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Euro Area Business Confidence and Covid-19

Gene Ambrocio*

Abstract

I study the effects of the Covid-19 pandemic on business confidence in 11 Euro area countries and its consequent impact on economic activity. To obtain causal effects, I instrument business confidence with domestic household confidence as well as average household confidence in neighboring countries. I find evidence suggesting that the confidence and expectations channel was an important component to the economic transmission of Covid-19. A one standard deviation drop in business confidence leads to between 5-6 and 9 percent fall in economic activity in the industrial and wholesale and retail trade sectors respectively. These results highlight the importance of managing confidence and expectations in crises episodes.

JEL Codes: E23, E66, E71, I12

Keywords: Business confidence, survey expectations, Covid-19

1. Introduction

An important channel through which pandemics, and crises in general, affect economic activity is through the way they change agents' expectations about future economic conditions. This also holds for the ongoing Covid-19 pandemic which has gripped the world since early 2020.¹ The expectations channel is even more important in that large crises and pandemics can have permanent scarring effects on beliefs and expectations (Kozłowski et al., 2020). Consequently, a key component to evaluating the economic impact of crises such as the Covid-19 pandemic and formulating the appropriate policy responses is to

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¹See e.g. Baldwin and Weder di Mauro (2020a,b).

assess how much these pandemics have affected confidence regarding future economic conditions. However, identifying the effects of Covid-19 induced shifts in expectations on economic activity is hampered by the difficulty of disentangling its effects on expectations from the direct effects of the pandemic itself on economic activity as well as that of the policy responses implemented to address the public health and economic consequences of the pandemic.

This paper studies the effects of business confidence on business activity during the Covid-19 pandemic for several Euro area countries and deals with identification via an Instrumental Variables approach.² I find that the effect of the Covid-19 pandemic in terms of disruptions in industrial production and wholesale and retail trade through an expectations channel is quite significant for many Euro area countries. Using domestic and neighboring country household confidence as instruments for business confidence, I find that a one standard deviation drop in business confidence leads to a between 5 to 6 percentage points fall in industrial production growth and about 9 percentage points drop in turnover growth in the wholesale and retail trade sector. For perspective, business confidence fell by an average of slightly over three standard deviations in April of 2020 while the actual average fall in year-on-year industrial production growth and turnover growth in wholesale and retail trade in April of 2020 were about 23 percent. I also find that these results remain even after accounting for common trends in other Euro area countries. These results highlight the importance of the communication aspect to policy responses in crises and their role in managing confidence and expectations.

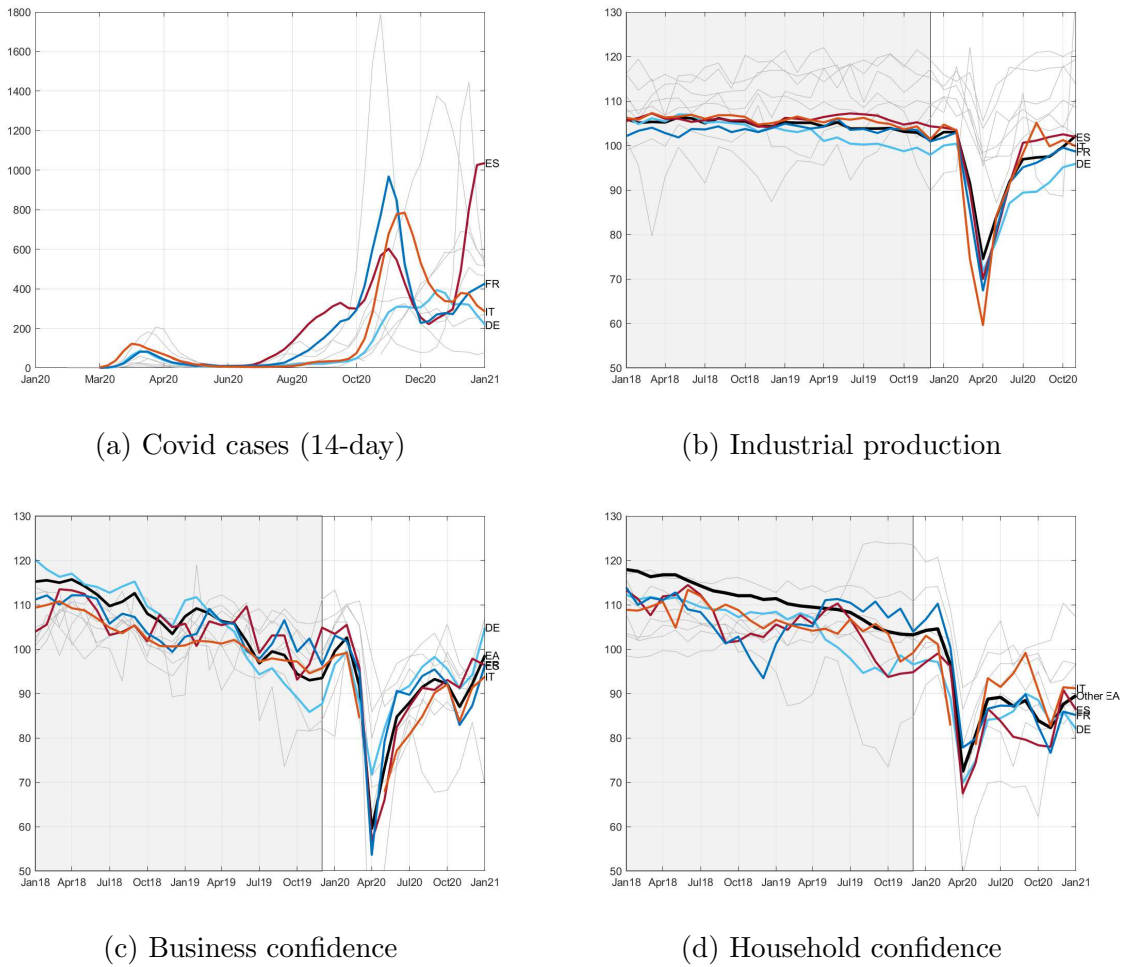
Figure 1 plots the evolution of Covid-19 cases (14-day moving average of cases per 100,000 population), business and household confidence, and industrial production for 11 Euro area countries.³ The top left panel plots the number of Covid-19 cases relative to each country's population from early 2020 until January 2021. It shows an explosion

²I use the European Commission's measure of business confidence which draws on survey responses regarding expected production or activity over the next quarter as well as the state of order books and stock of products.

