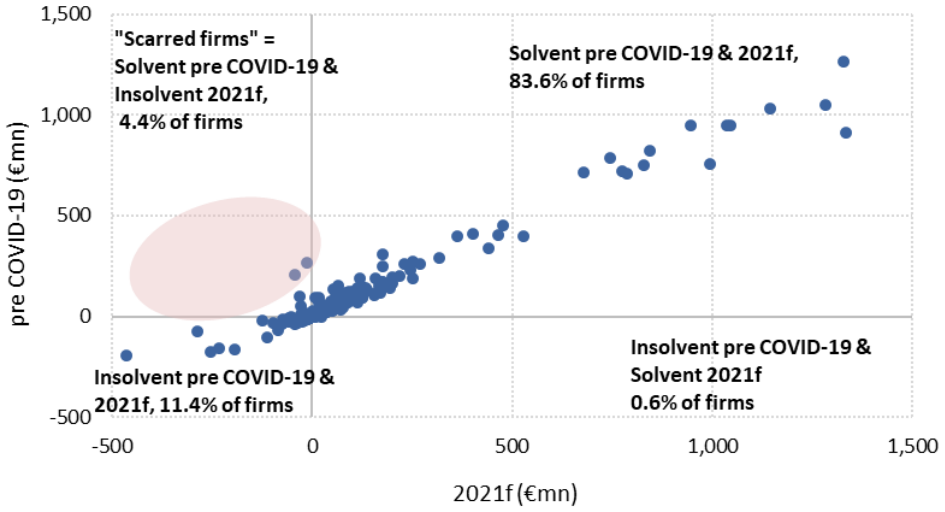
Equity *(€mn)*



Solvent vs insolvent firms



Pre COVID-19 vs 2021 granular equity *(€mn)*



- ✓ We define a firm as **solvent**, when it has positive equity.
- ✓ We define a firm as **insolvent**, when it has negative equity, in other words it has an equity gap.
- ✓ We define a firm as "**scarred**", when it has a negative post COVID-19 equity from positive pre COVID-19 equity.
- ✓ Outliers are trimmed in scatterplot, but they are included in the calculations. Each dot of the scatterplot represents an enterprise.

PIRAEUS BANK

Source: ICAP DATA.Prisma, ELSTAT, IMF, Piraeus Bank Research

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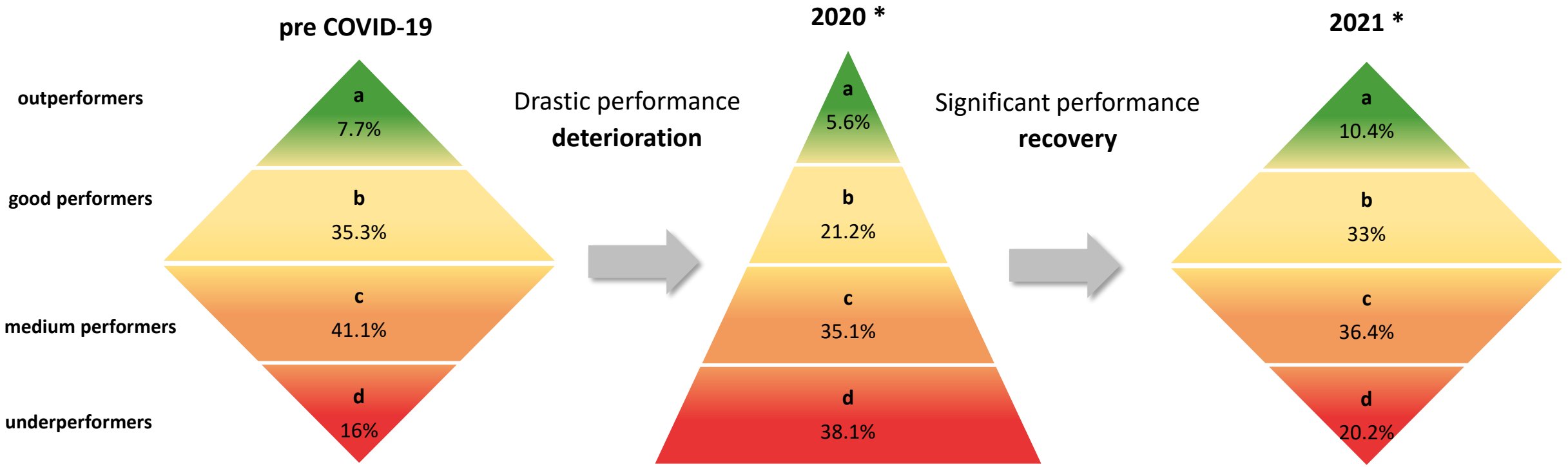
Implementing our COVID-19 Impact Simulation Results on our Enterprise Rating System

- ✓ In 2020, a massive number of companies saw a deterioration in their ratings.
- ✓ After the macro improvement of 2021, most companies returned to their pre-COVID-19 ratings.
- ✓ However, we recorded a higher concentration at the edges of the distribution in 2021 compared to pre-COVID-19 (i.e. to 'a' and 'd' ratings).

Enterprise Breakdown by ERS Rating

Out of 12,236 enterprises



* For rating purposes, ratios outside acceptable boundaries were treated as if they were on upper or lower boundaries.

Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Final Rating Transition Matrix: A remarkable rebound of Greek corporate ratings in 2021

Transition Rates

pre COVID-19 to 2020

pre COVID-19 \ 2020 estimates	a	b	c	d
a	54%	25%	20%	2%
b	4%	47%	36%	12%
c	0%	6%	49%	44%
d	0%	0%	3%	97%

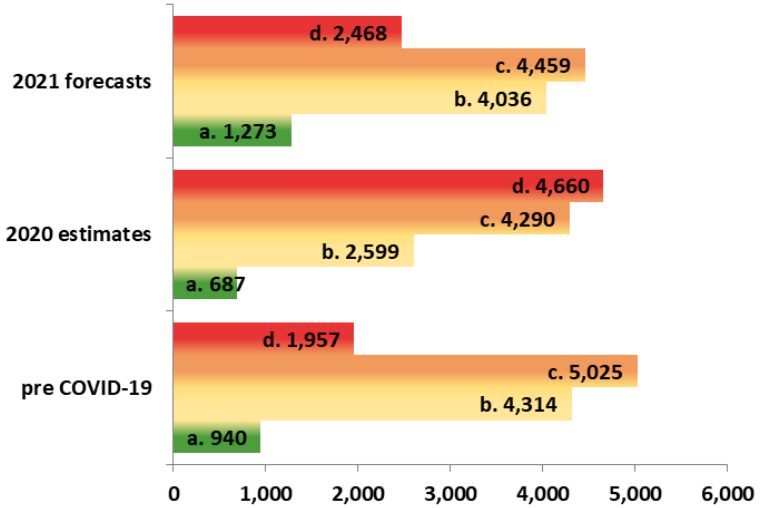
2020 to 2021

2020 estimates \ 2021 forecasts	a	b	c	d
a	93%	7%	0%	0%
b	17%	78%	4%	0%
c	4%	38%	55%	3%
d	0%	7%	43%	51%

pre COVID-19 to 2021

pre COVID-19 \ 2021 forecasts	a	b	c	d
a	91%	9%	0%	0%
b	10%	82%	8%	1%
c	0%	9%	81%	11%
d	0%	0%	3%	97%

Enterprise Breakdown by ERS rating



Highlights

- ✓ The most unfavourable rating transitions from pre COVID-19 to 2020 were:
  - Pre-COVID-19 medium performers (“c”) to 2020 underperformers (“d”) (44%).
  - Pre-COVID-19 good performers (“b”) to 2020 medium performers (“c”) (36%).
- ✓ The most favourable rating transitions from 2020 to 2021 were:
  - 2020 underperformers (“d”) to 2021 medium performers (“c”) (43%).
  - 2020 medium performers (“c”) to 2021 good performers (“b”) (38%).
- ✓ The highest rating transitions from pre COVID-19 to 2021 :
  - The most favourable: pre-COVID-19 good performers (“b”) to 2021 outperformers (“a”) (10%).
  - The most unfavourable: pre COVID-19 medium performers (“c”) to 2021 underperformers (“d”) (11%).

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Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Liquidity Rating Transition Matrix: Better corporate liquidity ratings in 2021, but still plenty of stressed firms

Transition Rates

pre COVID-19 to 2020

pre COVID-19 \ 2020 estimates	a	b	c	d
a	88%	9%	2%	1%
b	9%	73%	14%	4%
c	1%	9%	74%	16%
d	0%	1%	6%	93%

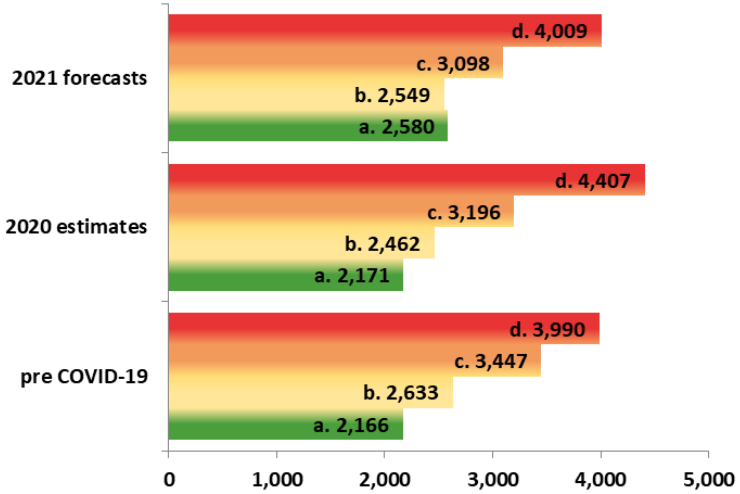
2020 to 2021

2020 estimates \ 2021 forecasts	a	b	c	d
a	98%	2%	0%	0%
b	17%	81%	2%	0%
c	0%	16%	82%	2%
d	0%	1%	10%	89%

pre COVID-19 to 2021

pre COVID-19 \ 2021 forecasts	a	b	c	d
a	90%	7%	2%	1%
b	20%	66%	12%	3%
c	3%	17%	67%	14%
d	1%	2%	12%	86%

Enterprise Breakdown by ERS rating



Highlights

- ✓ Pre-COVID-19 “d”-rating class (32.6% of the total sample) was estimated to expand to 36% in 2020, drawing mostly from “c”-rated companies.
- ✓ Firms with “a”-rated liquidity appeared resilient.
- ✓ 20% pre COVID-19 “b” rated firms were upgraded to “a” in 2021.
- ✓ 14% of pre COVID-19 “c” rated firms were downgraded to “d” in 2021.
- ✓ 12% pre COVID-19 “b” rated firms were downgraded to “c” in 2021.

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Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Profitability Rating Transition Matrix: From fragile profitability for all ratings in 2020 to significant profit recovery in 2021

Transition Rates

pre COVID-19 to 2020

pre COVID-19 \ 2020 estimates	a	b	c	d
a	44%	26%	6%	24%
b	1%	41%	23%	36%
c	0%	5%	32%	62%
d	0%	1%	3%	96%

