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DISCUSSION PAPER SERIES

IZA DP No. 14481

The Effects of COVID-19 on Employment, Labour Markets and Gender Equality in Central America

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ABSTRACT

The Effects of COVID-19 on Employment, Labour Markets and Gender Equality in Central America*

This study considers the economic impact of Covid-19 on enterprises in four Central American countries – El Salvador, Guatemala, Honduras and Nicaragua. At the time of the analysis neither the pandemic nor its economic consequences had fully run their course. It is not, therefore, a definitive analysis but it is important to try to draw important lessons as soon as possible. The main focus of the study was the initial impact on labour markets. The analysis was based on World Bank enterprise surveys** undertaken before the outbreak of Covid-19 and follow-up surveys on the effects of the pandemic, also undertaken by the World Bank. These were combined with data on government containment measures and on morbidity and mortality rates. The use of enterprise data to analyse labour market issues has some limitations but also many strengths. The data is useful for analysing the consequences for gender equality in employment. Since the demand for labour is a derived demand firm level data provides a clear link to labour market effects. The pandemic has caused a significant loss in sales for many firms, This creates a loss of liquidity which, in turn, has caused some firms to reduce employment, working hours and wages. Government containment measures necessary to save lives such as temporary workplace closures have added to the burden for both firms and employees. The study starts by using the surveys to identify the important stylised facts. Although some issues are already well documented anecdotally through media reports this provides a more evidence based approach. It also helps identify several issues, such as the impact on gender equality which have received less journalistic attention. The study is further supported by a regression analysis (OLS and SURE) of several key outcomes (changes in sales, employment, the share of females in employment and firm expectations of survival). A limitation of such analysis with any enterprise level is heterogeneity and, in consequence, a risk of sample selection bias. To provide robustness checks we use a matching approach. The results suggest that a significant proportion of surviving firms are vulnerable to permanent closure. The ability of firms to retain labour depends on sales which are affected by both the pandemic itself and the government containment measures. Only a small proportion of firms have received government support and there is evidence that it could help both firm survival and the retention of labour. There is some doubt whether the four countries have the institutional capacity to provide effective support. If such doubts prove well founded then support may need to be externally driven.

JEL Classification: I18, J23, J28, J65

Keywords: labor demand, temporary closures, furloughs, firm-level data, COVID-19, emergency

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** Source: Enterprise Surveys, The World Bank, http://www.enterprisesurveys.org

1. INTRODUCTION

The Covid-19 pandemic has not yet fully played out in the four Central American countries covered in this study (El Salvador, Guatemala, Honduras and Nicaragua), as in other parts of the world. Nor have the full economic consequences yet become clear. This means that there is an important opportunity to learn lessons from the earlier stages of the pandemic. There is plenty of anecdotal evidence from media reports and some evidence from macro-economic data on GDP and unemployment and the like but little more. To date there are few evidence based, scientific studies of the effects on firms.

This study uses World Bank enterprise surveys undertaken before the outbreak of Coviod-19 and two follow-up enterprise surveys on the effects of the pandemic, also conducted by the World Bank for each country. These were combined with data on government containment measures and on morbidity and mortality rates. The focus of this study is on the impact on labour markets. There are some weaknesses in using firm level data to capture labour market effects. For example, the data capture well the impact on gender equality in labour markets but are not well suited to capture the impact on other forms of inequality. However, there are also considerable advantages in using enterprise data. The demand for labour is a derived demand. With Covid-19 some firms experienced a substantial loss of sales. This created a loss of liquidity which meant that some were unable to sustain earlier levels of employment. The enterprise data allows us to understand this process better. It also allows us to better understand that the impact on labour is not just that on employment. Cuts in wages and hours of work, for example, were introduced by some firms. Temporary firm closures resulted in a substantial economic cost. Gender equality was also affected.

The analysis presented in this study starts with a presentation of the stylised facts emerging from the World Bank surveys of enterprises. This is much longer than would be normal because the stylised facts of the effects of the pandemic on firms in Central America (or elsewhere) are still emerging. A number of important points serve to provide a basis for anecdotal evidence from media reports but there are also many issues that have not been so well covered by journalism. The effects on gender equality in employment, the prevalence of wage cuts and the impact on enterprise debt are all issues thar have received less media focus. For these reasons more attention than usual was devoted to the stylised effects.

The study also undertakes an econometric analysis. Some of this confirms the utility of looking at labour demand as a derived demand – that the consequences of reduced demand for products or services is a reduced demand for labour. This in turn not only leads firms to reduce employment but also to, for example, reduce hours of work. Government containment measures to save lives, including temporary workplace closures, have often had a statistically significant effect of sales and, both directly and indirectly, on labour.

2. REVIEW OF LITERATURE

The Covid-19 pandemic outbreak led to an unprecedented disruption in most industry sectors (Donthu and Gustafsson, 2020). All studies on the economic impact of the pandemic unanimously agree that small businesses were adversely impacted (WTO, 2020). Small firms were in particularly heavily impacted due to their financial fragility and limited access to commercial financing (Barthik et al. 2020; A host of other studies also document the negative impact on small firms in terms of revenue loss, production and employment, business closures, layoffs, liquidity and gender inequality (see for example Dai et al. 2020; Apedo-Amah et al. 2020; Bartik et al. 2020; Humphries

et al. 2020; Adams-Prassl et al. 2020; Borland and Charlton, 2020; Fairlie 2020 a,b; Cirera et al. 2021; Bachas et al. 2021; Webster et al. 2021).

Studies that examine the labour market impact of Covid report a negative impact of the pandemic on production and employment. For example, Apedo-Amah et al. (2020) find that firm sales declined by more than 70 percent during the first wave and employment was negatively impacted especially for micro and small businesses (those with fewer than 20 employees). Others find that the employment for the less educated, younger and women workforce was particularly adversely affected (BLS, 2020; Costa Dias et al. 2020; Borland and Charlton, 2020). Bachas et al. (2021) examine the impact on formal firms in Honduras and find that sectors which were subject to stricter containment measures experienced higher revenue losses. Further, larger firms experienced smaller revenue losses than smaller firms.

Governments designed measures to support businesses in addressing the negative impact of the COVID-19 shock. Specific measures, such as tax deferrals, direct cash transfers or interest free loans were allowed to provide temporary liquidity support. Others measures included government guaranteed bank loans and equity-like injections, and these were to address the problem of insolvency of smaller firms. A growing body of literature examines the effectiveness of governments policies and the choice of different policy instruments employed to support businesses in addressing the impact of Covid-19 (see Cui et al. 2020; Chen et al. 2020; Granja et al. 2020; Chetty et al. 2020). In a recent note, the IMF (2021) suggests that combining job retention and worker reallocation support schemes can mitigate the negative and unequal employment impacts of the pandemic though this is country specific.

Studies that explore the implications of government financial support for affected firms also comment on how the pandemic impacted the liquidity of firms (see Banerjee et al. 2020; Bircan et al. 2020; Schivardi and Romano, 2020; De Vito and Gomez, 2020). For our study the most relevant work is by Cirera et al. (2021) which uses World Bank enterprise surveys to assess the effectiveness of policies in developing countries and how these measures supported businesses in addressing the negative impact of Covid. This study finds that smaller firms, especially those owned by women in sectors such as hospitality, had limited access to support measures and experienced the largest decline in sales. An interesting finding is that that firms in low-income countries are more likely to lose from mistargeting of support schemes. An explanation for mistargeting is linked with weak governance and implementation capacity of these countries.

Other country specific studies that examine the effectiveness of government support programs in China, Italy, Portugal, and the United States present mixed results (see Cororaton and Rosen, 2020; Granja et al. 2020; De Marco, 2020; Cui et al. 2020; Kozeiniauskas et al. 2020). For example, Cui et al. (2020) and Chen et al. (2020) find that governmental policies in China, which include payroll tax mitigation and deferral of social insurance contributions, supported firms to mitigate the negative effects of the pandemic. Others, however, find that financial support policies by the government in the United States were not been as effective (Granja et al. 2020; Chetty et al. 2020).

The debate on the choice of policy instruments used by governments to address the supply-side shocks which in turn influenced aggregate demand and output is still evolving. Guerrieri et al. (2020) suggest that monetary policy instruments are more effective compared to standard fiscal stimulus since monetary measures directly address the short-term liquidity constraints of firms. Chetty et al. (2020), however, find that traditional macroeconomic tools that aimed to stimulate aggregate demand and provide liquidity to businesses may have diminished their capacity to restore employment due to the health concerns of the pandemic.

3. OVERVIEW ON ENTERPRISE SURVEY COMBINED DATABASE AND STYLISED FACTS

As with many research studies this section both details data sources and provides a descriptive summary of the data. At one level the stylised facts of the impact of the pandemic are familiar from extensive media reporting but, to date, little systematic evidence has been available. The media reports newsworthy stories which are not necessarily typical. More systematic analysis is needed to assess whether these give a reliable picture. This section includes a much-extended summary of the data in order to provide a set of stylised facts about impact of Covid-19 on enterprises from Central America, facts which are based on systematic survey evidence provided by World Bank Enterprise Surveys.

Since the focus of the paper is on employment, labour markets and gender equality the summary of the data starts with employment (section 3.2)+ and then other labour market effects (section 3.3). Gender differences are covered within these sections. The demand for labour is a derived demand. The pandemic has an impact on enterprises which results in changes in their demand for labour. One advantage of using enterprise data is that this link cam be analysed. Section 3.4 considers the extent to which Covid-19 has affected the ability of remaining firms to survive and section 3.5 the extent to which government support has been provided. Another feature which has threatened the ability of some firms to survive is a loss of sales, resulting in a loss of liquidity. Section 3.6 examines losses of sales and liquidity and considers the extent to which firms have been able to access credit to survive. Finally, section 3.7 considers the main obstacles to business reported by firms in the enterprise surveys conducted before the onset of the pandemic. This section provides a link between the enterprise surveys and the analysis of institutional capacity provided in section of this study.

3.1 Sources and Composition

The database combined data from several sources. Firstly, World Bank enterprise surveys conducted before the pandemic – El Salvador (2016), Guatemala (2017), Honduras (2016) and Nicaragua (2016) – were combined with two follow up Covid-19 surveys for the same sample of firms as the enterprise surveys. Round 1 of the Covid-19 follow up surveys was conducted in June and July 2020 and round 2 from November 2020 to early January 2021. For each country data from two further sources at the country level (but varying on a daily basis) were added to the combined survey data for each country.