³These countries are Belgium, Germany, Estonia, Greece, Spain, France, Ireland, Italy, Lithuania, Latvia, and Malta. These countries were chosen based on data availability.

of confirmed Covid-19 cases in the Spring of 2020 followed by a much larger second (and possibly third) wave of infections towards the end of 2020. The bottom left panel plots the evolution of business confidence in the industrial sector taken from the monthly harmonized EU business and consumer surveys and extends the period to begin from January of 2018 to highlight the extent to which business confidence has fallen during the Covid-19 pandemic. This fall in business confidence is roughly equivalent to that which took place during the Global Financial Crisis of 2008-2009.⁴

Figure 1: Covid-19 in the Euro area



The figures plot confirmed Covid-19 cases, business and household confidence, and industrial production indices for 11 Euro area countries. Germany (DE) is light blue, France (FR) is dark blue, Spain (ES) is red, and Italy (IT) is orange. The 7 other countries (Belgium, Estonia, Greece, Ireland, Lithuania, Latvia, and Malta) are light gray. Covid-19 cases are 14-day moving averages of confirmed cases per 100,000 population. The industrial production indices are seasonally- and calendar-adjusted total industry volume of production indices. Business confidence is the confidence index for Industry from the monthly harmonized EU business and consumer surveys. Household confidence is the consumer confidence index from the monthly harmonized EU business and consumer surveys. The black line in the household confidence index plot is the average for the 8 other Euro area countries (Austria, Cyprus, Finland, Luxembourg, Netherlands, Portugal, Slovenia, Slovakia). The confidence indices are standardized such that 100 reflects the historical average over the period January 2000-December 2019 and 10 points reflects one standard deviation. The shaded areas in the plot cover the period January 2018-December 2019.

⁴See Ambrocio (2020) for more detailed comparisons.

In the top right panel we see that the index of industrial production for these Euro area countries also experienced sharp declines coinciding with the first wave of Covid-19 infections. Finally, the bottom right panel plots the household confidence index for the 11 Euro area countries as well as average household confidence in the 8 remaining Euro area countries. It is noteworthy that while the incidence of Covid-19 was quantitatively larger in the second wave of Covid-19 infections of late 2020, industrial production and the confidence indices were most affected in the first wave of Spring 2020.

While tempting, a simple comparison of the evolution of business confidence and activity is fraught with identification issues. First, business confidence may simply reflect what businesses are already planning to do given real-time information on current economic conditions.⁵ Second, Covid-19 infections may directly affect production and labor supply conditions. More importantly, the policy responses to the Covid-19 pandemic particularly the containment measures put in place to restrict movement may have strong economic consequences as well. An Instrumental Variables (IV) approach would work if one can find appropriate instruments. In this paper, I propose two which arguably satisfy these requirements, household confidence in the home country of these businesses and average household confidence in the other Euro area countries.

Households and businesses form expectations regarding Covid-19 from largely the same information reported by news media and government agencies. Thus, household confidence is very likely to satisfy the relevance condition for a valid instrument. Reverse causality is also unlikely as households are not inclined to keep track of and pay attention to monthly variations in industrial activity especially in real-time. Further, the exclusion restriction is also likely to hold since the effects of household confidence on household spending is likely to have lagged rather than immediate effects on industrial production. That is, if depressed household confidence leads to lower demand, the direct effects of lower demand on indices of industrial activity are only likely to take place in succeeding months. Rather, it is more likely that the erosion of confidence is shared between households and

⁵In this case, lagged values of publicly available statistics on economic conditions would be insufficient controls for firms' information regarding economic conditions.

businesses or alternatively, that businesses anticipate a drop in household confidence (and demand) thus eroding business confidence.⁶ One may nevertheless remain concerned that a confounding factor, e.g. related to domestic demand, shapes both household confidence and industrial production contemporaneously. In this regard, an alternative instrument robust to this concern would be household confidence in neighboring countries.

Finally, policy measures such as containment and stay-at-home policies may simultaneously affect household confidence and business activity through a supply channel. In order to maintain conditional exogeneity and rule out this potential bias in estimates, these factors need to be directly taken into account in the form of additional control variables. Consequently, the IV framework employed in this paper includes economic conditions, measures of Covid-19 incidence, and measures of policy responses to Covid-19 as control variables to take into account traditional factors influencing business activity, the direct effects of Covid-19, and the indirect effects of Covid-19 through policy responses respectively.

The motivation for household confidence from other countries as a candidate instrument is driven by recent work emphasizing international spillovers and the cross-border transmission of sentiment and confidence. [Levchenko and Pandalai-Nayar \(2020\)](#) show that US sentiment significantly affects Canadian business cycles and [Brzoza-Brzezina and Kotlowski \(2020\)](#) provides similar findings for the Euro area and Poland. Further, [Brzoza-Brzezina and Kotlowski \(2020\)](#) note that the transmission of confidence arises not just from trade linkages and traditional economic transmission channels but also directly through news and media. Consequently, measures of household confidence in neighboring Euro area countries may provide a suitable instrument for business confidence in other Euro area countries.

