

Gender disparities in COVID-19 job losses across European post-transition economies

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Abstract

COVID-19 has brought severe adverse effects on the economy and labour markets across the globe. Due to the nature of the crisis, firms in service sectors with frequent interactions among consumers or between consumers and providers have been particularly affected. Since these sectors predominately rely on female workers, higher propensities for female workers to be either laid-off or furloughed were expected. Hence, we explore gender differences in lay-offs and furloughs in European post-transition economies during the COVID-19 pandemic. Results confirm adverse labour market effects for female workers. More precisely, firms in post-transition countries are disproportionately more likely to dismiss female workers if they have recorded sales decrease and if the firm is larger and older. Surprisingly, firms in the manufacturing sector are more prone to shedding female workers or including them in furlough schemes, probably related to competitiveness and supply chain disruptions issues. Regarding restrictive COVID measures, we have established that closing restaurants and bars, gyms and sports centres, as well as the closure of entertainment venues, are creating adverse conditions for female workers.

Keywords: gender differences, labour market, COVID-19, post-transition

Introduction

COVID-19 pandemic has been influencing the global way of living, and it seems that it will continue to affect everyday life in the foreseeable future. While trying to understand the characteristics of the virus, most countries in the world experienced a substantial downturn in 2020. In that time, some groups of firms became more affected than others. Firms in service sectors with frequent interactions among consumers or between consumers and providers - such as retail, hospitality and travel - have been particularly disadvantaged. Since these sectors predominately

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rely on female workers (Lipowiecka and Kiriti-Nganga, 2016; Kerfoot and Korczynski, 2005; Kwolek-Folland, 2007; Metcalfe and Afanassieva, 2005; Singh *et al.*, 2022), they had higher propensities to be either laid-off or furloughed (Alon *et al.*, 2020). On the other hand, during lockdowns, the closure of schools and nurseries meant that parents provided all education and childcare services. In these circumstances, some mothers, who did not lose their jobs due to pandemics, felt compelled to (temporarily) withdraw from the labour market to take care of children (Bashevskva, 2020; Heggeness, 2020; Hipp and Bünning, 2021).

Gender effects of economic crises have been previously analysed in the literature (Karamessini and Rubery, 2014; Kantola and Lombardo, 2017; Pearson and Sweetman, 2011), and it is frequently the case that the crisis affects female workers stronger because they tend to be concentrated in occupations relatively more easily substituted by the automation processes. However, this crisis has been somewhat different because due to imposed restrictions it demanded severe changes in consumers and workers' behaviour (Nikolopoulos *et al.*, 2021). While COVID-19 brought severe disruptions in working conditions throughout the globe and inspired volumes of literature, little evidence so far is available on the post-transition societies. The female workers in post-transition societies are (after the restructuring of the former socialist systems) not primarily concentrated in the most vulnerable occupations as in developing economies (Auth, 2010; Fodor and Glass, 2018; Pascall and Kwak, 2010). Furthermore, due to social system legacy, they tend to put more emphasis on career success (Campa and Serafinelli, 2019). At the same time, the economic structure is also not fully developed as in more advanced market economies, making this an interesting setting to explore.

We contribute to the growing literature on the effects of the COVID-19 pandemic on gender disparities (Adams-Prassl *et al.*, 2020; Collins *et al.*, 2020; Cowan 2020; Farre *et al.*, 2020; Kristal and Yaish, 2020; Montenegro *et al.*, 2020; Reichelt *et al.*, 2021). Most of the evidence so far is from the perspective of workers and relatively little from the perspective of firms. Notwithstanding the voluminous literature, articles focusing on gender differences in lay-offs and furloughs in European post-transition economies during the COVID-19 pandemic from the perspective of firms are still relatively scarce. However, studies document different gender patterns emerging in the social sphere after the socialist system break up, that haven't converged to predominant Western economies models (Klenner and Leiber, 2010). Thus, without specific empirical evidence, we cannot conclude that a simple extrapolation of results based on empirical studies in more advanced market economies would be valid in a different social setting. In particular, since the specificities of the post-transition economies are not related only to the social sphere, but also to the vast consequences of the transformation on the business relationships, it is possible that COVID-19 pandemic will have a different effect on gender labour market outcomes in the post-transition countries. In this setting, we investigate whether the gender labour market COVID-19 consequences differ with the strength of the measures adopted by the governments in

the post-transition countries. We analyse the factors contributing to the propensity that a firm will have higher shares of female workers laid off than the relative share of total workers laid off. In addition, we analyse the factors contributing to the propensity that female workers will be furloughed.

The rest of the paper adopts the following structure. The next section gives a brief overview of related research, while section 2 summarises the methodology applied and data sources used. Results are discussed in section 3. The last section offers conclusions.

1. Related research

An economic crisis is a sudden and sharp change of conditions in the market. It is manifested in a significant decline in production and consumption, bankruptcy of firms and consequently in an increase of unemployment and decline in living standards. Still, not all crises are the same. Some are global, and their spillover effects through international trade and finance cause downturns in parts of the world far from the origin of the crisis. Some are also international, not necessarily global, but still have a negative effect on the region or the whole domestic economy. Further, there might be crises caused by problems in specific sectors or occupations, such as the oil production sector or financial sector. Finally, recessions might not have an economic but natural or political cause. Drought, flood, insect invasion, strong earthquake or war might cause a downturn in certain sectors, regions or whole countries. This implies that a resulting crisis might not necessarily have a uniform effect on labour market outcomes.

1.1. Overall impact of previous crises upon labour market and gender differences

Regardless of the phase of the business cycle, gender differences in the labour market are still present. However, even though gender differences are still present, it seems that they change with the phase of the business cycle, and they also depend on the sector. Hence, even though females increased their participation in the labour market during past decades, they are still more present in segregated and lower-paying sectors, which make them more vulnerable (Brunet and Jefers, 2017).