The first of these were data on the strength of government measures to contain the pandemic, taken from the containment and health index and its component indices produced by the Blavatnik School of Government, Oxford COVID-19 Government Response Tracker | Blavatnik School of Government (ox.ac.uk) The second were morbidity and mortality data for the Covid-19 pandemic obtained from Coronavirus Pandemic (COVID-19) - Statistics and Research - Our World in Data Both sets of data are at the country level at daily intervals. Although they do not, of course, vary by firm they are capable of significant variation over time. For each enterprise they were matched with the precise dates of their round 1 and round 2 Covid-19 follow up interviews. The final step was to combine the resulting data files for each country into a single "regional" file.

The sample of enterprises responding to the original enterprise survey was a total of 1427 firms (excluding those who reported no sales or employees). Of these 808 responded to the round 1 Covid-19 follow up survey and 827 responded to the round 2 survey. Further information on the

World Bank enterprise surveys and the follow-up Covid surveys can be found here: Enterprise Surveys Indicators Data - World Bank Group

3.2 Employment

Table 1 reports changes in employment for the sample of enterprises (compared to December 2019).

Table 1: Change in Employment by Country. Firm Size and Gender (full time permanent employees compared to December 2019)				
	Covid follow up round 1		**Covid follow up round 2**	
	All	**Female**	**All**	**Female**
El Salvador	**-8.9%**	**-9.1%**	**-11.6%**	**-7.0%**
Small	-11.9%	-15.5%	-48.4%	-46.3%
Medium	-3.3%	-12.6%	-10.9%	-14.7%
Large	-9.8%	-7.8%	-7.6%	-3.1%
Guatemala	**-15.7%**	**-25.6%**	**-9.0%**	**-16.7%**
Small	-22.7%	-36.9%	6.6%	11.1%
Medium	-30.9%	-55.4%	-31.0%	-64.0%
Large	-10.7%	-16.0%	-4.2%	-8.6%
Honduras	**-21.9%**	**-30.2%**	**-15.2%**	**-17.2%**
Small	-28.7%	-25.8%	-17.0%	-7.5%
Medium	-24.1%	-34.4%	-18.5%	-19.4%
Large	-18.5%	-28.3%	-12.1%	-16.6%
Nicaragua	**-8.8%**	**-9.2%**	**-11.9%**	**-23.0%**
Small	-10.6%	-39.9%	-9.3%	6.8%
Medium	-15.9%	-16.2%	-17.0%	-41.9%
Large	-6.2%	-6.2%	-10.8%	-21.1%
Full Sample	**-11.7%**	**-14.3%**	**-11.5%**	**-12.8%**
*** Covid follow up survey 1 (June-July 2020); follow up survey 2 (November 2020 to January 2021)**				

Unsurprisingly there is a substantial reduction in employment reported by firms both in the round 1 survey and the round 2 survey. Losses in female employment are almost invariably higher than for overall employment at the time of round 1 surveys and higher for all countries other than El Salvador at the time of round 2. In El Salvador small firms have suffered greater losses in employment than larger ones but in all of the other three countries employment in medium sized firms has been hit hardest.

Table 2 reports a similar analysis but by sector and gender.

Table 2: Change in Employment by Sector and Gender				
(full time permanent employyes compared to December 2019)				
	Covid follow up round 1		Covid follow up round 2	
	All	Female	All	Female
Food	-12.1%	-11.0%	-9.8%	-22.8%
Tobacco	-5.0%	-10.2%	7.6%	-4.8%
Textiles	-12.8%	-15.3%	6.6%	6.0%
Garments	-20.4%	-25.2%	-10.3%	-26.2%
Leather	-15.7%	-16.7%	-4.0%	-15.1%
Wood	-14.0%	-12.0%	-10.8%	-30.0%
Paper	-1.9%	-51.1%	-2.8%	-22.4%
Publishing, printing	-16.3%	-24.4%	-24.8%	-16.6%
Chemicals	3.0%	6.2%	2.1%	4.7%
Plasticds & rubber	2.8%	2.4%	8.5%	6.1%
Non-metallic mineral products	-8.6%	-28.6%	-46.4%	-93.5%
Fabricated metal products	-39.3%	-60.3%	-20.0%	-95.7%
Machinery & equipment	-12.3%	0.0%	-21.0%	-16.7%
Electronics	0.0%	0.0%	23.7%	19.1%
Transport machinery	-18.0%	0.0%	-15.4%	-8.0%
Furniture	-20.6%	-24.0%	-18.5%	-14.3%
Construction	-18.6%	-17.0%	-24.8%	10.7%
Servicing of motor vehicles	-15.9%	-24.0%	-23.4%	-5.7%
Wholesale	-0.5%	-14.5%	-22.0%	-13.0%
Retail	-15.6%	-17.0%	-21.8%	-52.2%
Hotels, restaurants etc	-41.0%	-94.2%	-26.0%	-30.2%
Transport services	-9.4%	-16.8%	-7.7%	-25.0%
IT services	-15.4%	-17.8%	-26.2%	-20.5%
All Sectors	**-11.7%**	**-14.3%**	**-11.5%**	**-12.8%**
*** Covid follow up survey 1 (June-July 2020); follow up survey 2 (November 2020 to January 2021)**				

These data show a huge loss of employment for the hospitality sector at the time of the round 1 survey with an overall reduction of 41% overall and an almost complete loss of female employment. By round 2 these employment reductions were high (26% overall and 30% of females) but less extreme. Other sectors experienced a much greater loss of employment by round 2 – fabricated metal products (which also reported large reductions in employment in round 1) reported an overall reduction of 20% but 96% of females and non-metallic mineral products a loss of 46% overall but 93.5% of females. A number of sectors reported increases in employment compared to before the pandemic – at round 2 these included textiles, chemicals, plastics and rubber and electronics. Media reports have suggested that the effect of Covid-19 on firms is much more sector specific than would be typical for a more normal economic downturn. These data confirm this insight.

There are two important points with respect to the interpretation of Tables 1 and 2. Firstly, the data reports changes in full-time permanent employment. Similar data were not collected for temporary, part-time or casual labour. It is impossible to know but one might expect job security to be weaker for these groups and, if so, these data to under-report the full effect on employment.

A second key point is that the data only includes those firms that survived long enough to report some employment at the time of the two follow up Covid surveys. These surveys did ask firms who participated in the earlier enterprise survey if they had permanently closed as a result of Covid-19. Very few (25 firms) responded accordingly but only 827 firms (58% of the original enterprise sample) completed the round 2 follow up survey. Some of the approximately 600

"missing" firms may have chosen to not co-operate, some may have permanently closed as a result of circumstances unrelated to Covid-19, but it is likely that there were a number of firms which permanently closed as a result of Covid-19 and could not be contacted. The loss of employment from these permanent closures is not included.

Overall, the changes in full-time permanent employment fir surviving firms since December 2019 would have been sufficient to generate serious concern had events been the result of a typical recession. That they are likely to understate the true picture shows that employment (including the impact on gender equality) is an important feature of the economic consequences of the pandemic for Central America.

The surveys allowed us to clearly identify the implications for gender equality in employment. The use of enterprise data to analyse the impact of Covid-19 has many advantages but they do not otherwise identify many key characteristics of employees which would allow a wider discussion of the impact on equality. The original enterprise surveys (but not the Covid-19 follow ups) did contain information on skill categories and the proportion of workers at certain education levels. We calculated the "implied" effect on different categories of employee by, for example, each firm, assuming that they employed workers in the same proportion at the time of the Covid-19 follow up surveys. That is, firms that employed a high proportion of skilled production or university educated workers were assumed to have continued to do so. The results are presented in Appendix 1. In general, they suggest that the least skilled and least educated workers faced marginally smaller reductions in employment than others.

3.3 Other Impact on Labour

As discussed earlier the survey does not provide sufficient evidence to analyse permanent firm closures. In any case the main impact of such closures would be on employment and not on other labour aspects. Temporary workplace closures are different because any loss of labour time is, by definition, not permanent. They do, however, impose substantial costs which must be borne by one or more of employees, firms or the government. Table 3 provides information on temporary closures and the implied loss of labour time. (the number of weeks the firm was closed multiplied by the number of its full-time permanent employees). All of the four sample countries recorded workplace closures at the time of the first Covid-19 survey but only El Salvador and Guatemala reported such closures at the time of the second survey.

Table 3: Total Weeks of Temporary Firm Closures*				
	Round 1 Covid-19 survey		Round 2 Covid-19 survey	
	Average Weeks Closed	Labour Weeks Lost**	Average Weeks Closed	Labour Weeks Lost**
A. By Country and Firm Size				
El Salvador	**6.32**	**213598**	**2.89**	**102291**
small	7.23	20048	2.63	36601
medium	5.22	24614	2.74	49116
large	5.33	168936	3.57	16574
Guatemala	**4.18**	**47756**	**2.92**	**55205**
small	5.03	4639	2.73	32310
medium	3.78	13751	3.13	17205
large	3.41	29366	3.04	5690
Honduras	**7.81**	**46655**		
small	9.31	7582		
medium	6.91	17548		
large	4.63	21525		
Nicaragua	**1.68**	**14350**		
small	2.74	1723		
medium	1.05	2491		
large	0.83	10136		
B. By Sector *				
Food	1.99	8091	3.64	26547
Tobacco	2.83	20696	3.69	25415
Textiles	8.33	34020	2.70	29913
Garments	8.13	102594	5.71	136
Leather	6.00	1315	3.80	671
Wood	4.13	290	0.00	0
Paper	3.80	665	2.50	3990
Publishing, printing	5.61	3603	1.47	2073
Chemicals	2.10	2895	3.60	652
Plastics & rubber	3.44	4770	2.65	2303
Non-metallic mineral products	5.44	6872	0.00	0
Fabricated metal products	7.47	6606	2.17	5705
Machinery & equipment	6.00	4893	1.14	1544
Electronics	6.00	18570	0.00	0
Transport machinery	7.20	1200	3.20	32
Furniture	9.60	11977	2.25	20465
Construction	6.66	8858	4.80	3449
Servicing of motor vehicles	4.34	10179	2.22	4879
Wholesale	3.55	20696	2.60	4750
Retail	5.41	40703	2.69	12239
Hotels, restaurants etc	6.22	7942	3.06	1621
Transport services	2.85	3576	2.62	1672
IT services	7.60	1348	9.33	10940
Full Sample	5.08	322359	2.89	158996
*** El Salvador and Guatemala only at the second Covid survey (November 2020 to January 2021)**				
****Total weeks of full-time permanent employees**				

At the time of the first Covid-19 survey firms for all four countries reported an average temporary closure of just over 5 weeks, implying an overall loss of just over 322,000 labour weeks for the sample. Average firm closures were lowest for Nicaragua (1.7 weeks) and highest for Honduras (7.8 weeks), although the total number of lost labour weeks was highest for El Salvador. The longest average temporary closures were recorded for the textiles and garment sectors (an average of just over 8 weeks in both cases) at the lowest was for the food (just under two weeks). For each country temporary closures were, on average, longest for small firms and mainly shortest for large ones.