This paper builds on earlier work studying the effects of sentiment and confidence on

⁶While current household expectations may provide businesses with useful information regarding household spending today and in the near future, this information would not be available to firms until the end of the month when the survey results are published by the European Commission or the respective national statistics agencies.

economic activity.⁷ For instance, [Taylor and McNabb \(2007\)](#) show that business confidence can help predict downturns in European countries. More recently, [Levchenko and Pandalai-Nayar \(2020\)](#) and [Brzoza-Brzezina and Kotlowski \(2020\)](#) show that sentiment and confidence not only affects domestic business cycles but neighboring economies as well.

The focus on business confidence and the Covid-19 pandemic complements related work on the effects of Covid-19 on household consumption behavior. For example, [Baker et al. \(2020\)](#) and [Bachas et al. \(2020\)](#) document the effects of Covid-19 on household spending in the US while [Andersen et al. \(2020\)](#) provides similar results for Denmark. Furthermore, [Baker et al. \(2020\)](#) and [Goolsbee and Syverson \(2021\)](#) highlight the role of containment policies in depressing consumption. [Goolsbee and Syverson \(2021\)](#) specifically note that voluntary restrictions of movement may have stronger effects on consumption than (legally) mandated containment measures.

Covid-19 and the associated policy responses have also strongly affected businesses. While business closures seem to be effective in mitigating the transmission of the disease ([Song et al., 2021](#)) and lowering mortality ([Bongaerts et al., 2020](#)), it can also adversely affect sales and profitability of business. The adverse effects to businesses from the drop in household consumption and purchases due to Covid-19 and containment measures can, in extreme cases and for small businesses, lead to layoffs and business closures ([Fairlie, 2020](#)). This paper adds to this literature by documenting the effects of Covid-19 on business activity through the expectations or business confidence channel.

The rest of the paper is organized as follows. Section 2 describes the data and methodology used in the analysis. Section 3 reports the empirical framework and results from the analysis. Finally, Section 4 concludes with some remarks.

⁷See e.g. [Akerlof and Shiller \(2010\)](#); [Barsky and Sims \(2012\)](#); [Leduc and Sill \(2013\)](#); [Lagerborg et al. \(2019\)](#). See also [Ludvigson \(2004\)](#) and the references therein for consumer confidence and household spending specifically.

2. Data

Countries in the Euro area provides a suitable setting to study the effects of business confidence during the Covid-19 pandemic. First, cross-country analyses of relatively similar economies expands the information one can use given the relatively short period for which data is available regarding Covid-19. Member countries in the European Union participate in the harmonized monthly business and consumer survey overseen by the European Commission. This survey provides a harmonized dataset capturing consumer and business expectations, in which data on the latter is available for 17 of the European Union member countries. Of the 17 countries with business confidence indicators, 12 are also members of the Euro area which share a common monetary policy. Second, the European Centre for Disease Prevention and Control collects data on confirmed Covid-19 cases, the amount of Covid-19 testing, and the rate of positive test results. Combined with data on economic conditions and policy responses from other sources, a rich dataset capturing the extent to which the Covid-19 pandemic has hit these countries along with business expectations and conditions allows for sufficiently deep analysis.

The business confidence index is constructed from quantified balances of responses (i.e. the fraction of responses indicating *better* less the fraction of responses indicating *worse*) to three questions generally pertaining to the state of the order book or sales, the stock of finished products, and expected production or sales over the next quarter. I focus primarily on business confidence indices for respondents from the industrial (IND) and the wholesale and retail trade (RET) sectors.⁸ In addition, I also include the measure for household confidence (HLD) from the consumer surveys.⁹

I combine the data on business confidence with national weekly measures of the intensity of the Covid-19 pandemic from the European Centre for Disease Prevention and Control. Namely, I take 14-day average confirmed Covid-19 cases per 100,000 population,

⁸Production data for businesses in the Services sector are available only for an even smaller subset of countries. Further, initial analysis indicates that confidence in the Building and construction sector appear to behave differently relative to the other sectors during the Covid-19 pandemic.

⁹See [Ambrocio \(2020\)](#) for more details on the construction of the confidence indices.

the rate of Covid-19 tests conducted per 100,000 population, and the rate of positive to total tests of Covid-19. All data are averaged to a monthly frequency. Note that the number of confirmed cases relative to the population can be broken down into the number of tests conducted relative to the population times the rate of positive results in the tests. This breakdown is especially useful since while the rate of testing may be endogenous to economic conditions and policy responses, the rate of positive test results to total tests is arguably more exogenous and less related to policy responses.

Regarding policy responses, I take the Oxford government response indices and its sub-components (Hale et al., 2020), specifically the overall government response indices, the stringency of containment measures indices, and the economic stimulus indices. Again, all data are averaged to a monthly frequency. I complement the Oxford stringency index with daily data from Google Community Mobility Reports regarding traffic in the retail, transport, and workplace categories.¹⁰ While the stringency index better captures mandated restrictions on movement, the Google Community Mobility Report indices also capture voluntary restrictions of movement. These have also been averaged to a monthly frequency.

Finally, I take six measures of economic conditions from Eurostat. I collect data on average daily interest rates, harmonized consumer price inflation (year-on-year), unemployment rates, growth in the industrial production indices, growth in the turnover of wholesale and retail trade sector, and average lending rates for non-bank loans. These variables provide a comprehensive view of the state of the economy capturing information on prices, interest rates, economic activity in the industrial and wholesale and retail trade sectors, as well as labor market conditions. All growth rates are year-on-year and variables are seasonally adjusted when applicable.