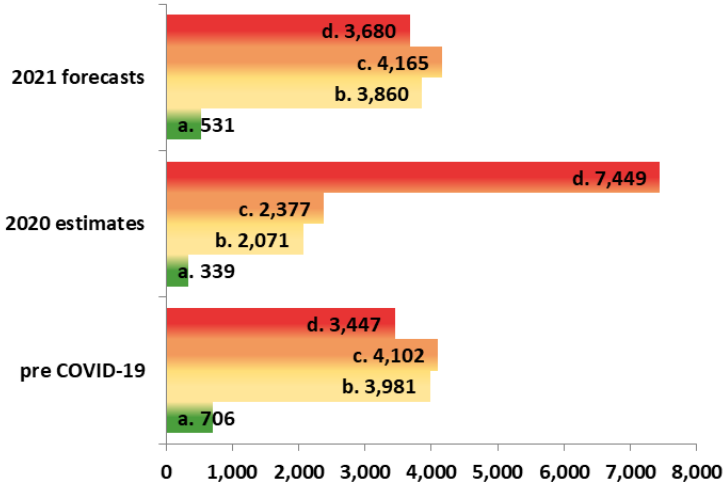
2020 to 2021

2020 estimates \ 2021 forecasts	a	b	c	d
a	88%	12%	0%	0%
b	5%	81%	12%	1%
c	1%	35%	60%	4%
d	1%	18%	33%	48%

pre COVID-19 to 2021

pre COVID-19 \ 2021 forecasts	a	b	c	d
a	73%	25%	2%	0%
b	0%	89%	8%	2%
c	0%	3%	91%	6%
d	0%	1%	3%	97%

Enterprise Breakdown by ERS rating



Highlights

- ✓ Almost all the firms of our sample had worse profitability rating in 2020.
- ✓ 2020 “d”-rated firms in profitability made up almost 61% of the sample.
- ✓ It was estimated that in 2021, firms’ ratings significantly improved after their drastic 2020 downgrading.
- ✓ However, 25% of firms with pre COVID-19 “a”-rating were expected to get downgraded to “b” in 2021.

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Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Solvency Rating Transition Matrix: Following an increase in insolvency risk in 2020, it declined in 2021 but remained above its pre COVID-19 levels

Transition Rates

pre COVID-19 to 2020

pre COVID-19 \ 2020 estimates	a	b	c	d
a	53%	13%	29%	4%
b	6%	42%	33%	20%
c	0%	4%	49%	47%
d	0%	0%	4%	96%

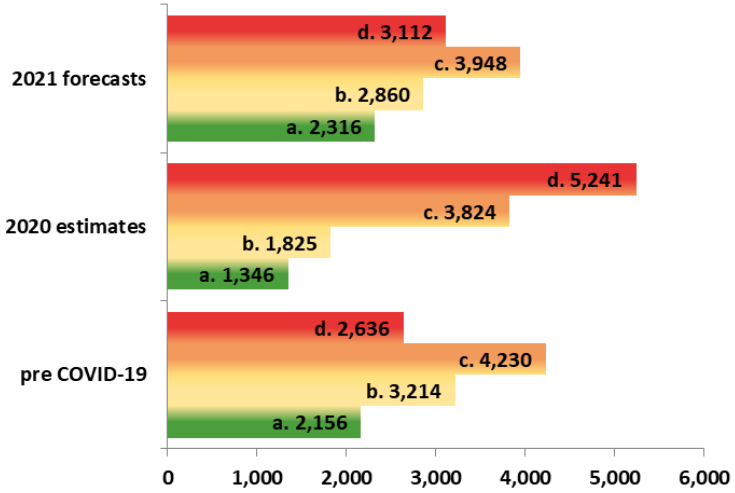
2020 to 2021

2020 estimates \ 2021 forecasts	a	b	c	d
a	97%	3%	1%	0%
b	26%	69%	5%	0%
c	14%	30%	53%	4%
d	0%	8%	35%	57%

pre COVID-19 to 2021

pre COVID-19 \ 2021 forecasts	a	b	c	d
a	90%	9%	1%	0%
b	12%	75%	13%	0%
c	0%	6%	82%	12%
d	0%	0%	2%	98%

Enterprise Breakdown by ERS rating



Highlights

- ✓ In 2020, the “d”-rated companies almost doubled.
- ✓ In 2021, the number of “d”-rated companies declined but still remained above the pre COVID-19 levels.
- ✓ 970 more solvency “a”-rated firms were estimated in 2021 compared to 2020.
- ✓ 12% of pre COVID-19 “b”-rated firms were upgraded to “a” in 2021.
- ✓ 13% of pre COVID-19 “b”-rated firms were estimated to decline to “c” in 2021.

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Source: ICAP DATA.Prisma, ELSTAT, Piraeus Bank Research

Agenda

1 Research motivation | Key Findings

2 Methodological Framework

3 Estimating the Balance Sheet Impact

4 Assessing Corporate Financial Distress

5 Stress-testing our Enterprise Rating System (ERS)

6 **Appendices**

Appendix I-a: Demand Shock and Turnover Adjustment Estimation

- ✓ Let $S_{si,t}$ denote the sales (turnover) or operating revenue of firm i that belongs to sector s, at year t.
- ✓ Also let d_s denote the percentage of decline* in turnover in that sector. Then:

$$Operating\ Revenue\ Adjustment_{i,t} = (1 - d_s) \times S_{si,t-1}$$

- ✓ The value of d_s for all major sectors of the Greek economy are provided in the Appendix II. As an example, if we expect that a sector will see a 30% reduction in sales as a result of COVID-19, the revenue adjustment of all companies in that sector will be equal to (1 – 30%) x $sales_{pre\text{-}COVID}$ or 70% of $sales_{pre\text{-}COVID}$.

* However, we should be aware that some sectors, such as health services and supermarkets, have reported an increase in their turnover.

Appendix I-b: Cost Adjustment Estimation

- ✓ To approximate the actual business decision process as closely as possible, it is realistic to assume that the corporations faced with this unprecedented shock, will try to contain their operating cost base, $C_{si,t}$.

- ✓ We assume (following the EC Working Document, *Identifying Europe's recovery needs*, May 2020) that this cost adjustment will be proportional to the expected decline in turnover. We call this **cost elasticity** and express it as a percentage of the demand shock.

- ✓ Due to lack of evidence and information, we adopt EC assumption for a cost elasticity of 50%. Therefore,

$$Operating\ Cost\ Adjustment_{i,t} = (1 - x\% \times d_s) \times C_{si,t-1}, with\ x = 50\%$$

Appendix I-c: Profit and Loss Adjustment Estimation

✓ The level of profit or loss for each firm i is estimated as:

$$Profit\ or\ Loss\ (EBITDA\ or\ Net\ results)\ Adjustment_{i,t}$$

$$= Operating\ Revenue\ Adjustment_{i,t} - Operating\ Cost\ Adjustment_{i,t} - (Interest\ Expenses_{i,t} + Taxes_{i,t} + Other_{i,t})$$

✓ In our simulation model, our adjustments are made at operating income level and all the other income factors remain the same (*ceteris paribus*).