Kopytov *et al.* (2018) analysed the employment during and after the 2008 recession, which was caused by financial factors, and discovered that jobs that require a higher level of education, working with information technology and creativity recovered well after the recession, while lower-skilled, routine jobs, such as jobs on the factory assembly line did not recover much. Hence, to the extent that certain sectors and occupations are dominated by one gender, such as the textile industry, a recession might increase gender inequality in the labour market. Similarly, Jaba *et al.* (2015) found that even though gender employment gap still

existed during 2008 recession in the EU countries, it is much narrower for the persons with a higher level of education.

Peinado and Serrano (2019) also analyse the 2008 recession and find that gender differences diminished during that period. However, it seems that this improvement is not related to improvements in females' outcomes in the labour market, but with the deterioration of males' condition.

The gender gap in labour market has been researched also for the recessions that are now well in the past. For example, Margo (1993) analysed employment and unemployment during 1930's and argued that during the Great Depression the position of females worsened, especially if they were married.

Economic crises often hit certain demographic groups harder than others, with ethnic minority females, youngest females and single mothers being frequent targets (Grown and Tas, 2010). Also, gender segregation across sectors and part-time work have a stronger negative effect on females during and in the aftermath of the economic crisis (Boll *et al.*, 2016; Rubery and Rafferty, 2013).

1.2. Gender differences of the impact of COVID-19 upon labour market

The before mentioned causes of crises and their effects are already well known. However, when the world confronted the COVID-19 pandemic, new and unprecedented conditions developed. Restriction measures, such as the closure of nonessential shops, cafes and restaurants, restricted mass gatherings, stay-at-home restrictions and teleworking changed the functioning of the whole economy and behaviour of consumers. Some sectors were temporarily closed, such as tourism, the entertainment industry and personal services, while some others organised work from home, such as education, government sector and some services, which caused changes in consumer behaviour. Consumers turned to online shopping (Guthrie *et al.*, 2021), for which some of them had to embrace digital technology (Sheth, 2020). Cox *et al.* (2020) analyse the early effects of the pandemic on consumer behaviour and find that consumers cut spending at the beginning of the pandemic but that the resulting downturn was caused by pandemic rather than labour market disruptions.

The COVID-19 pandemic did not only change consumer behaviour, but it also had a strong effect on the labour market, including rising inequalities between genders. De Paz Nieves *et al.* (2021) analyse how the pandemic has a different effect on females' and males' labour market outcomes. Females are more likely to stop working for a salary and have experienced a slower recovery. They find a reason for the disproportionately negative effect on females in places of females' employment. Sectors and occupations that employ a disproportionately higher share of females were among those that were hit the hardest by the COVID-19 restriction measures induced by the governments, such as tourism, hospitality and retail (Fana *et al.*, 2020). Similar results regarding the more adverse economic impact of the pandemic on females were also reported in Center on Gender Equity and Health (2020),

Adams-Prassl *et al.* (2020), Carli (2020), Collins *et al.* (2020), Cowan (2020), Kristal and Yaish (2020), Ramazzotti and Formisano (2020); Albanesi and Kim (2021), Bundervoet *et al.* (2021), Cucagna and Romero (2021), Kugler *et al.* (2021), Reichelt *et al.* (2021) and World Economic Forum (2021).

However, not all studies point to harsher conditions for females than males during the pandemic. Hupkau and Petrongolo (2020) analyse the effects in the UK and find that job losses and furloughing for females and males were roughly the same, but that females experienced a bit smaller drop in hours worked and earnings. The females carried out a larger share of duties in the household, even though the difference was smaller than before. Results for other advanced European economies, such as Italy and Spain, are similar – the difference in labour market outcomes in the pandemic between females and males is not that much pronounced (Farré *et al.*, 2020), unlike the evidence on females' disproportional increase in household duties (Del Boca *et al.*, 2020; Farré *et al.*, 2020). Béland *et al.* (2020) study the US and find that males and females are both affected by the pandemic, but males are affected more. For males, the decrease in hours of work and wages is more pronounced than for females. This is probably related to supply chain disruptions, which had different effects across industries (Tejani and Fukuda-Parr, 2021).

Some parts of the labour market and some firms managed to cope better with the pandemic than others. Amin and Viganola (2021) investigate the impact of the access to finance on the performance of firms and among others find that firms with better access to finance which at the same time use more skilled workers have lower decline in output than other firms. Also, firms with better access to finance which have fewer female workers relative to male workers also experience better business performance. The argument is that having the necessary finances is less effective in retaining female workers since females are more likely to withdraw from the labour force to take care of children and other household duties.

The lockdown caused a massive drop in revenues for firms that had to close their doors and could not establish online trade, such as personal services and cafes. At the same time, the COVID-19 pandemic caused more difficult access to finance for firms because banks, as the primary source of finance for firms, especially smaller ones, were affected with lower profit margins and high uncertainty due to the inability to assess firms' expected performance during the pandemic. In this situation, government aid in many countries appeared to be an important mechanism to help distressed firms and their employees. In that context, Bennedsen *et al.* (2020) analyse the impact of government aid on lay-offs and furlough decisions at the beginning of the pandemic and show that government aid had a positive impact on preserving jobs. More precisely, the government aid enabled the avoidance of lay-offs on a large scale and also enabled even larger increases in furloughed workers. Alstadsæter *et al.* (2020) analyse Norway and the US and find that policies supporting payrolls in both countries have a positive effect in reducing firms' economic distress. Similar studies regarding the use of government aid measures in

helping firms and workers are conducted for Greece (Betcherman *et al.*, 2020), Portugal (Manteu *et al.*, 2020) and Spain (Labora *et al.*, 2021), among others.