I focus on 11 Euro area countries (Belgium, Germany, Estonia, Greece, Spain, France, Ireland, Italy, Latvia, Lithuania, and Malta) for which I can obtain information across all

¹⁰Google LLC, *Google COVID-19 Community Mobility Reports*, <https://www.google.com/covid19/mobility/>, Accessed: February 8, 2021.

sources and restrict the sample period to months in the calendar year 2020 which leaves me with at most 132 country-month observations. Table 1 provides summary statistics of the data.

Table 1: Data summary statistics

| | Mean | St. dev. | Obs. |
|--------------------------------------------|---------|----------|------|
| Confidence (IND) | 89.309 | 13.730 | 131 |
| Confidence (RET) | 89.705 | 12.847 | 131 |
| Confidence (HLD) | 89.925 | 12.092 | 131 |
| Confidence (HLD)-Other EA | 88.796 | 8.933 | 132 |
| Covid cases (14-day) | 108.074 | 201.551 | 132 |
| Covid test rate | 960.429 | 941.678 | 132 |
| Covid positive rate | 3.780 | 4.908 | 132 |
| Oxford government response index | 48.385 | 22.407 | 132 |
| Oxford stringency index | 49.477 | 25.316 | 132 |
| Oxford economic stimulus index | 55.843 | 31.625 | 132 |
| Google mobility (RTW) | -26.099 | 18.330 | 121 |
| Daily interest rate | -0.461 | 0.009 | 132 |
| HICP inflation | 0.038 | 1.079 | 132 |
| Unemployment rate | 8.346 | 3.957 | 129 |
| Industrial production growth | -5.758 | 11.461 | 123 |
| Wholesale and retail trade turnover growth | -1.442 | 9.740 | 131 |
| Lending rate | 2.386 | 0.894 | 132 |

Data sources: European Commission, European Centre for Disease Prevention and Control, Hale et al. (2020), Google LLC, Eurostat. Data are seasonally adjusted when applicable. Growth rates and inflation are year-on-year. Confidence indices are standardized such that 100 reflects the 2000-2019 historical average and 10 points is 1 standard deviation. Household confidence for the other Euro area countries only vary across time and take the same value for each of the 11 countries in the sample.

The 11 Euro area countries selected for the analysis reflect a nearly balanced panel and includes the largest economies in Europe. The focus on Euro area countries also mitigates identification issues arising from large differences in economic development and conditions as well as in terms of the conduct of monetary policy. Nevertheless, this leaves us with a sample that is small in both the time and the cross-section dimensions. As such, the empirical methods used in the succeeding section relies on standard least squares methods chosen for their well-understood small-sample properties while noting potential biases that may be present in the estimation.

3. Covid-19, Business Confidence and Activity

I first examine the impact of the Covid-19 pandemic directly on business confidence. To do so, I run the following regression

$$CONF_{i,t} = \alpha_i + \beta Covid_{i,t} + \sum_{k=1}^K \gamma_k X_{i,t-1}^k \quad (1)$$

where the confidence index $CONF_{i,t}$ in country i and month t is regressed on a host of country fixed effects (α_i) to take into account differences in initial conditions and the levels of the variables across countries, a Covid-19 variable(s) $Covid_{i,t}$, and a set of control variables $X_{i,t}$. I use lagged values of industrial production growth, turnover growth in wholesale and retail trade, unemployment, average daily interest rates, lending rates to non-banks, and the inflation rate as the set of control variables. This set of control variables containing prices, interest rates, and growth rates of quantities keeps the number of regressors feasible while capturing general economic conditions in the previous month. These variables are also lagged given that the survey underlying the confidence indicators are conducted in the first two weeks of each month such that the information available to respondents of the survey are very likely to be sufficiently captured by measures of economic conditions in the previous month.

Table 2 reports regression results of business confidence on several Covid-19 related variables. The top panel has business confidence in the industrial sector as the dependent variable while the bottom panel reports regression results with business confidence in the wholesale and retail trade sector.

In the first column of both panels, I include the number of confirmed Covid-19 cases in the previous month and find no significant relationships for confidence in the industrial sector and a negative relationship for confidence in the wholesale and retail trade sector. When I split confirmed cases into testing rates and positive test rates in the second column, I find that the rate of positive Covid-19 test results are now significant and

Table 2: Covid-19 and business confidence

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|--------------------------------------|--------------------|---------------------|--------------------|--------------------|---------------------|---------------------|--------------------|---------------------|
| Panel A. Dep. var.: Confidence (IND) | | | | | | | | |
| L.Covid cases (14-day) | -0.004 (0.01) | | | | | | | |
| L.Covid test rate | | 0.002 (0.00) | | | | | | 0.001 (0.00) |
| L.Covid positive rate | | -0.853*** (0.31) | | | | | | 0.011 (0.21) |
| Confidence (HLD) | | | 0.931*** (0.14) | | | | | 0.938*** (0.18) |
| Confidence (HLD)-Other EA | | | | 0.950*** (0.17) | | | | |
| L.Oxford government response index | | | | | -0.369*** (0.09) | | | |
| L.Oxford stringency index | | | | | | -0.304*** (0.08) | | -0.099 (0.06) |
| L.Oxford economic stimulus index | | | | | | 0.035 (0.06) | 0.070 (0.07) | 0.058 (0.05) |
| L.Google mobility (RTW) | | | | | | | 0.404*** (0.15) | |
| Fixed effects | Country | Country | Country | Country | Country | Country | Country | Country |
| Controls | YES | YES | YES | YES | YES | YES | YES | YES |
| Adj. r-squared | 0.409 | 0.444 | 0.736 | 0.694 | 0.499 | 0.487 | 0.511 | 0.736 |
| Observations | 119 | 119 | 130 | 130 | 119 | 119 | 108 | 119 |
| Panel B. Dep. var.: Confidence (RET) | | | | | | | | |
| L.Covid cases (14-day) | -0.010** (0.00) | | | | | | | |
| L.Covid test rate | | -0.001 (0.00) | | | | | | -0.003* (0.00) |
| L.Covid positive rate | | -0.742*** (0.23) | | | | | | -0.245 (0.22) |
| Confidence (HLD) | | | 0.645*** (0.12) | | | | | 0.615*** (0.13) |
| Confidence (HLD)-Other EA | | | | 0.604*** (0.15) | | | | |
| L.Oxford government response index | | | | | -0.203** (0.08) | | | |
| L.Oxford stringency index | | | | | | -0.033 (0.08) | | 0.149** (0.06) |
| L.Oxford economic stimulus index | | | | | | -0.125** (0.05) | -0.072 (0.05) | -0.122*** (0.04) |
| L.Google mobility (RTW) | | | | | | | 0.057 (0.10) | |
| Fixed effects | Country | Country | Country | Country | Country | Country | Country | Country |
| Controls | YES | YES | YES | YES | YES | YES | YES | YES |
| Adj. r-squared | 0.574 | 0.614 | 0.741 | 0.696 | 0.594 | 0.597 | 0.605 | 0.749 |
| Observations | 119 | 119 | 130 | 130 | 119 | 119 | 108 | 119 |