At the time of the second survey there were no recorded workplace closures for Honduras or Nicaragua so the data in Table 3 are for El Salvador and Guatemala only. Across both these

countries an average of further temporary closures of 2.9 weeks was reported, with an implied loss of just under 159,000 labour weeks. For El Salvador further closures by the second Covid-19 survey were longer for large firms and for Guatemala longest for medium sized firms. There were no reported further temporary closures for three sectors - wood, non-metallic mineral products and electronics. The highest reported temporary closure was for IT services, but this may reflect the scope for remote working in that sector. Garments and construction were subject to the next highest average periods of closure (5.7 and 4.8 weeks).

Table 4 provides details of furloughs, expressed as a percentage of full-time permanent employees for both all employees and for females. Again, all four countries reported furloughs in the first Covid-19 survey but neither Honduras nor Nicaragua did in the second survey.

Table 4: Workers Furloughed as a % of Full-Time Permanent Employees*				
	Round 1 Covid-19 survey		**Round 2 Covid-19 survey**	
	All	**Female**	**All**	**Female**
A. By Country and Firm Size				
El Salvador	20.2%	18.2%	10.3%	11.7%
small	26.9%	23.4%	6.9%	7.4%
medium	11.3%	9.1%	16.1%	15.8%
large	14.7%	17.8%	9.6%	13.7%
Guatemala	29.9%	21.1%	5.5%	5.4%
small	27.2%	25.9%	6.9%	8.9%
medium	22.4%	17.8%	2.6%	2.2%
large	42.4%	18.1%	7.0%	4.3%
Honduras	24.4%	19.9%		
small	25.9%	20.4%		
medium	24.0%	21.8%		
large	19.9%	13.0%		
Nicaragua	10.9%	10.3%		
small	14.9%	16.0%		
medium	9.3%	8.1%		
large	4.9%	3.2%		
B. By Sector *				
Food	12.2%	10.1%	4.6%	5.1%
Tobacco	9.5%	9.5%	47.6%	56.5%
Textiles	50.5%	12.1%	3.6%	3.1%
Garments	36.8%	41.6%	0.9%	14.9%
Leather	19.0%	20.0%	0.5%	0.0%
Wood	16.8%	8.3%	1.2%	2.9%
Paper	20.0%	25.0%	21.5%	33.9%
Publishing, printing	22.2%	17.7%	5.5%	8.5%
Chemicals	0.9%	0.0%	0.3%	0.3%
Plastics & rubber	13.6%	16.2%	5.6%	2.9%
Non-metallic mineral products	33.1%	29.5%	0.0%	0.0%
Fabricated metal products	29.6%	14.7%	9.2%	7.6%
Machinery & equipment	15.5%	15.4%	42.9%	51.2%
Electronics	0.0%	0.0%	0.0%	0.0%
Transport machinery	27.3%	20.0%	0.3%	0.5%
Furniture	35.9%	24.2%	7.0%	5.9%
Construction	24.0%	20.3%	21.3%	20.7%
Servicing of motor vehicles	16.1%	16.7%	16.1%	11.4%
Wholesale	11.9%	11.1%	2.2%	0.4%
Retail	16.4%	14.3%	5.8%	7.0%
Hotels, restaurants etc	37.6%	37.4%	30.2%	52.3%
Transport services	13.4%	10.4%	6.2%	8.0%
IT services	18.3%	22.1%	1.6%	0.0%
Full Sample	20.9%	17.3%	8.4%	8.8%
*** El Salvador and Guatemala only at the second Covid survey (November 2020 to January 2021)**				

At the first Covid-19 survey the proportion of females furloughed was lower in the sample (17%) than for all employees (21%). The highest proportion of furloughs (for all employees) was recorded for Guatemala (just under 30%) and the lowest for Nicaragua (just under 11%). With the exception of Guatemala, furloughs were more prevalent in small firms. For females the

highest proportion furloughed was again in Guatemala (21%) and the lowest in Nicaragua (10%). At the time of the first survey there was considerable variation in both the proportion of all workers and of females subject to furloughs For all employees the highest furlough rates were for textiles, garments and hospitality and for females garments and hospitality.

At the second Covid-19 survey furloughs were only recorded for El Salvador and Guatemala. El Salvador exhibited a higher proportion of female furloughs (11.7%) than for all employees (10.3%). For Guatemala the portion of females was very slightly lower than for all employees (5.4% against 5.5%). For the two countries combined the proportion of additional furloughs at the round 2 survey was higher for females than for all employees (8.8% compared to 8.4%). Sectors with high rates of furloughs at round 2 included tobacco, machinery and hospitality. For each of these the proportion of females furloughed was significantly higher than for all employees.

Table 5 provides details on the proportion of firms which cut either wages or hours of work or both.

Table 5: proportion of responding firms who cut wages or hours for at least some workers		
	wages	**hours**
A. By Country and Firm Size		
El Salvador	25.4%	32.5%
Small	28.3%	30.0%
Medium	19.5%	32.0%
Large	26.7%	38.1%
Guatemala	34.0%	24.0%
Small	53.3%	26.7%
Medium	25.0%	15.0%
Large	26.7%	33.3%
Honduras	31.6%	40.4%
Small	30.9%	41.8%
Medium	26.1%	34.8%
Large	53.8%	53.8%
Nicaragua	22.9%	29.6%
Small	22.4%	31.0%
Medium	22.2%	32.2%
Large	25.8%	19.4%
Full Sample	**26.3%**	**32.4%**
B. By Sector		
Food	21.0%	32.0%
Tobacco	20.0%	20.0%
Textiles	23.5%	11.8%
Garments	31.3%	29.7%
Leather	10.0%	40.0%
Wood	33.3%	16.7%
Paper	33.3%	16.7%
Publishing, printing	27.3%	36.4%
Chemicals	27.3%	22.7%
Plastics & rubber	10.0%	20.0%
Non-metallic mineral products	40.0%	33.3%
Fabricated metal products	19.0%	19.0%
Machinery & equipment	21.1%	26.3%
Electronics	0.0%	0.0%
Transport machinery	50.0%	50.0%
Furniture	31.4%	45.1%
Construction	35.3%	32.4%
Servicing of motor vehicles	25.5%	27.7%
Wholesale	26.4%	35.8%
Retail	26.0%	38.3%
Hotels, restaurants etc	26.8%	29.3%
Transport services	28.2%	33.3%
IT services	20.0%	0.0%
Full Sample	**26.3%**	**32.4%**

Overall, about 26% of firms reduced the salaries or wages of their employees and almost a third (32.4%) reduced hours of work. Cuts in wages were most prevalent in Guatemala and least common in Nicaragua. Reductions in working hours were most prevalent in Honduras and least used in Guatemala. Wage cuts were most prevalent in some manufacturing sectors (transport, machinery, non-metallic mineral products and garments) and in construction. Reductions in

working hours were also most common in manufacturing (leather, transport, machinery and furniture).

3.4 Enterprise Survivability

Table 6 provides details of the average number of weeks that firm would expect to survive with no sales. By country the average expected survival time varies from just under 8 weeks to just over 9 weeks. This should be compared to temporary firm closures that have already occurred (see Table 3). On average expected further survival times under fresh closures are greater than the length of previous temporary closures but not markedly so. Being able to rely on external finance markedly improves country averages by somewhere between 2 and 4 weeks. The expected times vary considerable by sector with manufacturing (leather, machinery and transport equipment) predicting some of lowest expected survival times. Construction, despite being harder hit by past temporary closures has relatively high projected survival times.

The key point here is that these figures are averages. Compared to past temporary closures it is reasonable to suppose that there would plenty of survivors from another, similar round. However, it is also clear that there would also be a number of non-survivors for which temporary closures would become permanent. Minimum survival times vary by sector from 0 to 8 weeks with no sales and from 0 to 15 weeks with no sales and external finance.

Table 6: Expected survival times of firms		
	Average weeks that firms could survive with:	
	No sales*	No sales + finance**
A. By Country and Firm Size		
El Salvador	**7.69**	**12.29**
small	5.85	12.48
medium	10.05	12.64
large	8.51	11.46
Guatemala	**9.42**	**11.85**
small	9.63	11.05
medium	9.63	13.67
large	8.89	10.87
Honduras	**8.20**	**10.28**
small	9.20	10.45
medium	7.24	10.27
large	7.18	9.50
Nicaragua	**8.53**	**12.69**
small	6.91	7.92
medium	8.06	14.95
large	12.59	14.41
Full Sample	**8.30**	**12.00**
B. By Sector		
Food	6.41	14.38
Tobacco	23.60	15.60
Textiles	7.13	11.44
Garments	7.85	12.08
Leather	4.25	6.71
Wood	5.43	7.33
Paper	8.80	11.20
Publishing, printing	6.23	9.04
Chemicals	6.25	9.00
Plastics & rubber	12.73	13.64
Non-metallic mineral produc	7.06	10.33
Fabricated metal products	7.88	18.82
Machinery & equipment	5.11	7.22
Electronics	11.50	15.00
Transport machinery	4.40	10.80
Furniture	5.23	10.00
Construction	13.12	25.79
Servicing of motor vehicles	6.65	11.87
Wholesale	9.40	12.95
Retail	7.38	9.27
Hotels, restaurants etc	7.39	11.68
Transport services	7.35	10.00
IT services	5.86	8.86
Full Sample	**7.65**	**12.00**
***Keeping the cost structure as it is now, how many weeks would this establishment be able to remain open if its sales stopped as of today?**		
****How many additional weeks this establishment could continue paying all costs and payments (such as payroll, suppliers, taxes or loan repayment) relying on external sources of finance that this establishment has access to?**		

Table 7 examines changes in the value of firm sales from the time of the second Covid-19 survey (mainly November and December 2020) and the same month in 2020. Overall, the (unweighted) average change in sales for firms was a reduction of just under one quarter of their sales one year previously. Several sectors had a majority of firms whose sales were 50% or lower than one year previously – garments, wood, furniture and hospitality. In general, small firms faced proportionately larger losses of sales than larger ones. At the country level the average proportionate change in sales was comparable for three of the four countries but markedly higher for Honduras.