✓ D&A: Depreciation and amortisation.

Appendix I-d: Liquidity Adjustment Estimation

✓ Under the assumption that firms are able to deplete their cash or working capital accounts, we estimate the liquidity impact of COVID-19 related losses based on their impact on the companies' pre-COVID cash balances or on their pre-COVID working capital levels. Either way:

$$Liquidity\ (Cash\ or\ Working\ Capital)\ Adjustment_{i,t} =$$
$$\max[Cash\ (or\ Working\ Capital)_{i,t-i} + Net\ profit\ or\ loss\ (excl.\ D\&A)\ Adjustment_{i,t}, 0]$$

When, $Net\ losses\ (excl.\ D\&A)\ Adjustment_{i,t} > Liquidity_{i,t-1}$

$$Liquidity\ (Cash\ or\ Working\ Capital)\ Shortfall_{i,t}$$
$$= Net\ losses\ (excl.\ D\&A)\ Adjustment_{i,t} - Cash\ (or\ Working\ Capital)_{i,t-i}$$

Where,

$$Working\ capital = current\ assets\ - current\ liabilities$$

✓ D&A: Depreciation and amortisation.

Appendix I-e: Liabilities Adjustment Estimation

✓ We assume that the amount of losses that companies are not able to cover with their cash and cash equivalent buffer – in other words, their cash shortfall – is added to their liabilities. Further, we assume that 50% of that amount is recognized as a current liability. Thus,

$$Liabilities_{i,t} = Liabilities_{i,t-1} + Cash\ Shortfall_{i,t}$$

$$Current\ Liabilities_{i,t} = Current\ Liabilities_{i,t-1} + 50\% \times Cash\ Shortfall_{i,t}$$

Appendix I-f: Equity Adjustment Estimation

- ✓ Assuming no profit distribution to shareholders/owners and no new equity injections, the equity adjustment follows the same pattern as the liquidity adjustment:

$$Equity\ Adjustment_{i,t} = Equity_{i,t-i} + Net\ Profit\ or\ Loss\ Adjustment_{i,t}$$

Appendix I-g: Framework of simulation from pre COVID-19 period to 1st year of pandemic (2020)

- ✓ All of these so-called adjustments introduced above form a system of equations that allows us to demonstrate how a macroeconomic demand shock reverberates across the Greek corporate balance sheet:

$$Operating\ Revenue\ Adjustment_{i,t} = (1 - d_s) \times S_{si,t-1}$$

$$Operating\ Cost\ Adjustment_{i,t} = (1 - x\% \times d_s) \times C_{si,t-1}, with\ x = 50\%$$

$$Profit\ or\ Loss\ (EBITDA\ or\ Net\ results)\ Adjustment_{i,t}$$
$$= Operating\ Revenue\ Adjustment_{i,t} - Operating\ Cost\ Adjustment_{i,t} - (Interest\ Expenses_{i,t} + Taxes_{i,t} + Other_{i,t})$$

$$Equity\ Adjustment_{i,t} = Equity_{i,t-i} + Net\ Profit\ or\ Loss\ Adjustment_{i,t}$$

$$Liquidity\ (Cash\ or\ Working\ Capital)\ Adjustment_{i,t} =$$
$$\max[Cash\ (or\ Working\ Capital)_{i,t-i} + Net\ Profit\ or\ Loss\ Adjustment\ (excl.\ depreciation\ and\ amortisation)_{i,t}, 0]$$

When, $Net\ losses\ (excl.\ D\&A)\ Adjustment_{i,t} > Liquidity_{i,t-1}$

$$Liquidity\ (Cash\ or\ Working\ Capital)\ Shortfall_{i,t}$$
$$= Net\ losses\ (excl.\ D\&A)\ Adjustment_{i,t} - Cash\ (or\ Working\ Capital)_{i,t-i}$$

$$Liabilities_{i,t} = Liabilities_{i,t-1} + Cash\ Shortfall_{i,t}$$

$$Current\ Liabilities_{i,t} = Current\ Liabilities_{i,t-1} + 50\% \times Cash\ Shortfall_{i,t}$$

Appendix I-h: Projection framework from 1st year to 2nd year of pandemic (from 2020 to 2021)

- ✓ After the estimation of the COVID-19 impact on the Greek corporate balance sheets for the first year of pandemic – 2020, we want to simulate the impact for the second year of pandemic – 2021.
- ✓ We use the same set of equations previously presented, apart from the operating revenue and cost adjustment. The 2021 operating income adjustment is described below:

$$Operating\ Revenue\ Adjustment_{i,t+1} = Op.Revenue_{i,t} + rebound\ \% \times |\, Op.Revenue_{i,t} - Op.Revenue_{i,t-1} \,|,$$