Post-transition countries are also exposed to the economic consequences of the COVID-19 pandemic. However, the employment risk index shows that their exposure is lower than for southern Europe and France (Doerr and Gambacorta, 2020). The reason for better performance in employment risk might be in rising labour shortages in post-transition countries. Even before the COVID-19 pandemic, there was a rising labour shortage, while demographic decline, which has been a reality for years, implies that after the recession in 2020 and consequently lower demand for labour, labour shortage will continue (Astrov *et al.*, 2021). Still, there was an increase in unemployment in most post-transition countries during the first wave of pandemics (Römisch, 2020; WIIW, 2021), despite government measures (Podvršič *et al.*, 2020; Aidukaite *et al.*, 2021). Similar to the other countries, the COVID-19 pandemic in post-transition countries also caused imposing work from home policies, reduced work time and increased digitalisation in relations with state institutions (Bălan and Pelinescu, 2020), changing the behaviour of consumers, as well as labour market outcomes. Although there is some literature on the effects of a pandemic on labour markets in post-transition countries, evidence is relatively scarce on the gender differences.

2. Methodology and data sources

The World Bank Enterprise Survey¹ covers a broad range of business environment topics using a representative sample of firms, restricted to those having at least five employees and excluding firms with 100% state ownership. The Survey is answered by the owners or top managers of the firm. The latest regular Enterprise Survey was primarily conducted in 2019, while in 2020, the World Bank's Enterprise Survey COVID-19 Follow-up (COVID-19 Survey) was developed. The COVID-19 Survey is an ongoing project that is creating additional panel data set with firms that participated in the Enterprise Survey. In this paper, we are interested in the effects of the COVID-19 pandemic on employment, predominantly female employment, in central and eastern European EU member states. Countries included in the analysis are Bulgaria, Croatia, Czechia, Hungary, Poland, Romania and Slovenia. The choice of the countries has been guided by the availability of the data from 3 COVID-19 survey waves.

Since the outbreak of the COVID-19 pandemic, efforts have been made to investigate the effects of the pandemic on enterprises. The first COVID-19 Survey questionnaire was implemented in May 2020, and by June 2021, in the countries analysed in the present paper, data from 3 survey rounds have been collected. The field collection, which usually lasts for one month for each round, is not uniformly

¹ For more information visit <https://www.enterprisesurveys.org/>.

distributed in time across the countries. For example, the first survey round was deployed in June 2020 in Hungary, in July in Bulgaria and Slovenia, in August in Poland and Romania, in September in Croatia, and in October in Czechia. The second survey round was deployed in September 2020 in Bulgaria, in November in Poland, Romania and Slovenia, and in January 2021 in Croatia, Hungary and Czechia. The third survey round was deployed in April 2021 in Bulgaria, in May in Croatia, Hungary, Poland and Slovenia, and in June in Czechia and Romania. Therefore, for each respondent, we have a maximum of three observations. So, to create a panel, we consider survey round as the time stamp, not the actual interview timing. We do, however, use the date of the interview to match it with the existing government health measures applied in each country at the time of the interview.

The initial inspection of the data shows that most firms (more than 90 percent) managed to maintain their operations throughout the analysed period (Table 1). The share of temporarily closed firms was highest during the second round across the analysed countries. In most countries (except for Slovenia and Poland), the share of permanently closed firms was the highest during the third survey round, which is consistent with the assumption that the firms closed their operations only after they depleted all available resources.

We aim to explore the effects of the pandemic on gender differences in firm-level employment. For that purpose, we merge the COVID-19 Survey data with the latest regular Enterprise Survey data that was conducted in 2019, which allows us to use a more extensive set of information about the firms. In general, 2019 was a prosperous year. GDP growth was higher than 3 percent in almost all countries in the sample, with a good outlook for 2020 (European Commission, 2019). However, with the pandemic outbreak, the situation changed rapidly and drastically. Many governments have provided support since the early beginning of the pandemic, precisely to save jobs. Still, not all firms received government support and support for all firms was not lasting during all three rounds of the COVID-19 Survey (Table 2). As OECD (2020) documents, the types of policy measures offered differed significantly across the countries². Furthermore, studies suggest that the fiscal policy

² OECD (2020) provides an extensive overview of the measures adopted across different countries, including the dates of their adoption. For example, Bulgaria adopted a salary subsidy for workers whose jobs were under threat where the government paid for 60% of salaries for employees facing being laid off, with employers paying the remaining 40%. In Croatia the government has made available special subsidies to employers, to cover salaries of full-time and part-time workers in accommodation, food and beverage, transportation and storage and other sectors in which workers are prevented from attending work due to confinement measures. In Czech Republic the government provided support to employers who continued, despite their businesses being shut down, to pay out 100% of the salary to affected employees by covering 80% of salary cost. In Hungary a job preservation through wage support has been introduced, where the state assumed 70% of wage costs for companies that have lost 15-50% of their activity as a result of the COVID-19 epidemic. Depending on

effort was directly correlated to GDP per capita and the number of COVID-19 cases (Elgin *et al.*, 2020).

Table 1. Working/operation status of surveyed firms

		Open	Temporarily closed	Permanently closed
Croatia	Round 1	96.9	0.6	2.6
	Round 2	90.5	6.9	2.7
	Round 3	94.6	1.8	3.6
Hungary	Round 1	97.8	0.5	1.8
	Round 2	97.4	2.0	0.6
	Round 3	97.2	0.9	1.9
Bulgaria	Round 1	91.4	1.8	6.8
	Round 2	88.9	3.3	7.8
	Round 3	90.3	1.7	8.1
Czechia	Round 1	98.3	0.0	1.7
	Round 2	93.8	4.7	1.5
	Round 3	96.6	0.9	2.5
Poland	Round 1	90.8	6.3	3.0
	Round 2	96.2	2.5	1.3
	Round 3	94.5	3.7	1.6
Romania	Round 1	96.4	0.2	3.4
	Round 2	95.5	1.0	3.5
	Round 3	94.1	1.0	4.9
Slovenia	Round 1	99.2	0.8	0.0
	Round 2	95.6	4.0	0.4
	Round 3	98.2	1.8	0.0

Source: World Bank COVID-19 Follow-up Survey

Table 2. Percentage of firms receiving national or local government support

	Round 1	Round 2	Round 3
Bulgaria	12.5	14.0	17.4
Croatia	63.8	22.0	15.5
Czechia	58.8	30.1	36.5
Hungary	28.1	13.0	22.5
Poland	58.4	20.2	25.0
Romania	42.3	13.6	9.5
Slovenia	74.3	20.2	34.8

Source: World Bank COVID-19 Follow-up Survey

the speed of the measures being introduced in different countries, as well as the attractiveness of the schemes, the take-up of the resident firms was different.