Two sectors exhibited a modest average gain in sales – tobacco and electronics. All other sectors recorded and average reduction in sales. Particularly large average reductions (39% or more) were recorded for garments, wood, construction and hospitality.

Table 7: changes in firm sales		
Average percentage change in firm sales compared to same month in 2019*		
	Unweighted	**Sales weighted**
A. By Country and Firm Size		
El Salvador	**-23.3%**	-9.8%
small	-31.4%	-12.6%
medium	-18.4%	-10.0%
large	-12.9%	-9.6%
Guatemala	**-24.0%**	**-10.3%**
small	-34.8%	-30.5%
medium	-22.6%	19.4%
large	-10.3%	-17.7%
Honduras	**-33.7%**	**-26.3%**
small	-39.7%	-23.6%
medium	-29.6%	-23.1%
large	-23.3%	-31.2%
Nicaragua	**-22.9%**	**3.4%**
small	-37.8%	-23.6%
medium	-15.5%	-4.6%
large	-16.0%	5.1%
Full Sample	-24.8%	-4.4%
B. By Sector		
Food	-19.5%	-5.3%
Tobacco	4.5%	8.0%
Textiles	-14.8%	-11.5%
Garments	-45.9%	-27.2%
Leather	-31.0%	-1.5%
Wood	-42.0%	-29.9%
Paper	-16.4%	5.3%
Publishing, printing	-33.2%	-33.2%
Chemicals	-7.5%	8.6%
Plastics & rubber	-4.8%	0.7%
Non-metallic mineral products	-28.2%	-9.0%
Fabricated metal products	-12.1%	-13.8%
Machinery & equipment	-36.3%	8.3%
Electronics	10.0%	18.0%
Transport machinery	-18.8%	-25.0%
Furniture	-26.5%	-15.3%
Construction	-39.2%	-56.8%
Servicing of motor vehicles	-24.6%	-28.5%
Wholesale	-15.5%	-6.8%
Retail	-22.9%	-1.1%
Hotels, restaurants etc	-49.5%	-45.1%
Transport services	-14.8%	-3.5%
IT services	-32.5%	-32.1%
Full Sample	-24.1%	-4.4%
*** from the second covid follow up survey conducted from**		
November 2020 to January 2021		

3.5 Government Support

Across the full sample just over three quarters of firms had neither received nor expected to receive government support. Firms with some foreign ownership were substantially less likely to have received or to be expecting to receive government support. A much higher proportion of firms (almost 40%) in El Salvador had either received or expected to receive government support. This compares to 15% in Guatemala, just over 10% in Honduras and just over 6% in Nicaragua. A number of sectors which reported proportionately large falls in sales (Table 7) – garments, wood, construction and hospitality – had varying degrees of support. Of firms in the garment sector fewer than the overall average (68% compared to 77%) had neither received nor expected to receive support. Firms in construction (82%), wood (87.5%) were more likely to not receive or expect support and firms in hospitality were only marginally less likely to be non-recipients (72%).

Table 8: Recipients of Government Support (at time of second Covid survey)			
	Support		
	Received	Expected	Neither
Full Sample	**19.2%**	**4.0%**	**76.8%**
wholly domestic owned	20.4%	4.5%	75.1%
foreign owned (part or full)	12.7%	1.6%	85.7%
female top manager	20.0%	3.4%	76.6%
male top manager	19.0%	4.1%	76.9%
A. By Country and Firm Size			
El Salvador	**32.7%**	**7.2%**	**60.2%**
small	32.5%	9.8%	57.7%
medium	51.0%	6.9%	42.2%
large	10.7%	2.4%	86.9%
Guatemala	**12.4%**	**2.6%**	**85.0%**
small	13.3%	0.0%	86.7%
medium	12.2%	2.0%	85.7%
large	11.4%	6.8%	81.8%
Honduras	**9.5%**	**0.9%**	**89.7%**
small	0.0%	0.0%	100.0%
medium	17.0%	2.1%	80.9%
large	23.1%	0.0%	76.9%
Nicaragua	**5.0%**	**1.1%**	**93.9%**
small	6.8%	0.0%	93.2%
medium	2.2%	2.2%	95.5%
large	9.4%	0.0%	90.6%
B. By Sector			
Food	21.6%	6.9%	71.6%
Tobacco	0.0%	0.0%	100.0%
Textiles	23.1%	3.8%	73.1%
Garments	24.0%	8.0%	68.0%
Leather	12.5%	25.0%	62.5%
Wood	0.0%	12.5%	87.5%
Paper	0.0%	0.0%	100.0%
Publishing, printing	32.3%	3.2%	64.5%
Chemicals	20.0%	4.0%	76.0%
Plastics & rubber	16.7%	0.0%	83.3%
Non-metallic mineral produc	12.5%	12.5%	75.0%
Fabricated metal products	11.8%	0.0%	88.2%
Machinery & equipment	33.3%	0.0%	66.7%
Electronics	0.0%	0.0%	100.0%
Transport machinery	20.0%	20.0%	60.0%
Furniture	24.3%	5.4%	70.3%
Construction	14.7%	2.9%	82.4%
Servicing of motor vehicles	9.8%	4.9%	85.4%
Wholesale	14.5%	1.8%	83.6%
Retail	20.5%	1.9%	77.6%
Hotels, restaurants etc	25.0%	2.8%	72.2%
Transport services	17.1%	2.4%	80.5%
IT services	14.3%	0.0%	85.7%

The reasons for not receiving government support are set out in Table 9. A lack of awareness of the available support was modest (less than 20% of firms) for El Salvador and Guatemala but more substantial in Honduras (31%) and Nicaragua (24%). Nearly 30% of firms in El Salvador but much lower proportions in Honduras and Nicaragua were ineligible for support. An important reason in both El Salvador and Guatemala was that firms had no need for support.

Table 9 : Reasons for not receiving government support (% of firms)				
	El Salvador	Guatemala	Honduras	Nicaragua
Not aware	17.6%	12.3%	30.8%	24.3%
Too cumbersome or costly to apply	10.0%	13.8%	7.7%	3.0%
Not eligible	29.5%	12.3%	5.8%	2.4%
Do not expect to get it because of lacking right connections	2.4%	1.5%	6.7%	10.7%
Applied but not received it	7.6%	7.7%	5.8%	3.0%
No need of support	24.8%	38.5%	15.4%	15.4%
Other reason	4.8%	13.1%	26.0%	39.6%
Non-response	3.3%	0.8%	1.9%	1.8%

Table 10 summarises enterprise responses to the most needed support measures. Tax reductions or deferrals were by far the most preferred option in all countries other than El Salvador (and still the second most popular option there). Access to new credit was the most preferred option in El Salvador but more of a minority choice in the other countries. In none of the countries were either wage subsidies or technical support popular choices by enterprises.

Table 10: What would be the most needed government measures to support this business over the COVID-19 crisis? (Round 2 survey)	
	% of respondents
El Salvador	
Cash Transfer	11.9%
Deferral of credit payments, utility bills, rent or mortgage, suspension of interest payments, or rollover of debt	11.6%
Access to new credit	32.2%
Tax reductions or tax deferrals	24.3%
Wage subsidies	10.6%
Support (technical assistance or subsidies) for adoption of digital technologies	4.7%
Other	4.7%
Guatemala	
Cash Transfer	5.9%
Deferral of credit payments, utility bills, rent or mortgage, suspension of interest payments, or rollover of debt	10.2%
Access to new credit	18.2%
Tax reductions or tax deferrals	44.9%
Wage subsidies	7.0%
Support (technical assistance or subsidies) for adoption of digital technologies	4.3%
Other	9.6%
Honduras	
Cash Transfer	8.3%
Deferral of credit payments, utility bills, rent or mortgage, suspension of interest payments, or rollover of debt	14.0%
Access to new credit	10.2%
Tax reductions or tax deferrals	55.4%
Wage subsidies	4.5%
Support (technical assistance or subsidies) for adoption of digital technologies	3.8%
Other	3.8%
Nicaragua	
Cash Transfer	5.3%
Deferral of credit payments, utility bills, rent or mortgage, suspension of interest payments, or rollover of debt	15.0%
Access to new credit	15.0%
Tax reductions or tax deferrals	56.1%
Wage subsidies	3.2%
Support (technical assistance or subsidies) for adoption of digital technologies	0.5%
Other	4.8%

3.6 Liquidity and Credit

As enterprises in the sample of Central American firms typically experienced significant reductions in sales revenues (Table 7) an inevitable consequence is that they face a loss of liquidity, affecting the

ability of firms to survive the Covid-19 crisis. Table 11 shows that nearly 60% of firms experienced a decrease in liquidity. A much lower proportion of firms with some foreign ownership (48%) experienced a decrease in liquidity. In each of the four countries small firms were much more likely to face decreases in liquidity than larger ones. A very high proportion of firms experienced decreased liquidity in publishing and printing, transport machinery, wood and paper. No firms in the tobacco or electronics sectors reported decreased liquidity. Of the service sectors hospitality had by far the highest proportion of firms (70%) who experienced decreased liquidity.