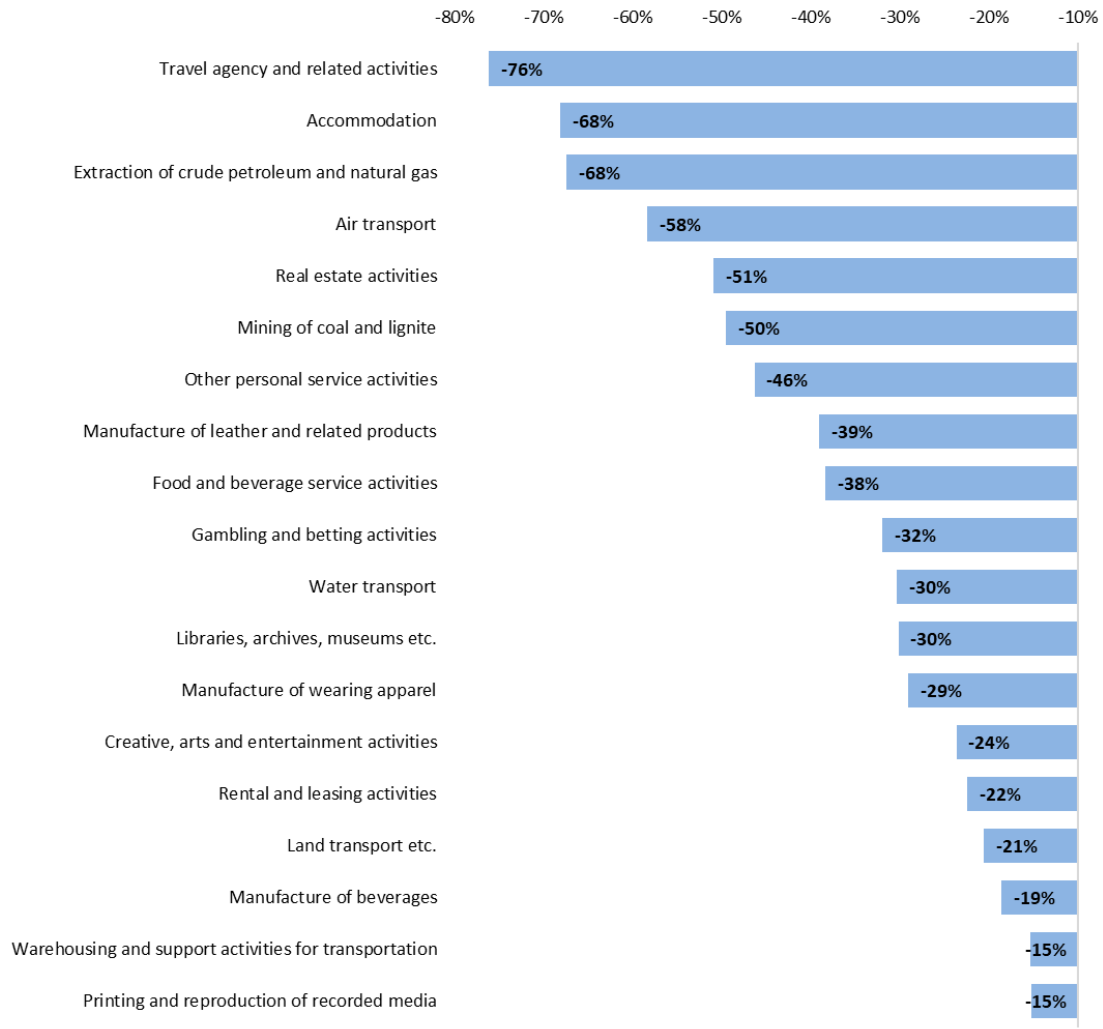
$$where\ rebound = \%\ of\ the\ revenue\ loss\ recovery\ or\ gain\ retainance$$

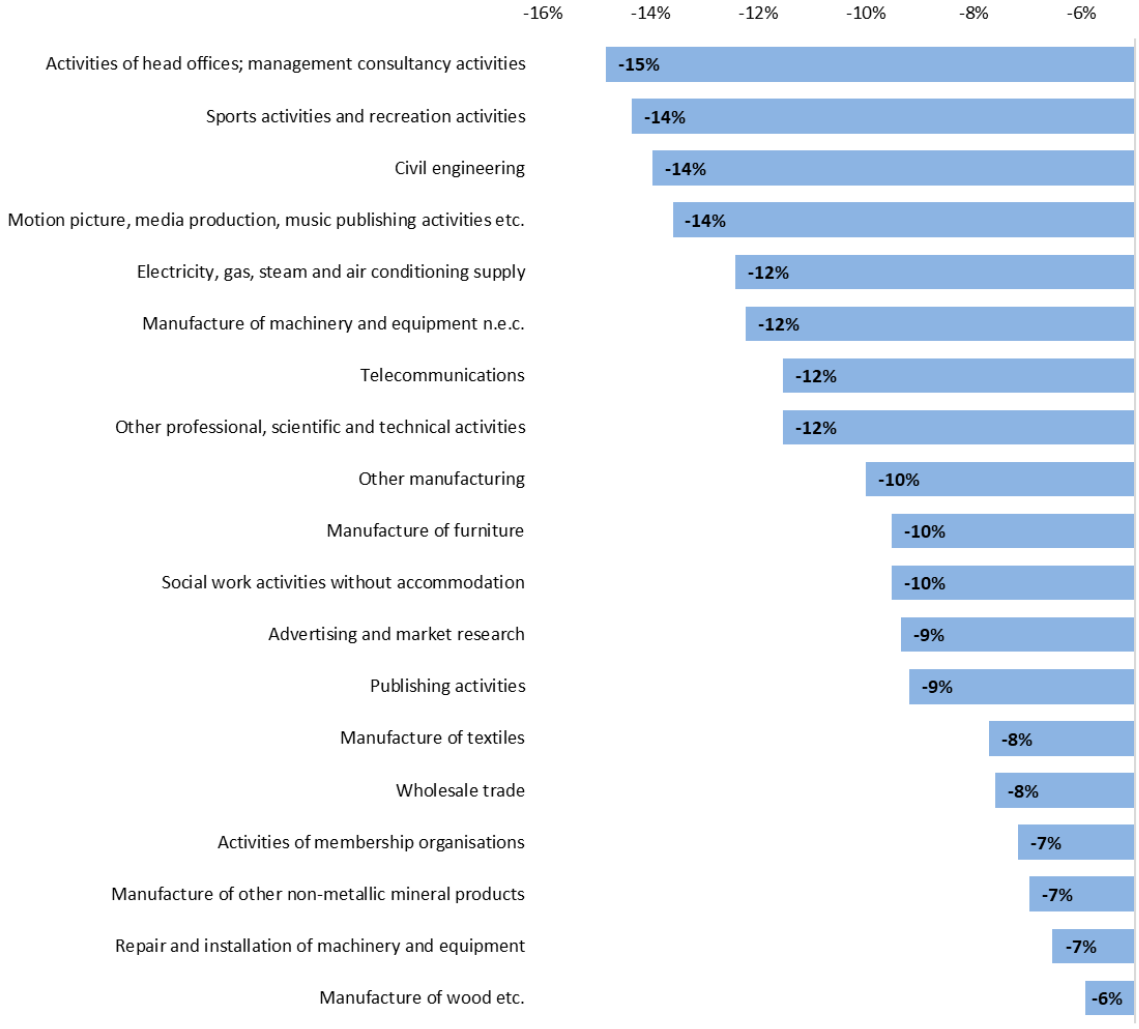
$$Operating\ Cost\ Adjustment_{i,t+1} = Op.Revenue_{i,t+1} \times \frac{Op.Cost_{i,t-1}}{Op.Revenue_{i,t-1}}$$