*p less than 0.1, **p less than 0.05, ***p less than 0.01; Robust standard errors in parentheses.

negative for both sectors indicating that a higher positive test rate leads to lower business confidence. In the third column, I include household confidence and find a strong positive relationship.¹¹ This result indicates a strong co-movement of business and household confidence even after controlling for economic conditions in the previous month. I find similar effects in column 4 when I replace domestic household confidence with average household confidence in the 8 Euro area countries excluded from the sample.

In columns 5 to 7, I explore the effects of various policy responses to the Covid-19 pandemic on business confidence. I first use the overall Oxford government policy response index in column 5 and find a negative relationship. When I split the government response indicator to two of its main components - the stringency of containment measures and the economic stimulus index - in the sixth column, I find that it is the stringency of containment measures which is largely responsible for lowering business confidence in the industrial sector while a strong economic stimulus response counter-intuitively seems to lower confidence in the wholesale and retail trade sector.¹² I replace the Oxford stringency index with the the Google mobility index for retail, transport, and workplace in column 7 and find that the restriction of movement - either due to government policy responses or voluntarily, lower business confidence in the industrial sector while no statistically significant effects of policy responses are found on confidence in wholesale and retail trade.

Finally, in column 8, I include a host of Covid-19 related variables including Covid-19 testing and positive test rates, the household confidence index, and policy response indices regarding the stringency of containment measures and economic stimuli. I find that the strong positive relationship with similar point estimates between household and business confidence remains even after controlling for the intensity of the Covid-19 pandemic as well as the response of governments. This strongly suggests that household confidence satisfies

¹¹The household confidence indicator is not lagged given that both surveys are conducted at about the same time, in the first two weeks, of each month.

¹²The heterogeneous impact of general economy-wide stimulus measures across sectors as well as nuances in the nature and sectoral impact of directed stimulus programs are plausible reasons for why the coefficient may be negative.

the relevance condition as an instrument for business confidence during the Covid-19 pandemic. In addition, the counter-intuitive negative relationship between the economic stimulus index and confidence in the wholesale and retail trade sector is compounded with a positive relationship with the stringency index once other factors, particularly on the incidence of Covid-19 cases, are taken into account. These results point towards the difficulty in disentangling the direct effects of Covid-19 from (policy) responses to it for the wholesale and retail trade sector.

The key takeaway from these regressions is the strong positive relationship between business and household expectations during the Covid-19 pandemic. The results also show that the strong positive relationship remains even after accounting for the direct effects of Covid-19 as well as the effects of policy responses to the pandemic. Further, the relationship between household and business confidence is not purely driven by common trends across time. In the appendix, I show that the strong relationship between household and business confidence remains even if we rely exclusively in across-country variation by including time fixed effects as additional controls.¹³

A second criterion for finding suitable instruments for business confidence is conditional exogeneity. I settle on two possible instruments. The first is the domestic household confidence index. Conditional on controlling for the incidence of Covid-19, policy responses, and general economic conditions in the previous month, household confidence is arguably exogenous to other factors that may affect business confidence. This is because households are unlikely to keep close track of monthly economic developments when forming expectations at the monthly frequency. This argument is strengthened if I use household confidence in neighboring Euro area countries as the instrument for business confidence.

Given the results from the initial analysis on the factors driving business confidence, I run Instrumental Variables (IV) regressions with domestic household confidence or average

¹³Results are reported in Table A.1 in the appendix wherein the regression specifications include dummy variables for each month in 2020.

household confidence in neighboring countries as instruments for business confidence to ascertain the effect of business confidence on business activity. As discussed previously, to help ensure that conditional exogeneity is maintained, variables controlling for Covid-19 incidence and Covid-19 policy responses that could simultaneously affect household confidence and business activity need to be included in the analysis to account for the direct as well as the indirect effects of Covid-19 through policy responses. In particular, I run the regression

$$Activity_{i,t} = \alpha_i + \beta CONF_{i,t} + \sum_{j=1}^J \delta_j Z_{i,t-1}^j + \sum_{k=1}^K \gamma_k X_{i,t-1}^k \quad (2)$$

where $Activity_{i,t}$ is either industrial production growth or turnover growth in the wholesale and retail trade sectors reflecting business activity in these sectors, α_i are country-specific constant terms, $CONF_{i,t}$ is the business confidence indicator which is instrumented with household confidence, $Z_{i,t}$ are a host of Covid-19 related control variables such as the average number of confirmed cases, the Oxford stringency, and the Oxford economic stimulus indices, and $X_{i,t}$ are key economic indicators such as daily interest rates, inflation, unemployment, non-bank loan lending rates, growth in industrial production, and growth in the turnover of wholesale and retail trade.