Table 11: Changes in liquidity since the outbreak of Covid-19 (% of firms)*			
	Liquidity		
	Increased	Same	Decreased
Full Sample	10.9%	29.8%	59.3%
wholly domestic owned	10.4%	28.2%	61.4%
foreign owned (part or full)	13.6%	38.4%	48.0%
female top manager	11.0%	26.7%	62.3%
male top manager	10.9%	30.5%	58.6%
A. By Country and Firm Size			
El Salvador	12.9%	26.4%	60.6%
small	9.8%	20.7%	69.5%
medium	11.9%	27.7%	60.4%
large	20.5%	36.1%	43.4%
Guatemala	11.1%	31.4%	57.5%
small	3.3%	28.3%	68.3%
medium	16.3%	34.7%	49.0%
large	15.9%	31.8%	52.3%
Honduras	8.7%	25.2%	66.1%
small	3.6%	19.6%	76.8%
medium	15.2%	26.1%	58.7%
large	7.7%	46.2%	46.2%
Nicaragua	8.3%	37.8%	53.9%
small	5.1%	30.5%	64.4%
medium	11.2%	33.7%	55.1%
large	6.3%	62.5%	31.3%
B. By Sector			
Food	11.8%	30.4%	57.8%
Tobacco	0.0%	100.0%	0.0%
Textiles	19.2%	34.6%	46.2%
Garments	4.0%	20.0%	76.0%
Leather	0.0%	25.0%	75.0%
Wood	0.0%	12.5%	87.5%
Paper	20.0%	0.0%	80.0%
Publishing, printing	0.0%	10.0%	90.0%
Chemicals	28.0%	40.0%	32.0%
Plastics & rubber	0.0%	58.3%	41.7%
Non-metallic mineral products	12.5%	18.8%	68.8%
Fabricated metal products	17.6%	11.8%	70.6%
Machinery & equipment	0.0%	22.2%	77.8%
Electronics	0.0%	100.0%	0.0%
Transport machinery	0.0%	0.0%	100.0%
Furniture	8.1%	27.0%	64.9%
Construction	14.7%	23.5%	61.8%
Servicing of motor vehicles	12.2%	31.7%	56.1%
Wholesale	12.8%	35.8%	51.4%
Retail	11.3%	33.1%	55.6%
Hotels, restaurants etc	10.8%	18.9%	70.3%
Transport services	14.6%	34.1%	51.2%
IT services	0.0%	57.1%	42.9%
*** at time of second Covid survey**			

Credit is an obvious response to a temporary lack of liquidity and equally obviously enables firms to survive, thereby sustaining higher levels of employment than would otherwise be the case. Appendix 2 provides details of average changes in debt between January and September 2020. Across the full

sample the average effect was an increase in debt of 6.3% but there were important variations. Firms with some foreign ownership reported no change in their debt. Smaller firms typically reduced their debt over this period. It is not immediately apparent why this was so. Although it is not a topic covered in this paper it would be interesting to know if this reflected decisions by small firms to reduce leverage or decisions by lenders based on perceptions of increased risk arising from the pandemic.

As Table 12 shows a significant proportion of firms (32%) applied for a loan since the outbreak of the pandemic. In Guatemala and Nicaragua (and to some extent in Honduras) the proportion of small firms applying for a loan was much lower than that of larger firms. Sectors with a high proportion of firms applying for loans included the manufacture of paper and transport machinery (60% in both cases).

Table 12: Proportion of Firms Applying for a loan (since the outbreak of Covid-19)	
Full Sample	31.9%
wholly domestic owned	33.3%
foreign owned (part or full)	24.0%
female top manager	32.2%
male top manager	31.8%
A. By Country and Firm Size	
El Salvador	39.0%
small	39.3%
medium	38.4%
large	39.0%
Guatemala	26.3%
small	15.9%
medium	30.6%
large	36.4%
Honduras	38.3%
small	28.6%
medium	52.2%
large	30.8%
Nicaragua	19.0%
small	10.2%
medium	21.6%
large	28.1%
B. By Sector	
Food	28.2%
Tobacco	0.0%
Textiles	23.1%
Garments	34.7%
Leather	12.5%
Wood	12.5%
Paper	60.0%
Publishing, printing	32.3%
Chemicals	48.0%
Plastics & rubber	33.3%
Non-metallic mineral products	6.3%
Fabricated metal products	44.4%
Machinery & equipment	44.4%
Electronics	0.0%
Transport machinery	60.0%
Furniture	31.4%
Construction	26.5%
Servicing of motor vehicles	35.0%
Wholesale	37.6%
Retail	32.1%
Hotels, restaurants etc	32.4%
Transport services	24.4%
IT services	28.6%

Appendix 3 provides a summary of the main reasons for not applying given by those firms who did not seek a loan and the outcome of the application for those that did. Unsurprisingly the most common reason for non-application was that firm had no need. Small but non-trivial proportions of firms did not apply because of complex procedures, a belief that the application would not succeed or that interest rates were unfavourable. In three of the four countries 75% or more of loan

applications were approved in full or in part. The exception – El Salvador – had 45% of applications still in progress at the time of the second Covid-19 follow up survey.

3.7 Key Obstacles to Business

Table 13 presents the responses by firms to potential obstacles to doing business in the original enterpriser surveys. That is, they reflect problems perceived by business before the outbreak of Covid-19. It is likely that such problems have not been since eliminated and co-exist with those added by the pandemic.

Table 13: Perceived main obstacles to business (average scores)					
	El Salvador	**Guatemala**	**Honduras**	**Nicaragua**	**All countries**
Electricity supply	1.2	1.1	2.0	1.5	1.4
Telecommunications	1.0	1.1	1.6	1.1	1.1
Transport	1.2	1.6	1.6	1.0	1.3
Customs	1.1	1.5	1.8	1.3	1.3
Access to land	0.9	1.2	1.0	0.6	0.9
Crime, theft and disorder	2.1	2.1	1.8	0.8	1.8
Access to finance	1.3	1.3	1.5	1.0	1.3
Tax rates	1.8	1.7	2.6	1.3	1.8
Tax administration	1.4	1.5	2.2	1.2	1.6
Business licensing	1.2	1.4	2.0	1.2	1.4
Political instability	2.1	2.6	2.2	1.3	2.1
Corruption	2.1	2.9	2.5	1.6	2.3
Courts	1.6	2.0	2.0	1.2	1.7
Labour regulations	1.1	1.6	1.6	1.1	1.3
Taken from the original enterprise survey					
No obstacle = 0					
Minor obstacle = 1					
Moderate obstacle = 2					
Major obstacle = 3					
Very Severe Obstacle = 4					

Reading down the columns shows that, in each country, political instability and corruption were rated as amongst. the most serious obstacles to business overall. In El Salvador and Guatemala crime was relatively highly rated. In Guatemala and Honduras, the courts were ranked as one of the higher obstacles and tax (rates and administration) were perceived as a problem in Honduras. Overall, these responses suggest that the capacity of local institutions to safely see firms through the Covid-19 crisis may be imperfect.

3.8 Summary of key stylised facts for Central America

It is impossible to tell for certain from the available data but there were a large number of "missing" firms from the original enterprise surveys when both Covid-19 follow ups were conducted. It is likely that Covid-19 did result in a significant number of firm closures, with a resulting loss of employment. For those firms that did survive there were significant reductions in employment, and this were greater for females than for all employees. Unsurprisingly retail and hospitality recorded larger than average employment losses as did several manufacturing sectors.

The effects on labour markets were not restricted to employment. Workplace closures were associated with large numbers of lost labour weeks and a high number of workers furloughed. Presumably furloughs were linked to temporary closures, but these would, at best, affect the sharing of the cost of lost labour weeks not the total loss. A substantial minority of firms either cut wages of working hours or both.

Firms' predictions of the number of weeks that they would survive without sales are, on average, longer than the average length of temporary closures. It is clear that many firms could survive further temporary closures, but it is also clear that this is far from the case for all firms.

On average firm have lost about 24% of their sales since December 2019, much higher for sectors such as construction, garments and hospitality. Unsurprisingly, close to 60% of firm report a decrease in liquidity as a result of Covid-19.

Ultimately a loss of liquidity threatens the survival of firms. There are two main routes by which firms can survive without sufficient sales – government support or private finance. Nearly 77% of our sample had neither received nor expected to receive government support. Some sectors, of course, do not need support but sectors such as construction and hospitality which faced large sales losses have average or greater than average proportions of firms without support.

About one third of firms in the sample applied for loans, of which more than one half were approved in full in three of the four countries. The exception (El Salvador) had more than 40% of applications still under consideration. A majority of firms did not apply for loans because they did not need them. Overall, Covid-19 must have increased the risk faced by lenders but there is evidence that finance has been available to a significant proportion of applicants. It is less clear that the same could be said of government support.

Firms, when asked in the Round 2 survey, most consistently ranked tax reductions or deferrals as a preferred means of government support. In the earlier enterprise surveys, they identified political instability and corruption as the most serious obstacles to business.

Overall, the Covid-19 crisis is still temporary even if deeper and more prolonged than any recent economic downturn. The focus of the paper on labour and, in particular, employment means that the hoarding of labour by firms is key. This, in turn, requires firms to be able to survive in presence of significantly reduced sales. The demand for labour is a derived demand and a key strength of firm level data is that it makes clear the link between firm survival and labour demand.

4. METHODOLOGY

The idea that one tests a clearly specified and detailed theoretical model although sound in principle has long been impractical. For some time the empirical researcher has needed to do more to estimate the underlying data generating process. This is particularly the case for the effects of Covid-19 on firms. Much of the available information is anecdotal. Since it is unprecedented in living memory there is neither a clearly specified theory nor a substantial body of previous research on which to base an empirical specification. In consequence this study adopts a general to specific approach – see Campos et al (2005) – which has been widely used elsewhere. In so doing we note, from Hoover and Perez (1999) that general to specific modelling is both distinct from and, in many circumstances, a superior approach compared to data mining.

In practice this meant including a long list of variables in our first specification from original enterprise surveys, follow-up Covid-19 enterprise surveys, data on government containment measures and medical data on morbidity and mortality. Those variables that were found to be jointly statistically insignificant were eliminated leaving a specific model. It is these specific models that are reported throughout. In some cases variables that are individually statistically insignificant are reported. The reason is that they were jointly significant with one or more other variables.

Our initial approach was to specify OLS regression models for each of four key dependent variables:

- The number of weeks that the firm would expect to survive with no sales

- The percentage change in firm sales (from 2019)
- The percentage change in full-time permanent employees from December 2019
- The percentage change in the share of females in full-time permanent employment (also from December 2019)

Each specification was tested for heteroskedasticity and, where necessary, robust standard errors used.

However, separate OLS regressions do not perhaps provide the best representation of what theory is available. Labour is a derived demand. For example, government containment measures affect the sales of the enterprise in the first instance. This leads to a change in the labour demand by the enterprise. To better capture this process estimates using a Seemingly Unrelated Regression Equations (SURE) model were used – see Zellner (1963). Firstly, a two equation model with the proportionate change in sales as the first dependent variable and the proportionate change in full-time permanent employment as the second dependent variable. A second two equation model was also estimated with, again, the percentage change in sales as the first dependent variable and the percentage change in the share of females in full-time permanent employment as the second.