- ✓ In other words, for our 2021 scenario we assumed that:
  - enterprises recovery a part of their estimated turnover loss, or in case of increased revenues, they retain a part of their turnover gain, and
  - They return to the pre COVID-19 operating cost to revenue ratio.

Appendix II-a: Demand Shock on 2020 Sectoral Sales

✓ Based on January – December 2020 yoy changes, we defined the per–sector demand trends as follows:





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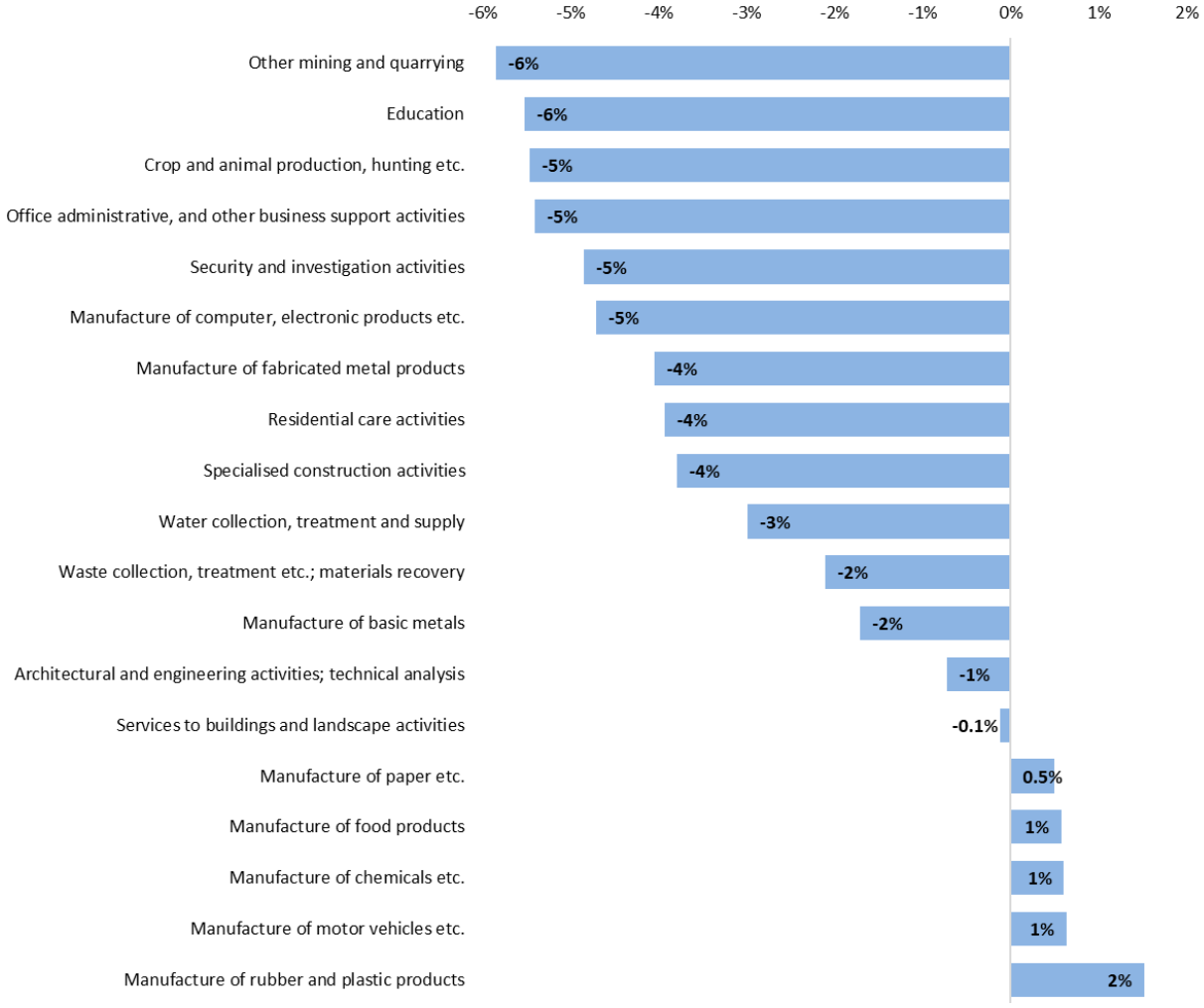
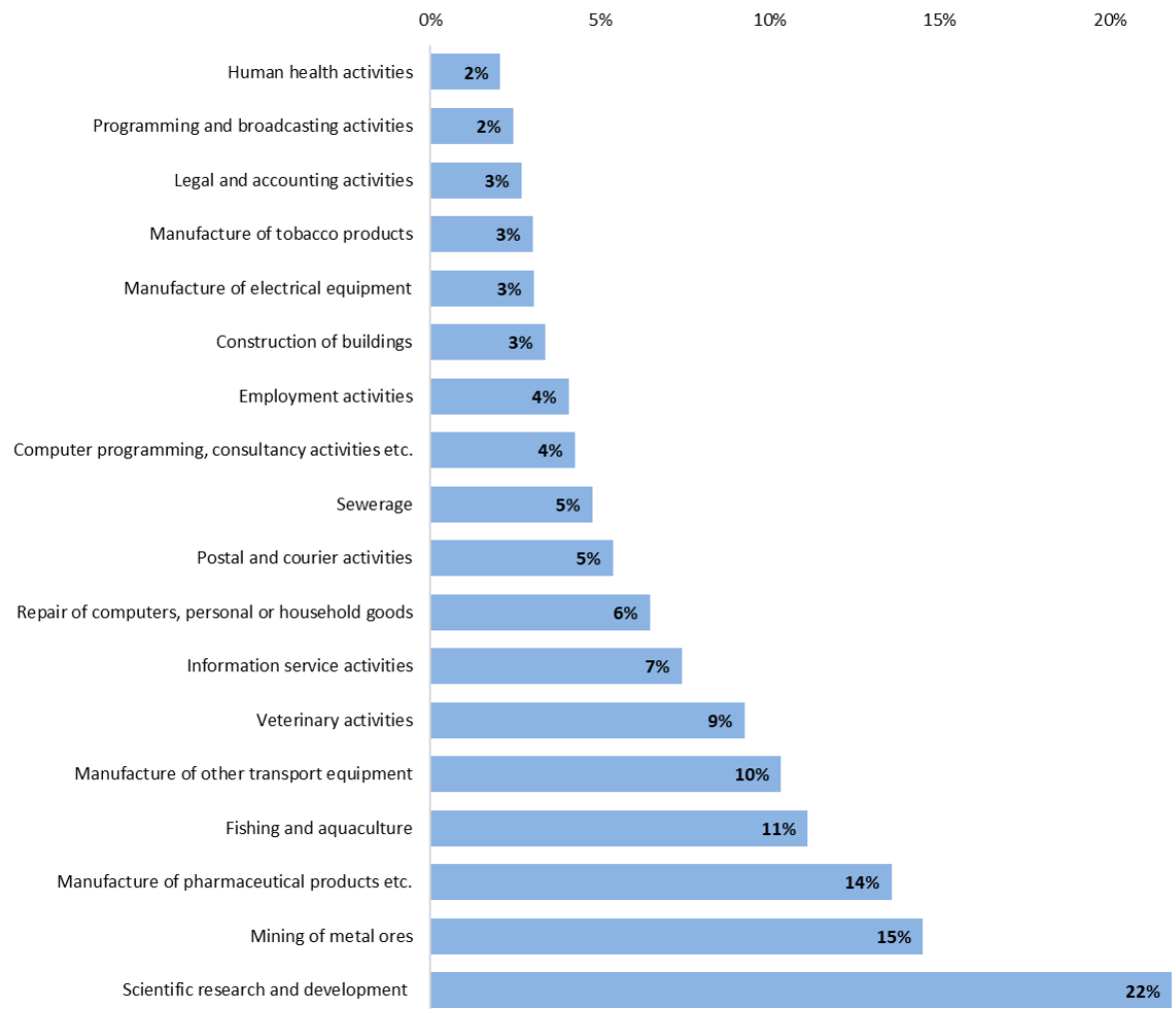
✓ Our analysis was based on enterprises with available financial statements. For consistency reasons, we used the turnover of entities with double-entry bookkeeping by ELSTAT per two-digit NACE rev. 2 analysis, expect for 45 (trade and repair of vehicles) and 47 (retail trade). The used data is before the ELSTAT 2018 business register revision.