Since some of the firms could not cope with decreased demand, they might have taken the opportunity to shed some workers. We were especially interested in whether women were more likely to lose their jobs; subsequently we keep in the sample only firms that reported having female workers in 2019³. Based on the COVID-19 Surveys we identify whether the firms in their employment resizing disproportionately targeted women. The respondents of the COVID-19 Survey have been relatively reluctant to answer this question, leading to an unbalanced dataset.

It is natural to assume that we have some persistence in the dependent variable, because a firm that laid off a worker at the beginning of the economic downturn is less likely to re-employ that worker before the turn of the cycle. Since we have only three data points, we do not perform formal statistical procedures to detect persistence. Instead, careful inspection of the data suggested that we do not have firms that persistently laid off more female workers. Thus, it reveals that firms are not discriminating on purpose, which is reassuring. Yet, the open question remains what the factors leading to more female job shedding are.

Relative to the pre-pandemic period, there is no unique pattern of employment changes. On average, firms reported lower employment in survey round 1, except in Poland (Table 3). Also, in most countries, the fall in female employment was stronger than total employment. Our findings are in accordance with Webster *et al.* (2022) who, based on the same data source but only based on the first COVID-19 Survey wave document decline in the share of female employment in southern Europe. The fall in employment is related to the effects of the pandemic, the ability of firms to cope with adverse market conditions and the generosity of government support schemes applied in each country. Yet, the decision to shed disproportionately more female workers could be justifiable only by the type of occupation⁴ and/or firm sector.

Table 3. Percentage change in permanent full-time employees between the Survey round 1 and the end of 2019

	Percentage change of permanent full-time employees (total)	Percentage change of permanent full-time employees (females)
Bulgaria	-4.6	-7.3
Croatia	-0.9	-0.8
Czechia	-2.4	-2.1
Hungary	-2.8	-3.1
Poland	2.2	-1.2
Romania	-4.2	-6.1
Slovenia	-2.7	-2.5

Source: World Bank COVID-19 Follow-up Survey Round 1

³ The Enterprise Survey is the source for this data.

⁴ We cannot support this claim with our dataset.

Another mechanism employers used to cope with decreased demand for their products was furlough. The application of the mechanism widely varied across countries (Stuart *et al.*, 2021). In contrast to hard adjustment to adverse changes in market demand, furloughing schemes enabled workers to have a certain security that they will have a job after the initial lockdowns. However, some argue that its primary function was not economic but rather epidemiological (Pieroni *et al.*, 2021). Furlough schemes were particularly suited for hospitality sectors, with a high risk of contact with customers. In most countries, women are more likely to occupy these positions (Campos Soria and Robles Teigeiro, 2019) and are more likely to accept such arrangements in situations where their family obligations increase due to stay-at-home children⁵ (Collins *et al.* 2020; Hank and Steinbach, 2021; Mooi-Reci and Risman, 2021).

To gain more insight into why firms might shed more female workers, we specify two equations. The first one analyses the probability of a firm having higher shares of female workers laid off than the relative share of total workers laid off. We do not directly compare female and male numbers of laid-off workers because the respondents are not asked for the number of male workers in the questionnaire, just the total and female workers numbers. Although it might be logical that the number of male workers equals total subtracted by the number of female workers, this is a potential source for the introduction of a measurement error in the estimates that we want to avoid. The second model analyses the probability that female workers will be furloughed to a greater extent than the workers in general. In both cases the dependent variable is binary and equals one if the share of female workers laid-off/furloughed in the original female workforce is higher than the share of total workers laid-off/furloughed in the original total workforce⁶.

The set of independent variables is the same in both equations and includes⁷:

- Firm age, size and sector. The assumption was that small firms and firms in specific sectors had lower resilience to such a strong shock. We distinguish between 3 sizes – small, medium (reference value) and large, and 6 sectors – manufacturing (reference value), retail trade, wholesale trade, construction, hotel or restaurant and provider of services. Age is calculated as a difference between the year when the survey was conducted and the beginning of the firm's operation. We have no prior assumptions about the age effect. It could be that younger firms are more agile and can retain workers through alternative working arrangements. It could also be the case that older firms who have already

⁵ Similar attitudes were recorded in the pre-pandemic period. Michoń (2010) documents falling but still prevalent support for traditional gender role taking in the late transition period in comparison to early phases of transition.

⁶ As previously explained, the data source for total/female workforce is Enterprise Survey, while the data for total/female laid-off/furloughed workforce is COVID-19 Survey.

⁷ The definition of the independent variables is provided in Appendix Table A1.

- experienced periods of crisis have the institutional knowledge to weather these circumstances more easily;
- Market orientation. We assume that firms faced different types of disruptions in their selling markets. Firms oriented towards exporting might be facing more disruptions because of global value chains disorders, while firms securing a government contract were better positioned because their business deals were more secure. We included a dummy taking value 1 if a firm is doing business in foreign markets and a dummy variable taking value 1 if a firm is doing business with the government;
 - Foreign ownership. If a firm has a (partial) foreign ownership, the owners might be less concerned about workers in another country and more about the profits. Hence, a foreign owner might easier lay off workers. To operationalise this, we include a dummy variable taking value 1 if a firm has (partial) foreign ownership;
 - Female ownership and management. Firms with female owners or female managers might be more gender-sensitive in making lay-off decisions⁸. To capture this, we included two dummy variables, first is taking value 1 if a female is (co)owning the firm, and second is taking value 1 if a female is the firm's top manager;
 - Effect of the crisis. The firms that were more severely hit by the crisis had a stronger incentive to reduce costs. Thus, we include a dummy variable indicating whether the firm's sales decreased compared to the same month last year;
 - Support from the government. Governments in different countries secured a different combination of support for firms. We argue that those firms that received wage subsidies were more likely to be conditioned not to shed labour. Hence, we included a dummy variable indicating whether a firm received wage subsidy from the government;
 - COVID-19 measures. To control differences between the countries, we include dummy variables depicting the current state of measures adopted in each country⁹. We assume that introducing measures corresponds to the severity of COVID-19 incidence in a country, thus presenting a disruptive element for business activity. While the European Centre for Disease Prevention and Control (ECDC) provides a set of different response measures introduced in the countries, we focus on the ones directly affecting the business operations.