One methodological limitation of regression models with surveys of individual enterprises is that such data is prone to heterogeneity and, hence, a risk of sample selection bias. One solution to this is to use a matching estimator as, at least, a robustness check. In this study we used the Inverse Probability Weighted Regression Adjustment (IPWRA) estimator – Cattaneo (2010) and Cattaneo et al (2013. This model allows for more than one treatment variable. In practice more than two is unduly complex but two treatments enables interactions between them to be modelled. The model, like most matching estimators, estimates a treatment model which estimates the probability of observing the treatment given different characteristics of relevance. The inverse probabilities resulting are then used as weights for a regression model of the outcome variable.

The IPWRA estimator has been shown to have some important properties. Hirano et al (2003) showed that IPRWA is a "doubly robust" estimator. That is, if either one of the treatment or outcome models is incorrectly specified then it remains a consistent estimator. Of course, if both are incorrectly specified it is not. It was also shown by King and Nielsen (2019) that the IPWRA estimator had lower bias than alternatives.

In this study IPWRA was used as a robustness check on, in particular, the effects of a number of independent variables that were often found to be not statistically significant in the regression models. The two (0,1) treatment variables in each case were:

- The firm had started or increased (a) online sales and (b) remote working.
- The firm experienced (a) decreased liquidity and (b) increased debt.
- (a) some foreign ownership and (b) a female top manager.

5. REGRESSION ANALYSIS

5.1 OLS Regression

Table 14 presents the results of OLS regressions for four key dependent variables:

- The number of weeks that firms would expect to survive if they were to have no sales. This gives a measure of the vulnerability of the firm to permanent closure and, hence, loss of employment
- The percentage change in sales from 2019. This variable is a measure of changes in demand for the final product or service, relevant since labour is a derived demand,
- The percentage change in full-time permanent employees since December 2019, measured at the time of the second Covid-19 survey.
- The percentage change in the share of females in full-time permanent employment since December 2019.
- Employment losses in the sample. The share is used to assess potential gender bias in these losses.

The estimation followed a general to specific approach and it is the results of the specific that are reported. The results include some variables that were not individually significant but were found to be jointly significant with other variables that were similarly insignificant on an individual basis.

Table 14: OLS Regression Results

Dependent variable	expected weeks of survival with no sales			% change in sales since 2019			% change in FT permanent employees since Dec 2019			% change in the share of females in FT permanent employment		
Independent variables	**Coefficient**	**Robust Std. Err.**	**t**	**Coefficient**	**Robust Std. Err.**	**t**	**Coefficient**	**Robust Std. Err.**	**t**	**Coefficient**	**Robust Std. Err.**	**t**
% change in sales since 2019	0.019*	0.010	1.81				0.003***	0.001	4.99	0.002	0.002	1.37
expected weeks of survival with no sales				0.200**	0.093	2.15	0.002*	0.001	1.6			
% change in FT permanent employment since Dec. 2019	1.342	0.954	1.41	14.120***	3.181	4.44				-0.197**	0.103	-1.91
% change in debt Jan-Sept 2020	-2.966***	1.101	-2.69							0.039	0.045	0.86
% of foreign ownership				0.085**	0.040	2.12				0.005	0.007	0.71
started or increased delivery (0,1)	-1.868*	1.061	-1.76				7.795	2.726	2.86	-0.102	0.145	-0.70
started or increased online sales (0,1)										0.183	0.182	1.00
female top manager (0,1)	-1.604*	0.942	-1.70							0.073	0.088	0.83
online salres as a % of total sales	0.040	0.033	1.23	-0.180***	0.063	-2.83				0.003	0.003	1.03
no government support (0,1)	2.101*	0.767	2.74									
firm applied for loan (0,1)							0.051	0.041	1.23			
exports as a % of total sales							0.001	0.000	1.56	-0.003	0.005	-0.69
number of weeks closed				-1.468***	0.208	-7.04						
proportion of employees furloughed	-2.242*	1.183	-1.89	-15.707***	4.289	-3.66	0.452**	0.230	1.97			
labour inensity - labour as a share of total cost	2.991**	1.443	2.07							-0.046	0.164	-0.28
containment and health index										-0.041	0.041	-1.00
government workplace closures - stringency	-9.862**	4.672	-2.11	15.527**	7.444	2.09	0.185**	0.094	1.96	-0.289*	0.171	-1.69
stay home restrictions - stringency				-15.781***	4.608	-3.42				0.588	0.444	1.32
closures of public transport - stringency				-46.252***	10.951	-4.22				0.392	0.362	1.08
total Covid-19 cases per million	0.004*	0.002	1.84				-0.00004**	0.000	-2.12			
total Covid-19 deaths per million	-0.067	0.046	-1.46	0.148***	0.045	3.27				0.008	0.007	1.06
transport machinery sector (0,1)	-5.551***	0.826	-6.72									
transport sector (0,1)	1.938	1.266	1.53	19.436***	5.542	3.51						
IT services sector (0,1)	-6.490	2.237	-2.90									
garments sector(0,1)							-0.149**	0.058	-2.58			
chemicals sector (0,1)				15.396**	7.252	2.12						
rubber and plastics sector (0,1)				22.680***	7.508	3.02						
non-metallic mineral products sector (0,1)										1.115*	0.662	1.68
constant	2.434	1.821	1.34	-32.045***	3.469	-9.24	-0.029	0.043	-0.67	0.163	0.430	0.38
Number of observations	386			618			626			285		
F	2.81	(15, 370)		10.03	(16, 601)		11.64	(8, 617)		1.76	(17, 267)	
Prob > F	0.0004			0			0			0.0338		
R-squared	0.1022			0.2107			0.1312			0.1006		
Adj R-squared	0.0658			0.1897			0.1199			0.0433		
Root MSE	9.468			31.104			0.42401			0.91075		

Note: * significant at 90% confidence, ** at 95% and ** 99%

The expectations of firms to the length of their survival time without sales were found to be related to a number of variables. Expected survival time was found to be positively related to the change in sales, as one might expect, but this effect was only significant at 90% confidence levels and of a small magnitude. A much more powerful and statistically significant (at 99% confidence) was the negative effect of changes in debt. It suggests that increases in debt as a consequence of Covid-19 substantially reduce the length of time that firms believe they can survive. Two further variables which have a negative effect, but which are only statistically significant at 90% confidence were (a) developing online delivery and (b) a female top manager. It is not clear whether the latter effect reflects either greater pessimism amongst female top managers or whether their firms face a tougher reality than those of males. Another strong and statistically significant effect on expected survival is the stringency of government workplace closures. Unsurprisingly the tougher government closures the lower is the expected firm survival time.

As one might expect the change in sales was statistically significantly and positively correlated (at 99% confidence) with both expected survival times and changes in employment. The causality, of course, is likely to be from sales changes to labour changes or survival expectations. Foreign ownership was found to have a modest but statistically significant (95%) positive effect on the change in sales. As one might expect there are negative and statistically significant correlations between sales changes and (a) the number of weeks the firm was closed and (b) furloughs. Both, almost by definition, should be associated with fewer sales. More quixotic is the relationship between different government containment measures and sales. In general, one would expect to find the tougher government restrictions the worse firm sales. The results suggest this to be the case for stay-at-home restrictions and public transport closures, both of which have negative and statistically significant (at 99%) coefficients. A perverse result is that the coefficient for workplace closures is positive and significant.

As expected the effect of a change in sales on the change in employment was found to be positive and statistically significant (at 99% confidence) but the magnitude was lower than expected. The coefficient for the share of workers furloughed was positive, statistically significant and of some magnitude. This suggests that furloughs have been effective in helping to preserve employment.

The regression for the share of females in employment was statistically complex. The results include a number of variables that were individually statistically insignificant but which are jointly significant. The likely explanation is that many of these variables interact – for example, stay at home restrictions, online sales and delivery – and are multicollinear. This notwithstanding the main variables affecting the share of females in employment are those one would expect – the change in overall employment and workplace closures. The effect of employment changes on the share of females was negative and statistically significant (at 95% confidence). This suggests that losses in employment have fallen more heavily on males and had the effect of modestly increasing the share of females. It is likely that this has been driven by gender segregation and the fact that a number of manufacturing sectors having been hard hit. Government workplace closures also had a negative and statistically significant effect on the share of females. Again, this is likely to be related to gender segregation with services being more prone to closures.

5.2 Seemingly Unrelated Regression Equations (SURE)

The OLS regression results suggest that that the change in firm sales is an important determinant of the change in employment. This is not a remarkable proposition. Covid-19 typically resulted in a decrease in sales (fall in product demand) which resulted in a loss of liquidity. This, in turn, resulted in a loss of employment (fall in labour demand). For these reasons a two equation SURE model was used to provide some more complete insights.

Table 15 reports the results of the SURE model linking the proportionate change in sales with the proportionate change in full-time permanent employees. As with the OLS regressions the results reported are those after working from general to specific.

Table 15: SURE Estimation for changes in sales and employment

	Observations	**RMSE**	**"R-squared"**	**chi2**	**P**
% change in sales since 2019	615	31.2941	0.1782	133.61	0.000
% change in FT permanent employment	615	0.4233	0.1305	96.64	0.000
(since December 2019)					
	Coefficient	**Std. Err.**	**z**	**P>z**	
(a) '% change in sales since 2019					
expected weeks of survival with no sales	0.233*	0.125	1.86	0.063	
started or increased deliveries (0,1)	7.685***	2.725	2.82	0.005	
% of foreign ownership	0.088**	0.041	2.15	0.032	
share of online sales in total	-0.172***	0.067	-2.56	0.010	
number of weeks of tenporary closure	-1.622***	0.226	-7.17	0.000	
% of workers furloughed	-9.560**	4.301	-2.22	0.026	
stringency of govt workplace closures	17.557*	9.872	1.78	0.075	
stringencey of stay at home restrictions	-17.193***	5.955	-2.89	0.004	
extent of public transport closures	-50.386***	13.491	-3.73	0.000	
total Covid-19 deaths per million	0.155***	0.049	3.18	0.001	
chemicals sector (0,1)	16.573**	7.559	2.19	0.028	
plastics and rubber sector (0,1)	23.315**	10.605	2.2	0.028	
transport sector (0,1)	18.890**	8.885	2.13	0.033	
constant	-34.324***	3.769	-9.11	0.000	
(b) '% change in FT permanent employment					
expected weeks of survival with no sales	0.002	0.002	1.1	0.271	
% change in sales since 2019	0.003***	0.001	5.64	0.000	
firm applied for loan (0,1)	0.049	0.037	1.31	0.190	
exports as a % of total sales	0.001	0.001	1.05	0.296	
% of workers furloughed	0.458***	0.057	7.99	0.000	
stringency of govt workplace closures	0.183	0.123	1.48	0.138	
total Covid-19 cases per million	-0.00004*	0.000	-1.79	0.073	
garments sector (0,1)	-0.153**	0.069	-2.21	0.027	
constant	-0.021	0.048	-0.43	0.667	
Note: * significant at 90% confidence, ** at 95% and ** 99%					

For the change in sales the following variables exhibited a positive and statistically significant positive effect: developing deliveries, foreign ownership. The following variables had a statistically significant negative effect: the share of online in total sales, temporary closures, furloughs, stay at home restrictions and public transport closures. Most of these are as one might expect but the negative effect of online sales presumably reflects the difficulties of the retail sector. The equation for the change in sales repeats the perverse result of the OLS equation of a positive effect on the change in sales of the level of stringency of government workplace closures.