Source: ELSTAT, Piraeus Bank Research

Appendix II-b: Demand Shock on 2020 Sectoral Sales

✓ Based on January – December 2020 yoy changes, we defined the per–sector demand trends as follows:





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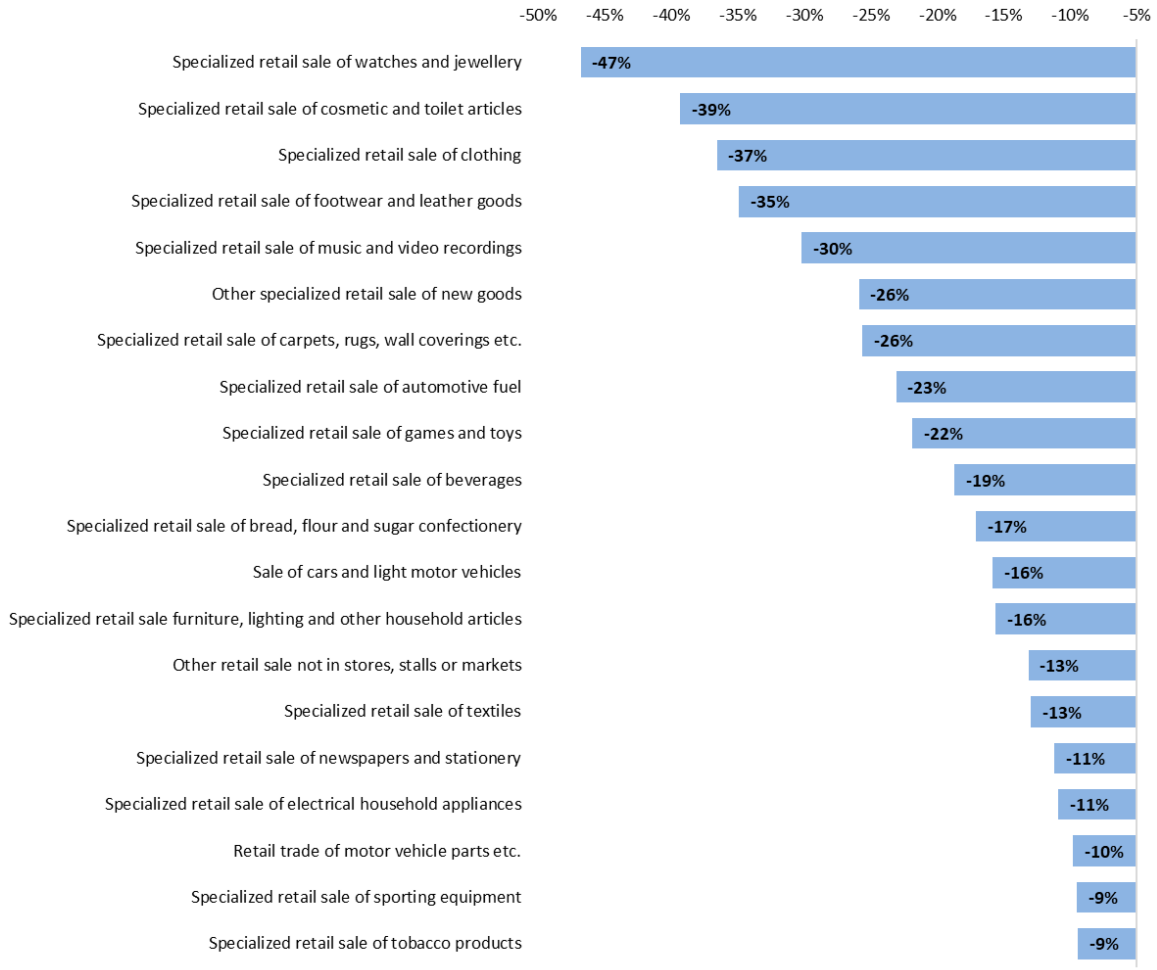
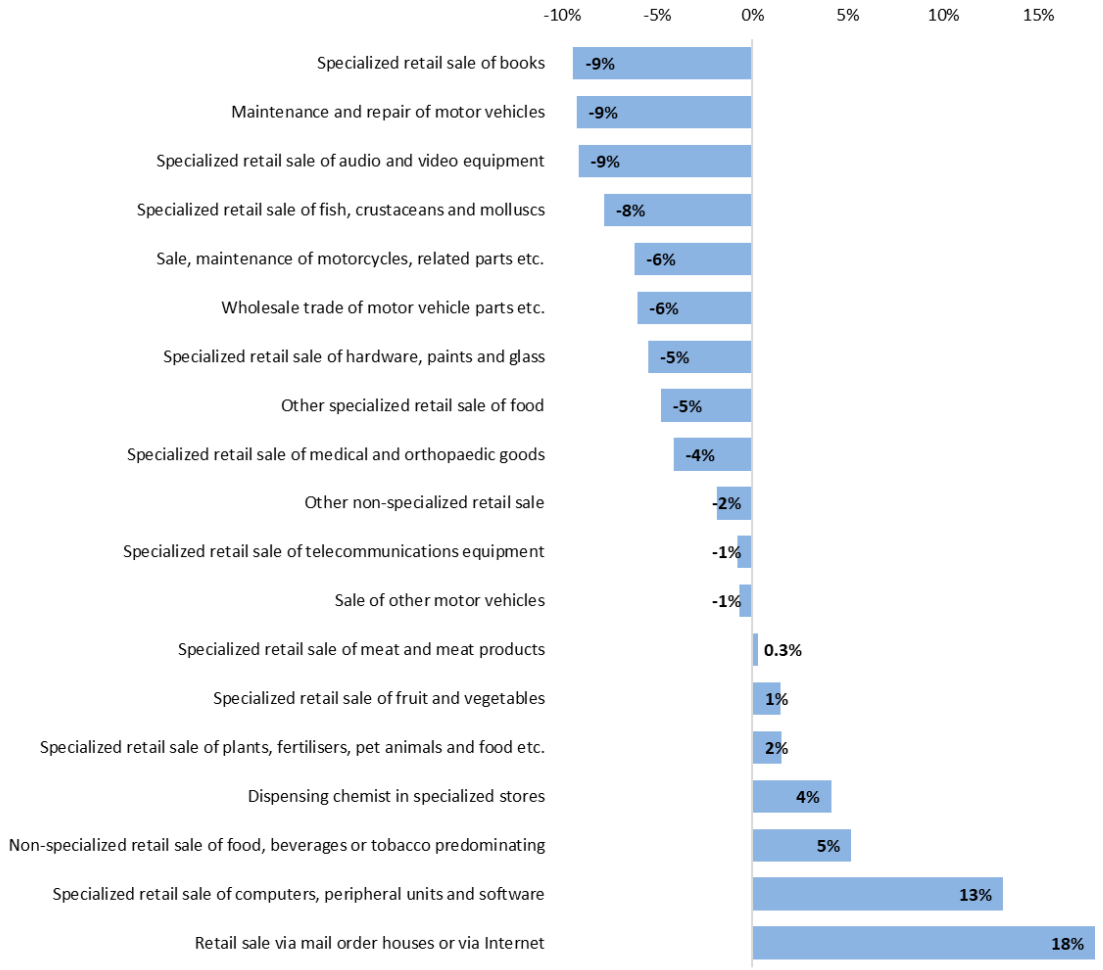
✓ Our analysis was based on enterprises with available financial statements. For consistency reasons, we used the turnover of entities with double-entry bookkeeping by ELSTAT per two-digit NACE rev. 2 analysis, expect for 45 (trade and repair of vehicles) and 47 (retail trade). The used data is before the ELSTAT 2018 business register revision.

Source: ELSTAT, Piraeus Bank Research

Appendix II-c: Demand Shock on 2020 Sectoral Sales: A Deep Dive in Autos' and Retail Trade

✓ Based on Q1-Q4 2020 yoy changes, for trade and repair of vehicles and retail trade we defined the per–sector demand trends as follows:





✓ The turnover trends of the subsectors of the retail trade were mixed, depending on the implemented health crisis measurements.

✓ ELSTAT has available further details for the turnover of trade and repair of vehicles (45) and the retail trade (47) per four-digit NACE rev. 2 analysis. However, at the time of our analysis construction, the turnover of entities with double-entry bookkeeping was not available for all months of 2020. The used data is before the ELSTAT 2018 business register revision.

✓ Since we wanted to examine the impact of the COVID-19 pandemic for the whole 2020, for sectors 45 and 47 we used the turnover data for the total of enterprises, available in quarters.

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Source: ELSTAT, Piraeus Bank Research

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