It should be noted that the set of controls include the lagged dependent variable. As such, an OLS regression would be subject to the *Nickell* bias and dynamic panel data methods would be preferred. However, the small cross-section dimension of the data would mitigate the potential improvements in estimates from using such methods. Consequently, I use two-stage least squares to provide IV estimates and also run simple OLS regressions for comparison.

Table 3 reports the regression results. The top panel reports results for the industrial sector while the bottom panel reports results for the wholesale and retail trade sector. Column 1 in both panels report OLS estimates which suggest that a one standard deviation fall in business confidence (10 points in the index) is associated with over three and a half percentage points drop in industrial production growth and turnover growth

in wholesale and retail trade. For perspective, the fall in business confidence in Spring of 2020 was approximately three standard deviations. Note that the estimated effect of business confidence on business activity is on top of the direct effect of Covid-19, as captured by the number of Covid-19 cases in the control variables, and the indirect effect of Covid-19 arising from policy responses such as containment measures and economic stimuli.

In columns 2 and 3 of both panels, I report first and second stage results of the IV regression instrumenting business confidence with household confidence. In both the regressions for the industrial and wholesale and retail trade sectors, tests for weak instrument and under-identification are rejected.¹⁴ I find substantially larger coefficients on the business confidence indicator in the second stage for both sectors. A one-standard deviation fall in business confidence (10 points in the index) results in a 6 and 9.5 percent drop in industrial production growth and turnover growth in wholesale and retail trade respectively. These results remain even after accounting for common trends in industrial production and wholesale and retail trade growth in other Euro area countries.¹⁵

Finally, columns 4 and 5 report first and second stage results of the IV regression instrumenting business confidence with the average household confidence in neighboring Euro area countries. I find a slightly smaller coefficient estimate on the effects of business confidence on industrial production growth and a larger coefficient on business confidence and turnover growth in the wholesale and retail trade sector. The results indicate potentially weak instruments for the wholesale and retail trade sector regression (columns 4 and 5 in the bottom panel) suggesting that the bias in estimates of the effects of confidence on turnover in the wholesale and retail trade sector reported in column 5 of the bottom panel may be quite large. Excluding this result, these IV estimates suggest that a one standard deviation fall in confidence leads to between 5-6 percentage points fall in

¹⁴The F-statistics are all above the Stock and Yogo critical value of 16.38 at the 10 percent maximal bias. The LM statistic also indicates a rejection of the null hypothesis of under-identification indicating that the instrument contains sufficiently distinct information from the control variables.

¹⁵Table A.2 in the appendix reports regression results which include lagged values of average industrial production growth and turnover growth in the wholesale and retail trade sector in the 8 other Euro area countries not included in the sample as additional controls.

Table 3: Business confidence and activity

| | (1) | (2) | (3) | (4) | (5) |
|--------------------------------------------------|---------------------|-------------------------|--------------------|-------------------------|--------------------|
| Panel A. Dep. var.: Industrial production growth | OLS | IV: 1st stage | IV: 2nd stage | IV: 1st stage | IV: 2nd stage |
| Confidence (IND) | 0.373** (0.16) | | 0.606*** (0.18) | | 0.537*** (0.15) |
| Confidence (HLD) | | 0.943*** (0.16) | | | |
| Confidence (HLD)-Other EA | | | | 0.972*** (0.18) | |
| L.Covid cases (14-day) | 0.010 (0.01) | 0.006 (0.01) | 0.011 (0.01) | 0.004 (0.01) | 0.011 (0.01) |
| L.Oxford stringency index | -0.062 (0.07) | -0.106 (0.07) | 0.021 (0.06) | -0.081 (0.09) | -0.004 (0.07) |
| L.Oxford economic stimulus index | 0.068 (0.06) | 0.069 (0.06) | 0.056 (0.06) | 0.020 (0.06) | 0.059 (0.06) |
| L.Daily interest rate | -83.993 (208.93) | -426.312*** (161.40) | 77.182 (203.25) | -676.698*** (152.70) | 29.106 (199.07) |
| L.HICP inflation | -1.309 (1.35) | 1.521 (1.29) | -1.687 (1.24) | 1.954 (1.38) | -1.574 (1.23) |
| L.Unemployment rate | -0.220 (1.27) | -1.902* (1.13) | 0.192 (1.15) | -1.208 (1.07) | 0.069 (1.15) |
| L.Industrial production growth | 0.149 (0.21) | -0.135 (0.14) | 0.228 (0.20) | -0.132 (0.16) | 0.204 (0.22) |
| L.Wholesale and retail trade turnover growth | 0.082 (0.22) | 0.147 (0.15) | 0.058 (0.21) | 0.021 (0.14) | 0.065 (0.21) |
| L.Lending rate | 1.765 (3.04) | 2.987 (3.82) | 0.351 (3.11) | 5.627 (4.35) | 0.773 (3.04) |
| Fixed effects | Country | Country | Country | Country | Country |
| Instrument | NA | | CONFH | | CONFH-Other |
| Adj. r-squared | 0.504 | | 0.284 | | 0.314 |
| Observations | 111 | 111 | 111 | 111 | 111 |
| Cragg-Donald F | | 77.062 | | 58.560 | |
| Kleibergen-Paap F | | 34.091 | | 28.025 | |
| Kleibergen-Paap LM | | 15.852 | | 15.209 | |