⁸ For example, Carrington and Troske (1998) have established gender workplace segregation in U.S. manufacturing. Additionally, Bender *et al.* (2005) suggested that women in female dominated workplaces report higher job satisfaction because they value job flexibility and choose the workplaces that provide job flexibility. In the analysis of specific COVID-19 environment, Wagner (2022) shows that female ownership is strongly correlated with enterprise resilience.

⁹ Retrieved from https://www.ecdc.europa.eu/sites/default/files/documents/Variable_Dictionary_and_Disclaimer_non-pharmaceutical_measures_v3.pdf.

Specifically, we include dummies depicting: closure of public spaces of any kind; closure of entertainment venues; closure of public transport; closure of gyms/sports centres; closure of hotels/accommodation services; closure of nonessential shops; closure of restaurants and cafes/bars.

Variables depicting firms' characteristics (age, size, sector, market orientation, ownership) all refer to the pre-pandemic period (obtained from the Enterprise Survey 2019) and are not varying through the analysed time. The variables that do change in time are related to the effects of the pandemic on sales and government measures – either support from the government to the firms or government response measures directed at business operations.

Since we are interested in average partial effects and have only three data points in the case of laid-off workers and two data points in the case of furloughed workers, we performed a pooled model. In each case, we estimate a baseline model, including pre-pandemic variables, the effect of the pandemic on sales and government support variable. Then we subsequently include different types of government response measures to investigate whether any of them affected the probability of higher female job loss. The marginal effects for the laid-off and furloughed workers are presented in the next section.

3. Results and discussion

The results for the probability that a firm will have a higher share of female workers laid off are presented in Table 4, while results on the probability that a firm will have a higher share of furloughed female workers are presented in Table 5. In each case, we start with the baseline model, which does not include any of the restrictive government response measures. We subsequently explore the connection between the probability that a firm will have a higher-than-average decrease in female workers and each of the measures considered.

By comparing all estimates for the lay-off propensity, we can notice that most models identify the same sign (and significance) of the covariates. In line with the expectations, firms are disproportionately more likely to dismiss female workers if they have recorded sales decrease, but also if the firm is larger and older. While sales decrease is rather straightforward, the positive correlation for the older and larger firms could be explained by the specific post-transition effect. Namely, it could be the case that these firms were already in a pre-bankruptcy state¹⁰, but the process lingered on due to the relatively slow restructuring process. Furthermore, Janzen and Radulescu (2022) in their analysis of the first COVID-19 Follow up Survey find that firms who received public support in the form of payment deferrals are less likely to lay-off

¹⁰ Gourinchas *et al.* (2020) emphasize the heterogeneity in the level of indebtedness among firms in different European economies prior to the COVID-19 crisis, that in addition to differences in banking system affect the differences in prediction to fail.

workers than firms who receive other type of government support, suggesting that the financial position of the firms suddenly became extremely vulnerable. Further, firms in the manufacturing sector are more prone to shedding female workers, comparing to other sectors. So, contrary to the fact that female work is predominant in the service sector where there is a high share of contact between customers and service providers, it seems that the manufacturing sector in the post-transition economies took the lead in shedding female workers. This is probably related to the disruptions in the global supply chains and the competitiveness patterns in post-transition economies that still tend to rely on inexpensive labour (Botrić, 2021).

With this in mind, the positive correlation between the firm's reliance on wage subsidy obtained from a government and intensive female labour shedding is less surprising. Although the government provided wage subsidies, this support for some firms was not enough, and it seems that the pandemic was a turning point during which severe restructuring took place. So, even though it seems contra intuitive that firms relying on wage subsidy would shed any workers, the pandemic has also been used to automate certain business processes to ensure the sustainability of business operations after the pandemic¹¹. Since female workers are disproportionally occupying positions prone to automatization (Chernoff and Warman, 2022; Egana-del Sol *et al.*, 2022), the business survival strategy for the after-pandemic period probably included considerations for higher productivity at the expense of female labour. The dataset cannot verify this argument because we do not have individual workers' characteristics, but this issue should be explored in more detail in future research endeavours. However, if this is found to be the case, clear policy measures could be easily foreseen. Developing adequate re-skilling and up-skilling training modules for vulnerable workers should be devised to prevent labour market mismatch.

Interestingly, firms with female top managers are less likely to lay off females, which confirms that female managers might be more gender-sensitive in making lay-off decisions (Bender *et al.*, 2005). On the other hand, variable related to female ownership turned out not to be significant, which implies that day to day communication with workers as a firm manager is more critical in making lay-off decisions than the firm's ownership. Also, in post-transition countries, businesses tend to be still predominately owned by men (Petrović and Radukić, 2018), so the effect of female ownership might not be statistically important due to that reason.

On the other hand, it turned out that (partial) foreign ownership as well as export orientation are not significant predictors of laying off female workers. This is also somewhat reassuring because the public discourse in post-transition economies frequently argues that foreign owners will care less about the local workforce. Another argument haunting public discussions assumes that increased competition related to international markets is correlated with productivity pressures. The everlasting quest for productivity in some sectors is correlated to automatization

¹¹ For example, increase use of self-service cashiers.

processes and technology unemployment, which again might affect women to a greater extent. However, such transformations also require developing new business strategies and financial resources. The pandemic environment probably exposed most of the firms to different types of stress and whether some of the firms were able to create new business strategies remains to be seen.