For the change in employment, as with the OLS equation the main statistically significant effects are positive – for the change in sales and the proportion of workers furloughed. As before they suggest that improved sales and furloughs save jobs.

Since the effects on gender equality are an important feature of this study a second SURE model was estimated, linking the change in firm sales to the change in the share of females in the share of full-time permanent employees of the enterprise. As before the underling reasoning is the link between product demand and labour demand. The proportionate change in the share of females in employment was used rather than changes in the number of females, in order to identify any gender biases involved. Again, the results after working from general to specific are reported in Table 16.

Table 16: SURE Estimation for changes in sales and the share of females in employment

	Observations	**RMSE**	**"R-squared"**	**chi2**	**P**
% change in sales since 2019	302	29.747	0.210	80.650	0.000
% change in female share in employment	302	0.872	0.087	28.190	0.003
(since December 2019, FT permanent employees)					
	Coefficient	**Std. Err.**	**z**	**P>z**	
(a) '% change in sales since 2019					
expected weeks of survival with no sales	0.218	0.167	1.31	0.19	
started or increased deliveries (0,1)	10.5765***	3.823	2.77	0.01	
% of foreign ownership	0.067	0.064	1.04	0.30	
share of online sales in total	-0.194**	0.097	-2.00	0.05	
number of weeks of tenporary closure	-2.221***	0.414	-5.37	0.00	
% of workers furloughed	-11.818*	6.353	-1.86	0.06	
stringency of govt workplace closures	20.128	15.445	1.30	0.19	
stringencey of stay at home restrictions	-21.220**	8.913	-2.38	0.02	
extent of public transport closures	-61.621***	19.831	-3.11	0.00	
total Covid-19 deaths per million	0.1999***	0.070	2.84	0.00	
chemicals sector (0,1)	27.697***	10.860	2.55	0.01	
plastics and rubber sector (0,1)	39.221***	15.521	2.53	0.01	
transport sector (0,1)	27.660**	11.596	2.39	0.02	
constant	-36.796***	5.570	-6.61	0.00	
(b) '% change in the share of females in FT permanent employment					
% change in full-time permanent employees	-0.200	0.128	-1.57	0.12	
% change in sales since 2019	0.002	0.002	1.00	0.32	
% change in debt (January to September 2020)	0.058	0.084	0.69	0.49	
Online sales as a % of total	0.216**	0.104	2.08	0.04	
% of foreign ownership	0.005**	0.002	2.43	0.02	
exports as a % of total sales	-0.003	0.002	-1.33	0.19	
overall containment index	-0.035	0.029	-1.18	0.24	
stringencey of stay at home restrictions	0.363	0.271	1.34	0.18	
stringency of restrictions on internal movement	-0.297*	0.160	-1.86	0.06	
total Covid-19 deaths per million	0.007	0.004	1.59	0.11	
non-metallic mineral products sector (0,1)	0.793**	0.369	2.15	0.03	
constant	0.083	0.314	0.26	0.79	
Note: * significant at 90% confidence, ** at 95% and ** 99%					

Since the equation for the change in sales yields similar conclusions to both the OLS regression and that in the preceding SURE model no further comment is offered. As with the OLS regression there are a number of variables in the female share equation that are collinear and, hence, individually insignificant but jointly significant. Surprisingly the change on employment is not statistically significant at 90% or higher confidence but it is negative and only just outside (significant at 88% confidence). Both online sales and foreign ownership were found to be both positive and statistically significant at 95% confidence.

6. INVERSE PROBABILITY WEIGHTED REGRESSION ADJUSTMENT (IPWRA)

As is often the case with enterprise surveys there is a likely problem with heterogeneity and hence potential sample selection bias. For this reason we used a matching approach (IPWRA) as a robustness check on several important conclusions arising from the regression analysis. Table 17 reports the results of the IPWRA analysis of the effects of (a) new or increased online sales and (b) new or increased remote working on, firstly, the expected survival times of firms and, secondly, the proportionate change in sales of the enterprise.

Table 17: IPWRA Analysis for online sales and remote working

IPWRA Analysis - started or inreased (a) online sales and (b) remote working				
Outcome		Absolute Effects		
		online sales	remote working	Both
Expected survival with no sales (weeks)	ATT	0.577	2.721**	1.431
	Std Error	(2.028)	(1.283)	(1.003)
		Relative Effects		
		online sales vs. remote	Only online sales vs. both	Only remote working vs both
	ATT	2.736	1.288	-1.496
	Std Error	(2.119)	(1.821)	(1.277)
Outcome		Absolute Effects		
		online sales	remote working	Both
Change in sales from December 2019 (%)	ATT	-0.504	5.736	8.303**
	Std Error	(3.779)	(3.779)	(3.848019)
		Relative Effects		
		online sales vs. remote	Only online sales vs. both	Only remote working vs both
	ATT	5.334	8.856**	5.475
	Std Error	(4.255)	(3.767)	(4.280)
Robust standard errors are in parentheses				
* significant at 90% confience, ** at 95% and ** 99%				

The results suggest that there is a statistically significant (95% confidence) and positive effect of remote working on the expected survival times of firms. Specially those firms which introduced or extended remote working exhibited significantly higher survival times compared to firms that developed neither remote working nor online sales. There was no similar statistically significant effect for online sales. This is most likely attributable to online selling being most likely to have strong effects only for those firms that sell direct to consumers. Remote working is available to a much wider range of sectors.

With respect to the effect on the percentage change in sales neither online sales nor remote working had a statistically significant effect compared to firms that developed neither. However, firms which developed both did have statistically significantly (99% confidence) higher sales changes compared to those that developed neither. Firms which developed only online sales but[JP1] not remote working experienced significantly (95%) greater changes in sales than those that developed both. In summary, the evidence suggests that remote working had a positive effect on expected survival times of firms but that developing online sales, unsurprisingly, had a positive effect on the change in sales.

A similar analysis of the effect of online sales and remote working on changes in employment and the share of females in employment was undertaken. The results are not reported as no statistically significant effects could be found.

Table 18 reports a similar analysis of the effects of (a) decreased liquidity and (b) increased debt on, again, expected survival times and the proportionate change in sales.

Table 18: IPWRA Analysis for liquidity and debt

IPWRA Analysis - decreased liquidity and increased debt				
Outcome		Absolute Effects		
		Liquidity Decreased	Debt Increased	Both
Expected survival with no sales (weeks)	ATT	-5.850**	-3.583	-6.556**
	Std Error	(2.179)	(2.699)	(2.991)
		Relative Effects		
		Liquidity loss vs debt increase	Only liquidity loss vs. both	Only raised debt vs both
	ATT	2.121	-0.3232	-2.509**
	Std Error	(2.428)	(0.929)	(1.205)
Outcome		Absolute Effects		
		Liquidity Decreased	Debt Increased	Both
Change in sales from December 2019 (%)	ATT	-30.289***	-1.102	-27.681***
	Std Error	(3.818)	(4.703)	(4.362)
		Relative Effects		
		Liquidity loss vs debt increase	Only liquidity loss vs. both	Only raised debt vs both
	ATT	28.612***	3.416	-26.933***
	Std Error	(3.782)	(2.935)	(3.639)
Robust standard errors are in parentheses				
* significant at 90% confience, ** at 95% and ** 99%				

The results find a statistically significant (at 95%) negative effect of decreased liquidity on the expected survival times of firms, compared to those that experienced decreased liquidity or increased debt. Likewise the combined effect of both decreased liquidity and increased debt had a stronger and statistically significant (also at 95%) negative effect on expected survival times compared to those enterprises that experienced neither.

With respect to the treatment effects upon the change in sales the results suggest a powerful and statistically significant effect (at 99%) between decreased liquidity, both individually and in combination with increased debt, and the percentage change in sales. Correlation is not causality. The study does not assert that decreased liquidity causes a loss of sales. The reverse is clearly the case. What it does show clearly is that the reverse effect is both statistically significant and powerful. Unsurprisingly a loss of sales is very strongly associated with a loss of liquidity.

Again, a similar analysis was run on both the proportionate change in employment and on the proportionate change in the share of females in employment. As with the earlier analysis no statistically significant results were obtained.

7. INSTITUTIONAL CAPACITY AND QUALITY

The evidence presented in this study builds on anecdotal evidence from the media in many parts of the world. That is, Covid-19 has created a deep and prolonged drop in sales. This threatens firm survival through a loss of liquidity. In some cases, this results in permanent firm closure with a loss of both employment and capital. In others firm have, to date, survived by reducing employment, cutting wages and hours and by means of furloughs. The Covid-19 crisis may be prolonged but it is not permanent. Retention of labour provides a strong rationale for providing temporary support to firms. Only a small proportion of firms in the sample of four Central American countries had received any support (see Table 8).

This raises a question as to whether the governments of these countries are well placed to provide appropriate support. The World Governance Indicators (World Bank) define six measures of governance:

- Control of corruption
- Political Stability and the absence of violence or terrorism
- Rule of Law
- Government Effectiveness
- Regulatory Quality
- Voice and Accountability

For each of these measures the data reported includes two indicators that are reported in Table 19. The first “estimate” fits a normal distribution to all the countries surveyed. Values therefore range from approximately -2.5 to +2.5 with a mean of 0. Higher values imply good governance and lower values poor. The second measure gives the percentile rank of the country with the full .sample of countries. The best performing countries will receive values of close to 100 and the worst closer to 0.