| | (1) | (2) | (3) | (4) | (5) |
|-------------------------------------------------------------------|-----------------------|----------------------|---------------------|------------------------|--------------------|
| Panel B. Dep. var.: Turnover growth in Wholesale and Retail Trade | OLS | IV: 1st stage | IV: 2nd stage | IV: 1st stage | IV: 2nd stage |
| Confidence (RET) | 0.353*** (0.10) | | 0.956*** (0.21) | | 1.330*** (0.37) |
| Confidence (HLD) | | 0.643*** (0.13) | | | |
| Confidence (HLD)-Other EA | | | | 0.632*** (0.17) | |
| L.Covid cases (14-day) | -0.004 (0.01) | -0.009** (0.00) | 0.002 (0.01) | -0.011** (0.00) | 0.006 (0.01) |
| L.Oxford stringency index | -0.168** (0.07) | 0.135** (0.06) | -0.163* (0.09) | 0.146** (0.07) | -0.160 (0.11) |
| L.Oxford economic stimulus index | 0.194*** (0.05) | -0.120*** (0.04) | 0.276*** (0.06) | -0.141*** (0.05) | 0.326*** (0.09) |
| L.Daily interest rate | -324.438* (186.19) | -213.119 (164.71) | -69.569 (195.69) | -402.411** (192.49) | 88.470 (228.21) |
| L.HICP inflation | 1.145 (1.53) | 1.336 (1.23) | 0.090 (1.88) | 1.823 (1.40) | -0.565 (2.31) |
| L.Unemployment rate | -0.320 (1.07) | 1.879** (0.90) | -1.490 (1.16) | 2.180** (1.00) | -2.216 (1.56) |
| L.Industrial production growth | -0.087 (0.08) | 0.000 (0.08) | -0.076 (0.10) | 0.049 (0.10) | -0.069 (0.14) |
| L.Wholesale and retail trade turnover growth | -0.096 (0.15) | 0.295** (0.14) | -0.214 (0.20) | 0.182 (0.16) | -0.288 (0.26) |
| L.Lending rate | 4.033 (2.71) | 1.859 (3.53) | 0.989 (3.37) | 4.463 (3.52) | -0.898 (4.58) |
| Fixed effects | Country | Country | Country | Country | Country |
| Instrument | NA | | CONFH | | CONFH-Other |
| Adj. r-squared | 0.464 | | -0.026 | | -0.576 |
| Observations | 119 | 119 | 119 | 119 | 119 |
| Cragg-Donald F | | 51.831 | | 31.785 | |
| Kleibergen-Paap F | | 23.869 | | 13.648 | |
| Kleibergen-Paap LM | | 12.036 | | 9.842 | |

*p less than 0.1,**p less than 0.05,***p less than 0.01; Robust standard errors in parentheses.

Stock and Yogo 10% critical value for the F-statistics is 16.38.

Kleibergen-Paap LM statistics reject the null of under-identification.

industrial production growth and about a 9 percentage points drop in turnover growth in wholesale and retail trade.

Another interesting result is that no other Covid-19 related variable appears to statistically significantly affect industrial production as evidenced by the coefficients on Covid-19 cases and the Oxford policy response indices in columns 1,3, and 5 of the top panel of Table 3. This suggests that the temporary drop in industrial production depicted in Figure 1, a disruption in industrial activity, may have been largely due to the effect of Covid-19 on business confidence which also featured a largely temporary drop. Regarding the relatively quick recovery in both business confidence and activity, businesses may have been able to successfully adjust their operations to the direct consequences of Covid-19 shortly after the initial wave of Covid-19 cases in the Spring of 2020.

On the other hand, the results in columns 1, 3, and 5 of the bottom panel of Table 3 indicate that more stringent containment measures may have helped dampen turnover in wholesale and retail trade while economic stimulus measures may have helped mitigate the drop in turnover (in contrast to its effects on business confidence). While caution should remain in interpreting these coefficients, if they are accurate then they would indicate that a trade-off between public health benefits and costs to economic activity for the wholesale and retail trade sector was present when restricting the movement of people and that economic stimulus policy measures may have helped the sector as well.

4. Concluding Remarks

I find that the effect of the Covid-19 pandemic on temporary disruptions in industrial production and wholesale and retail trade may have largely taken place through an expectations channel as reflected in business confidence. For instance, using household confidence as an instrument for business confidence, I find that a one standard deviation drop in business confidence leads to a 5-6 percent drop in industrial production growth and a 9 percent drop in turnover growth in the wholesale and retail trade sector on av-

erage for Euro area countries. These estimated effects are on top of and conditional on general economic conditions as well as the direct and indirect effects of Covid-19 through containment and stimulus measures.

This result has strong policy implications. As illustrated in the introduction, the fall in industrial production appears largely temporary as was the drop in business confidence in the industrial sector. This v-shaped pattern in both confidence and industrial activity, indicating a reversal of views and a *temporary* disruption to industrial activity, suggest that assuaging fears and managing expectations could have avoided potential amplification of the effects of the Covid-19 pandemic through the expectations channel. While the incidence of Covid-19 and indices of policy measures surged in the second-wave of late 2020, in many cases dwarfing the first wave of Spring 2020, business confidence and activity were not hit as hard or at all. This further indicates that the initial reaction to the pandemic, and specifically how it has shaped confidence and expectations, is an important component to the economic transmission of the health crisis.

One may of course interpret the results as businesses (correctly) anticipating a temporary fall in demand due to a drop in household confidence. In this case, incorrectly restoring business confidence will not necessarily lead to better outcomes since the impending fall in demand would lead to lower prices or an increased stock of unsold goods both of which would similarly reduce business profitability. Consequently, it is not just business confidence but also household confidence which should be addressed in crises management.