We turn next to inspecting specific COVID related government measures and their correlation to increase lay-off of female workers. We have established that closing restaurants and bars, gyms and sports centres, and the closure of entertainment venues is related to a higher probability that a firm will have higher shares of female workers laid off. This should not come as a surprise since the services industry, especially restaurants and bars, typically has a larger share of female workers. Gössling *et al.* (2021) already documented that COVID-19 creates disproportional risk to SMEs survival in hotels, food services, wholesale and retail services, particularly threatening the workforce in those sectors. So, restrictive government containment measures disproportionately also affected female workforce in the post-transition economies.

On the other hand, closing nonessential shops seems to be related to a lower probability that firms will disproportionately lay off female workers. This is probably related to the fact that such speciality shops, to a greater extent, employ male workers and rely on the special knowledge of their staff. While general stores might more easily find necessary workers after the crisis, speciality shops probably have fewer options on the labour market. This reveals granulated segmentation on the labour markets and the specific skills that employers tend to value specific skills.

Analysis of the furlough scheme suggests that there are similarities and differences to the lay-off decision-making process. Similar firm characteristics effects include age and sector, sales decrease, and firm management. The explanations why firms, to a greater extent, put female workers into furlough schemes are similar to those offered for lay-off. The exception is that in this case, we do not consider firm restructuring as important mechanisms for female workers' relative disadvantage.

It is interesting to notice that government support in the form of wage subsidy is correlated to increased female participation in furlough schemes at the firm level. It could be the case, as Webster *et al.* (2022) suggest, that furlough scheme works as a kind of substitute for a lay-off, giving the firms time to deal with the uncertain situation. Implementation of the furlough scheme also differs among the countries, and it could be the case that some firms were eligible for different government support measures and opt for the ones best suited for their situation. In some instances, furloughed workers were not entitled to wages but some type of social care assistance. In other cases, the furlough scheme was directly related to a wage subsidy, but the one that is lower than a usual wage. This issue deserves further attention in future research and should be explored at the individual country level in more details.

Table 4. Results on the probability that a firm will have higher shares of female workers laid off, marginal effects

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
time2	0.769*** (0.0133)	0.769*** (0.0133)	0.720*** (0.0149)	0.836*** (0.0414)	0.750*** (0.0141)	0.758*** (0.0186)	0.805*** (0.0165)	0.742*** (0.0156)
time3	0.637*** (0.0130)	0.636*** (0.0131)	0.607*** (0.0135)	0.673*** (0.0377)	0.633*** (0.0130)	0.633*** (0.0181)	0.639*** (0.0131)	0.628*** (0.0133)
Small	-0.0263** (0.0123)	-0.0263** (0.0123)	-0.0297** (0.0122)	-0.000313 (0.0285)	-0.0263** (0.0122)	-0.0296* (0.0173)	-0.0251** (0.0123)	-0.0278** (0.0123)
Large	0.0340** (0.0155)	0.0338** (0.0155)	0.0341** (0.0154)	-0.0246 (0.0345)	0.0353** (0.0155)	0.0391* (0.0214)	0.0341** (0.0155)	0.0326** (0.0155)
Age	0.000884** (0.000405)	0.000888** (0.000405)	0.000877** (0.000401)	0.000420 (0.000691)	0.000842** (0.000401)	0.000599 (0.000568)	0.000871** (0.000406)	0.000877** (0.000405)
Foreign	0.00567 (0.0204)	0.00588 (0.0205)	0.00614 (0.0202)	0.00407 (0.0413)	0.00391 (0.0205)	0.00716 (0.0305)	0.00575 (0.0205)	0.00652 (0.0204)
Retail	-0.120*** (0.0159)	-0.120*** (0.0159)	-0.114*** (0.0160)	-0.123*** (0.0364)	-0.123*** (0.0159)	-0.145*** (0.0241)	-0.121*** (0.0159)	-0.117*** (0.0160)
Wholesale	-0.115*** (0.0213)	-0.115*** (0.0214)	-0.112*** (0.0213)	-0.0838* (0.0448)	-0.119*** (0.0214)	-0.140*** (0.0328)	-0.116*** (0.0214)	-0.115*** (0.0214)
Construction	-0.162*** (0.0210)	-0.162*** (0.0210)	-0.160*** (0.0209)	-0.127** (0.0504)	-0.165*** (0.0211)	-0.137*** (0.0292)	-0.162*** (0.0210)	-0.162*** (0.0210)
Hotel	-0.221*** (0.0310)	-0.221*** (0.0311)	-0.216*** (0.0313)	-0.145*** (0.0520)	-0.225*** (0.0310)	-0.273*** (0.0541)	-0.221*** (0.0309)	-0.220*** (0.0312)
Service	-0.120*** (0.0190)	-0.120*** (0.0190)	-0.113*** (0.0189)	-0.103** (0.0454)	-0.120*** (0.0190)	-0.152*** (0.0300)	-0.122*** (0.0190)	-0.117*** (0.0191)
female_owners	0.00506 (0.0119)	0.00502 (0.0119)	0.000692 (0.0119)	0.0540* (0.0282)	0.00420 (0.0119)	-0.0186 (0.0165)	0.00429 (0.0119)	0.00494 (0.0119)
female_manager	-0.0253* (0.0145)	-0.0253* (0.0145)	-0.0241* (0.0145)	-0.0174 (0.0328)	-0.0237 (0.0145)	-0.0182 (0.0200)	-0.0244* (0.0145)	-0.0263* (0.0146)
Exporter	0.0156 (0.0121)	0.0159 (0.0121)	0.0141 (0.0120)	0.0380 (0.0293)	0.0114 (0.0122)	0.00736 (0.0178)	0.0185 (0.0121)	0.0157 (0.0121)
state_commerce	0.0138 (0.0146)	0.0141 (0.0147)	0.0153 (0.0145)	0.0293 (0.0311)	0.0132 (0.0147)	-0.0151 (0.0196)	0.0168 (0.0147)	0.0139 (0.0146)
wage_subsidies	0.120*** (0.0118)	0.120*** (0.0118)	0.119*** (0.0118)	0.146*** (0.0322)	0.120*** (0.0118)	0.112*** (0.0162)	0.121*** (0.0117)	0.120*** (0.0118)
sales_decrease	0.136*** (0.0113)	0.136*** (0.0113)	0.136*** (0.0112)	0.103*** (0.0307)	0.137*** (0.0113)	0.139*** (0.0151)	0.137*** (0.0113)	0.136*** (0.0113)
ClosPubAny		-0.00953 (0.0264)						
EntertainmentVenues			0.0830*** (0.0138)					
ClosureOfPublicTransport				0.0202 (0.0636)				
GymsSportsCentres					0.0562*** (0.0163)			
HotelsOtherAccommodation						-0.0236 (0.0225)		
NonEssentialShops							-0.0626*** (0.0168)	
RestaurantsCafes								0.0378*** (0.0137)
Observations	10,575	10,575	10,575	1,678	10,575	5,465	10,575	10,575