Table 19: World Governance Indicators (2019)				
Control of Corruption			**Government Effectiveness**	
(a) estimate			**(a) estimate**	
El Salvador	-0.553		El Salvador	-0.465
Guatemala	-0.898		Guatemala	-0.677
Honduras	-0.808		Honduras	-0.612
Nicaragua	-1.122		Nicaragua	-0.771
(b) percentile rank			**(b) percentile rank**	
El Salvador	32.692		El Salvador	35.577
Guatemala	18.750		Guatemala	26.442
Honduras	23.077		Honduras	30.288
Nicaragua	12.500		Nicaragua	21.635
Political Stability and Absence of Violence			**Regulatory Quality**	
(a) estimate			**(a) estimate**	
El Salvador	-0.127		El Salvador	0.022
Guatemala	-0.546		Guatemala	-0.225
Honduras	-0.531		Honduras	-0.493
Nicaragua	-1.035		Nicaragua	-0.689
(b) percentile rank			**(b) percentile rank**	
El Salvador	42.857		El Salvador	56.250
Guatemala	25.238		Guatemala	44.231
Honduras	27.143		Honduras	34.135
Nicaragua	13.333		Nicaragua	25.000
Rule of Law			**Voice and Accountability**	
(a) estimate			**(a) estimate**	
El Salvador	-0.762		El Salvador	0.138
Guatemala	-1.052		Guatemala	-0.313
Honduras	-1.009		Honduras	-0.552
Nicaragua	-1.176		Nicaragua	-1.077
(b) percentile rank			**(b) percentile rank**	
El Salvador	23.558		El Salvador	51.724
Guatemala	13.942		Guatemala	35.468
Honduras	15.385		Honduras	31.034
Nicaragua	9.615		Nicaragua	19.212
***estimate - normal distribution, minimum value of -2.5 and maximum of +2.5**				

Against all six measures almost all of the countries have a negative "estimate", in some cases substantially negative. The only exceptions are El Salvador for regulatory quality and for voice and accountability. These negative scores mean that the sample of countries are systematically worse, sometimes substantially worse, than the world "average" in terms of governance indicators. In terms of the percentile rank almost all of the countries are ranked below 50, the mid-point of the ranking. Again the same two exceptions apply to El Salvador. In some cases the rankings are particularly low. The lowest is Nicaragua's ranking of 9.6 for rule of law. This means that roughly 90% of countries do better than Nicaragua on this measure.

In governance terms generally these data imply that the four countries are below typical world standards. Small emerging economies face particular difficulties so this is not intended to be judgemental. Nonetheless, it does suggest that they may not be able to deliver effective support to see firms through the Covid-19 crisis. A greater role for regional or international agencies may be needed. This need not necessarily require the provision of support directly

to firms, For example, provision of guarantees for commercial loans could be a way to work through the financial sector.

8. CONCLUSIONS

At the heart of this analysis is an account of the way in which Covid-19 has affected employment in Central America which is familiar from many parts of the world. The pandemic causes a large drop in demand for the products or services of many firms but not all sectors. The lack of sales creates liquidity problems for the affected firms, reducing the demand for labour. Some of this is has resulted in permanent firm closures and some in reductions in demand for labour by survivors or as a consequence of temporary workplace closures. This may be familiar but, so far, there has been too little scientific and evidence-based analysis as opposed to anecdotal information.

The evidence presented here is not conclusive but it seems likely that there have been substantial employment losses from permanent closures of firms. Of the surviving firms there is evidence that many are vulnerable to further losses of sales – that without adequate support from government or the financial sector there could be further permanent closures of firms. The study also shows that surviving firms have significantly reduced employment. This is linked to falling sales and the consequent decreases in liquidity. For retention of labour and in order to build economic recovery these issues would need to be addressed.

Losses in employment are by no means the only impact on labour markets in Central America. Temporary closures and furloughs impose substantial costs on firms, employees or those providing support. Cuts in wages and hours of work have also been imposed by a number of firms. The effects on gender inequality have been driven by gender segregation and the uneven effects of Covid-19 by sector. In our sample losses of employment were significantly higher for females.

Some measures taken by firms have been effective in improving prospects of firm survival. The study finds remote working to have had positive effects. Developing online sales did not have overall statistically significant effects, presumably because it is only an option for a limited number of sectors.

Government measures to contain Covid-19, although necessary to save lives, do have a strong adverse effect on firms, and workplace closures in particular. Only a small proportion of firms report having received government support. Without such support, continued losses of sales threaten liquidity and the ability of firms to survive at all or to survive without further employment losses. Unchecked these would threaten prospects for rapid and effective recovery from the economic effects of Covid-19. Reference to published indicators of good governance cast some doubt on whether the four countries possess the institutional capacity to deliver the necessary support unaided.

As is often the case this study raises questions for further research. Permanent closures of firms are, most likely, a cause of substantial losses of employment. The Covid-19 follow-up surveys had a large proportion of firm who had responded to the earlier enterprise survey missing. It is likely that many of these could not be contacted because they had permanently closed. It would be an important addition to knowledge to be able to understand what could have reasonably been done to see the enterprise failures through the crisis. The analysis presented here could only cover those firms who survived up to the surveys

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Appendix 1: change in full-time permanent workers from December 2019 by skill category and education*				
A. By skill category				
Country/	**Non-production**	**Production workers**		
firm size	**workers**	**Skilled**	**Semi-skilled**	**Unskilled**
El Salvador	**-2.8%**	**-4.4%**	**6.3%**	**0.6%**
Small	-24.3%	-22.7%	-20.8%	-30.7%
Medium	-14.1%	-11.9%	-13.2%	-18.2%
Large	-1.3%	-2.1%	8.6%	2.7%
Guatemala	**-8.5%**	**3.8%**	**-14.2%**	**6.6%**
Small	-21.9%	-28.5%	-25.1%	-19.7%
Medium	-36.4%	-38.1%	-38.7%	-34.4%
Large	-2.4%	9.9%	-7.4%	15.1%
Honduras	**-18.8%**	**-18.7%**	**-15.6%**	**-15.5%**
Small	-8.1%	-7.5%	-5.1%	-12.0%
Medium	-22.3%	-21.8%	-31.7%	-21.1%
Large	-17.6%	-18.0%	-10.3%	-11.6%
Nicaragua	**-19.4%**	**-14.4%**	**-26.3%**	**-23.2%**
Small	8.3%	-5.4%	35.1%	-8.6%
Medium	-2.5%	-0.6%	2.5%	-4.5%
Large	-22.1%	-18.5%	-30.5%	-25.8%
Full sample	**-6.9%**	**-4.8%**	**-5.0%**	**-3.0%**
B. By education				
	All	**Educated to level of:**		
		University	**Secondary**	
El Salvador	-23.2%	-23.4%	-25.3%	
Small	-54.8%	-74.2%	-53.4%	
Medium	-29.7%	-25.2%	-33.1%	
Large	-17.1%	-14.4%	-19.2%	
Guatemala	-28.1%	-27.1%	-33.5%	
Small	-45.8%	-19.2%	-59.9%	
Medium	-43.7%	-36.3%	-48.8%	
Large	-22.3%	-24.9%	-26.9%	
Honduras	-39.1%	-36.3%	-39.7%	
Small	-34.7%	-38.3%	-36.9%	
Medium	-21.5%	-23.1%	-20.0%	
Large	-55.5%	-47.5%	-57.0%	
Nicaragua	-18.1%	-25.8%	-23.8%	
Small	-39.7%	-59.9%	-46.7%	
Medium	-26.3%	-21.8%	-27.1%	
Large	-14.0%	-22.8%	-20.9%	
Full sample	-25.0%	-26.3%	-28.2%	
*** As at time of second covid-19 survey (November 2020 to January 2021)**				
Calculated assuming same proportions of each category as in enterprise survey				

Appendix 2: Average change in debt between January and September 2020	
Full Sample	6.3%
wholly domestic owned	10.4%
foreign owned (part or full)	0.0%
female top manager	9.8%
male top manager	6.2%
A. By Country and Firm Size	
El Salvador	3.2%
small	-11.6%
medium	0.4%
large	5.6%
Guatemala	-2.5%
small	-17.3%
medium	-4.4%
large	-1.0%
Honduras	-0.5%
small	-7.7%
medium	8.0%
large	-9.6%
Nicaragua	21.1%
small	-8.2%
medium	-13.7%
large	25.7%
B. By Sector	
Food	-3.5%
Tobacco	-18.2%
Textiles	-0.3%
Garments	47.0%
Leather	-1.9%
Wood	-0.6%
Paper	-0.7%
Publishing, printing	-19.5%
Chemicals	25.4%
Plastics & rubber	-0.4%
Non-metallic mineral products	-6.6%
Fabricated metal products	4.0%
Machinery & equipment	6.1%
Electronics	0.0%
Transport machinery	12.4%
Furniture	6.7%
Construction	-17.3%
Servicing of motor vehicles	-4.7%
Wholesale	21.2%
Retail	-7.4%
Hotels, restaurants etc	8.9%
Transport services	-10.0%
IT services	-35.5%

Appendix 3: Main reason for not applying for a loan and outcomes of loan applications (% of firms by country)				
	El Salvador	**Guatemala**	**Honduras**	**Nicaragua**
A. Reasons for not applying				
No need for a loan - establishment had sufficient capital	56.7%	71.3%	56.3%	49.7%
Application procedures were complex	8.6%	4.3%	9.9%	5.5%
Interest rates were not favorable	5.7%	4.3%	9.9%	12.4%
Collateral requirements were too high	1.0%	0.9%	2.8%	7.6%
Size of loan and maturity were insufficient	0.5%	0.9%	0.0%	0.0%
Did not think it would be approved	7.1%	6.1%	7.0%	8.3%
Other	19.0%	12.2%	14.1%	16.6%
Non-response	1.4%	0.0%	0.0%	0.0%
B. Outcome od Loan Application				
Application still in process	44.7%	12.2%	11.4%	5.9%
Application was approved in full	40.2%	70.7%	68.2%	55.9%
Application was approved in part	9.1%	9.8%	6.8%	23.5%
Application was rejected	4.5%	7.3%	9.1%	11.8%
Application was withdrawn	1.5%	0.0%	4.5%	2.9%