In light of the key role that the expectations channel may play in transmitting health crises to economic outcomes, the messaging and communication aspect of policy responses have similarly pronounced roles in crisis management. For instance [Binder \(2020\)](#) has shown that being informed about the Federal Reserve’s policy responses to the Covid-19 pandemic has helped US households become more optimistic. Further, global survey evidence from [Fetzer et al. \(2020\)](#) indicates that the perception of a weak government response to the pandemic is associated with higher levels of worry and concern among re-

spondents and that strong government responses help correct misconceptions that households may have with respect to the effects and responses to the Covid-19 pandemic. These results emphasize the need for prompt and clear policy responses highlighting the communication aspect in managing crises.

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Appendix

Table A.1: Covid-19 and business confidence

| Dep. var.: | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|------------------------------------|------------------|--------------------|------------------|--------------------|--------------------|--------------------|------------------|--------------------|
| | | Confidence (IND) | | | | Confidence (RET) | | |
| L.Covid test rate | 0.002 (0.00) | | | 0.001 (0.00) | -0.003 (0.00) | | | -0.004* (0.00) |
| L.Covid positive rate | -0.032 (0.26) | | | 0.162 (0.21) | -0.521** (0.21) | | | -0.325 (0.21) |
| Confidence (HLD) | | 0.662*** (0.18) | | 0.685*** (0.21) | | 0.612*** (0.14) | | 0.594*** (0.14) |
| Confidence (HLD)-Other EA | | | | | | | | |
| L.Oxford government response index | | | | | | | | |
| L.Oxford stringency index | | | | 0.071 (0.13) | | | | 0.297*** (0.09) |
| L.Oxford economic stimulus index | | | 0.026 (0.09) | 0.011 (0.07) | | | -0.106 (0.07) | -0.106** (0.05) |
| L.Google mobility (RTW) | | | -0.051 (0.29) | | | | -0.302 (0.19) | |
| Fixed effects | Country, Time | Country, Time | Country, Time | Country, Time | Country, Time | Country, Time | Country, Time | Country, Time |
| Controls | YES | YES | YES | YES | YES | YES | YES | YES |
| Adj. r-squared | 0.712 | 0.764 | 0.681 | 0.758 | 0.684 | 0.737 | 0.654 | 0.760 |
| Observations | 119 | 130 | 108 | 119 | 119 | 130 | 108 | 119 |

*p less than 0.1,**p less than 0.05,***p less than 0.01; Robust standard errors in parentheses.

Table A.2: Business confidence and activity

| Dep. var.: | (1) | (2) | (3) | (4) | (5) | (6) |
|----------------------------------------------|------------------------------|----------------------|----------------------|--------------------------------------------|----------------------|----------------------|
| | Industrial production growth | | | Wholesale and retail trade turnover growth | | |
| | OLS | IV: 1st stage | IV: 2nd stage | OLS | IV: 1st stage | IV: 2nd stage |
| Confidence (IND) | 0.354** (0.14) | | 0.555*** (0.20) | | | |
| Confidence (RET) | | | | 0.344*** (0.10) | | 0.985*** (0.21) |
| Confidence (HLD) | | 0.976*** (0.19) | | | 0.640*** (0.12) | |
| L.Covid cases (14-day) | 0.011 (0.01) | 0.006 (0.01) | 0.012 (0.01) | -0.003 (0.01) | -0.009** (0.00) | 0.002 (0.01) |
| L.Oxford stringency index | -0.168 (0.12) | -0.041 (0.14) | -0.077 (0.14) | -0.151* (0.08) | 0.138** (0.07) | -0.183* (0.10) |
| L.Oxford economic stimulus index | 0.042 (0.06) | 0.085 (0.07) | 0.037 (0.06) | 0.196*** (0.05) | -0.120*** (0.04) | 0.276*** (0.06) |
| L.Industrial production growth-Other EA | -0.469 (0.39) | 0.265 (0.46) | -0.378 (0.40) | | | |
| L.Wholesale and retail trade-Other EA | | | | 0.147 (0.30) | 0.034 (0.22) | -0.170 (0.29) |
| L.Daily interest rate | -384.516 (378.52) | -254.419 (362.97) | -189.823 (421.52) | -275.002 (178.62) | -202.011 (177.85) | -119.136 (194.43) |
| L.HICP inflation | -1.001 (1.43) | 1.361 (1.34) | -1.381 (1.36) | 1.100 (1.51) | 1.324 (1.23) | 0.110 (1.91) |
| L.Unemployment rate | -0.391 (1.35) | -1.829 (1.16) | -0.009 (1.28) | -0.279 (1.10) | 1.885** (0.90) | -1.573 (1.19) |
| L.Industrial production growth | 0.182 (0.24) | -0.150 (0.16) | 0.242 (0.21) | -0.089 (0.08) | -0.000 (0.08) | -0.074 (0.10) |
| L.Wholesale and retail trade turnover growth | 0.169 (0.20) | 0.101 (0.15) | 0.132 (0.17) | -0.142 (0.21) | 0.283* (0.16) | -0.164 (0.24) |
| L.Lending rate | 1.098 (3.01) | 3.319 (4.08) | 0.030 (3.05) | 4.556 (3.12) | 1.988 (3.63) | 0.292 (3.77) |
| Fixed effects | Country | Country | Country | Country | Country | Country |
| Instrument | NA | | CONFH | NA | | CONFH |
| Adj. r-squared | 0.514 | | 0.313 | 0.460 | | -0.066 |
| Observations | 111 | 111 | 111 | 119 | 119 | 119 |
| Cragg-Donald F | | 74.911 | | | 46.763 | |
| Kleibergen-Paap F | | 27.391 | | | 26.907 | |
| Kleibergen-Paap LM | | 11.323 | | | 14.149 | |

*p less than 0.1,**p less than 0.05,***p less than 0.01; Robust standard errors in parentheses.

Stock and Yogo 10% critical value for the F-statistics is 16.38.

Kleibergen-Paap LM statistics reject the null of under-identification.

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