Note: Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' estimates based on World Bank Enterprise Survey and World Bank COVID-19 Follow-up Survey

Table 5. Results on the probability that a firm will have higher shares of furloughed female workers, marginal effects

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
time2	0.0183*** (0.00463)	0.0174*** (0.00458)	0.00374 (0.00452)	-0.00601 (0.0121)	0.00816* (0.00485)	0.0154*** (0.00535)	0.0314*** (0.00591)	0.00846* (0.00507)
time3	-0.143*** (0.00842)	-0.142*** (0.00835)	-0.149*** (0.00936)	-0.320*** (0.0494)	-0.144*** (0.00861)	-0.0831*** (0.00923)	-0.141*** (0.00831)	-0.146*** (0.00879)
Small	-0.00535 (0.00494)	-0.00541 (0.00494)	-0.00747 (0.00485)	-0.0133 (0.0152)	-0.00513 (0.00488)	-0.00220 (0.00503)	-0.00440 (0.00493)	-0.00613 (0.00496)
Large	0.000212 (0.00619)	0.000723 (0.00621)	0.000519 (0.00605)	-0.0306 (0.0187)	0.00117 (0.00612)	0.00751 (0.00639)	-0.000131 (0.00615)	-0.000564 (0.00621)
Age	0.000355* (0.000199)	0.000346* (0.000198)	0.000335* (0.000190)	-0.000193 (0.000528)	0.000319* (0.000194)	-3.16e-05 (0.000135)	0.000335* (0.000197)	0.000353* (0.000200)
foreign	0.00124 (0.00859)	0.00108 (0.00860)	0.00235 (0.00837)	-0.0273 (0.0233)	0.000468 (0.00851)	0.00441 (0.00849)	0.000493 (0.00853)	0.00198 (0.00867)
retail	-0.200*** (0.0134)	-0.200*** (0.0135)	-0.192*** (0.0130)	-0.401*** (0.0517)	-0.200*** (0.0135)	-0.130*** (0.0172)	-0.200*** (0.0135)	-0.199*** (0.0133)
wholesale	-0.203*** (0.0141)	-0.203*** (0.0141)	-0.197*** (0.0138)	-0.379*** (0.0497)	-0.203*** (0.0142)	-0.130*** (0.0175)	-0.202*** (0.0141)	-0.203*** (0.0140)
construction	-0.199*** (0.0137)	-0.199*** (0.0137)	-0.193*** (0.0134)	-0.395*** (0.0514)	-0.199*** (0.0138)	-0.125*** (0.0163)	-0.198*** (0.0137)	-0.199*** (0.0136)
hotel	-0.231*** (0.0175)	-0.232*** (0.0176)	-0.223*** (0.0171)	-0.420*** (0.0600)	-0.232*** (0.0178)	-0.150*** (0.0213)	-0.230*** (0.0175)	-0.230*** (0.0174)
service	-0.205*** (0.0141)	-0.206*** (0.0141)	-0.198*** (0.0136)	-0.398*** (0.0520)	-0.204*** (0.0140)	-0.133*** (0.0178)	-0.205*** (0.0142)	-0.204*** (0.0139)
female_owners	0.00705* (0.00408)	0.00720* (0.00409)	0.00488 (0.00393)	0.0212 (0.0132)	0.00660 (0.00402)	-0.00172 (0.00410)	0.00661 (0.00405)	0.00723* (0.00407)
female_manager	-0.0132** (0.00522)	-0.0135*** (0.00524)	-0.0126** (0.00503)	-0.0178 (0.0143)	-0.0122** (0.00513)	-0.0101* (0.00533)	-0.0126** (0.00520)	-0.0138*** (0.00522)
exporter	0.0163*** (0.00547)	0.0153*** (0.00545)	0.0159*** (0.00533)	-0.00935 (0.0160)	0.0146*** (0.00534)	0.0104* (0.00580)	0.0182*** (0.00556)	0.0171*** (0.00551)
state_commerce	0.00324 (0.00465)	0.00233 (0.00469)	0.00378 (0.00460)	0.0125 (0.0143)	0.00337 (0.00458)	-0.00522 (0.00456)	0.00479 (0.00475)	0.00342 (0.00463)
wage_subsidies	0.00871** (0.00411)	0.00883** (0.00413)	0.00789** (0.00401)	0.0111 (0.0130)	0.00796** (0.00404)	0.00232 (0.00399)	0.00946** (0.00414)	0.00866** (0.00412)
sales_decrease	0.0322*** (0.00560)	0.0320*** (0.00558)	0.0313*** (0.00542)	0.0107 (0.0160)	0.0323*** (0.00558)	0.0250*** (0.00612)	0.0327*** (0.00563)	0.0321*** (0.00558)
ClosPubAny		0.0200 (0.0128)						
EntertainmentVenues			0.0295*** (0.00501)					
ClosureOfPublicTransport				0.00160 (0.0231)				
GymsSportsCentres					0.0269*** (0.00600)			
HotelsOtherAccommodation						-0.000189 (0.00521)		
NonEssentialShops							-0.0239*** (0.00658)	
RestaurantsCafes								0.0150*** (0.00448)
Observations	10,575	10,575	10,575	1,678	10,575	5,465	10,575	10,575

Note: Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' estimates based on World Bank Enterprise Survey and World Bank COVID-19 Follow-up Survey

An important effect is found in the case of exporting firms. This is related to previous findings that firms who are direct exporters are more likely to be permanently closed than non-exporters in some countries (Webster *et al.*, 2022). Here we also find evidence that disruptions in the international markets were

correlated to a higher propensity that female workers will be disproportionately included in the furlough scheme. It seems that pressure to compete on the international markets together with the need to stop business operations due to COVID restrictions affected female workers disproportionately. Contrary to widespread perceptions that the service sector is mainly affected, our data again point to the disproportional effect in the manufacturing sector. This is, however, in accordance with findings based on a first wave follow-up COVID-19 Survey, where firm difficulties were more pronounced in labour-intensive manufacturing, as opposed to more skill or capital-intensive manufacturing activities (Waldkirch, 2021). Thus, firms adopting labour cost effectiveness strategy when competing internationally are more prone to adjust their workforce, in particular when it comes to low-skilled workers.

It is also interesting to notice that COVID measures had the same effect in the case of disproportional furlough of female workers as they did in the case of their lay-off. In this case, measures that affected service sector operations - closing restaurants and bars, gyms and sports centres, and the closure of entertainment venues – adversely affected female workers. The effect was again opposite in the case of nonessential shops closure.

Conclusions

The question of the disproportional effect of the economic crisis on specific segments of the labour market is a continuously intriguing research question. The recent global pandemic presented the opportunity to explore this effect on a worldwide level. This paper is focused on providing evidence for European post-transition economies. Specific contribution of the paper lies in the fact that it focuses on the firm perspective, contrary to previous studies mostly focused on the workers' perspective.

By relying on the World Bank Enterprise Survey and COVID-19 Survey data in Bulgaria, Croatia, Czechia, Hungary, Poland, Romania and Slovenia, we find evidence of adverse labour market effects for female workers. Although previous studies also found these effects, by relying on three waves of COVID-19 Survey, we establish that the effects linger on as the crisis continues. Specifically, we identify that firms are disproportionately more likely to dismiss female workers if they have recorded sales decrease, but also if the firm is larger and older. Comparing to other sectors, firms in the manufacturing sector are more prone to shedding female workers or including them in furlough schemes. This is probably related to a relatively high reliance on inexpensive labour as a competitiveness factor, a business strategy that became questionable with the increase disruptions in global value chains.

Exporting firms are disproportionately including female workers in the furlough scheme. Future research efforts should include individual worker data (at least their occupation) to explore this issue in more detail. Based on the results

presented in the paper, we cannot claim that exporters adversely target their female workers; it could simply be the case that some parts of the business process are more prone to inclusion in the furlough scheme.

Regarding restrictive COVID measures, we have identified that they had the same effect in the case of disproportional furlough of female workers as they did in the case of their lay-off. We have established that closing restaurants and bars, gyms and sports centres, and the closure of entertainment venues are creating adverse conditions for female workers. The opposite is found for the case of closing nonessential shops, which we relate to the notion that speciality shops require special knowledge of their staff.

Contrary to our initial assumption, we find evidence that firms who benefit from government wage subsidy schemes are more likely to disproportionately dismiss or put on furlough female workers. We assume that this is related to the different measures introduced across the countries. Thus, we suggest that in order to reach firm conclusions on the effects of government measures on the gender labour market outcomes, country-level studies with detailed analysis of the measures introduced should be performed.

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Appendix

Table A1. Definition of variables

Variable	Description
Female_laidoff	=1, if the share of laid-off female workers in the original female workforce is higher than the share of laid-off total workers in the original total workforce
Female_furlough	=1, if the share of furloughed female workers in the original female workforce is higher than the share of furloughed total workers in the original total workforce
time2	=1, if responses belong to COVID-19 Round 2 Wave
time3	=1, if responses belong to COVID-19 Round 3 Wave
Small	=1, if a firm has more than 5 and less than 19 employees
Large	=1, if a firm has more than 100 employees
Age	= number of years since the beginning of firm's operation
foreign	=1, if a firm has any percentage of foreign ownership
retail	=1, if a firm operates in the retail sector
Wholesale	=1, if a firm operates in the wholesale sector
Construction	=1, if a firm operates in the construction sector
Hotel	=1, if a firm operates in the hotel industry
Service	=1, if a firm operates in the other services sector
female_owners	=1, if amongst the firm owners there is a female
female_manager	=1, if a firm's top manager is female
exporter	=1, if a percentage of sales that were related to direct exports are larger than zero
state_commerce	=1, if a firm has over the last year secured or attempted to secure government contract
wage_subsidies	=1, if respondent reported receiving government support in the form of wage subsidies for employees
sales_decrease	=1, if respondent reported sales decrease comparing to the same month last year
ClosPubAny	=1, if the country implemented closure of public spaces of any kind at the time of survey
EntertainmentVenues	=1, if the country implemented closure of entertainment venues at the time of survey
ClosureOfPublicTransport	=1, if the country implemented closure of public transport at the time of survey
GymsSportsCentres	=1, if the country implemented closure of gyms/sports centres at the time of survey
HotelsOtherAccommodation	=1, if the country implemented closure of hotels/accommodation services at the time of survey
NonEssentialShops	=1, if the country implemented closures of non-essential shops at the time of survey
RestaurantsCafes	=1, if the country implemented closure of restaurants and cafes/bars at the time of survey

Source: Authors' representation