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How COVID-19 pandemic worsens the economic situation of women in South Africa

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How COVID-19 pandemic worsens the economic situation of women in South Africa

Abstract

To contribute towards addressing the problem of relatively few general equilibrium studies focusing on gender impacts of disease pandemics, this paper uses a gendered Computable General Equilibrium model linked to a microsimulation model to study the short run economic effects of COVID-19 pandemic in South Africa. A mild and severe scenario is run to represent the pandemic. Findings suggest that while COVID-19 leads to negative economic effects irrespective of scenario, female-headed households bear a disproportionately higher burden of the brunt. Because women tend to be more concentrated in employment in sectors that are hurt the most by COVID-19 response measures as well as that they predominate in unskilled categories, the simulation results show that women suffer disproportionately more from higher unemployment than their male counterparts though the differences are not as pronounced. The poverty outcomes show worsened vulnerability for female-headed households given that, even prior to the pandemic, poverty was already higher amongst women. These results are important in informing evidence-based responses by government to the COVID-19 pandemic.

Keywords: COVID-19, Computable general equilibrium model, Gender, Poverty, South Africa

JEL: C68, E60, J16, O55

1. Introduction

The Coronavirus disease 2019 (COVID-19) pandemic has had devastating health and economic effects globally in 2020 and beyond. Similar to other countries, South Africa has taken measures that have largely included enforcement of social distancing, which implied restricted movement of people, and lockdown of the economy. On 15 March 2020, barely two weeks after the first reported case in the country, South Africa declared a National State of Disaster, citing the ‘magnitude and severity of the COVID-19 outbreak which has been declared a global pandemic’.¹ On 25 March 2020, amendments were made to the legislation to cater for the outbreak, with the main intervention being an initial 21-day national lockdown commencing from midnight of March 26. This lockdown was subsequently extended to the end of April 2020. The overall aim was to flatten the pandemic curve so as to allow time for the health system to be readied for the increase in sick people. The amendments outlined contained measures pertaining to (a) restrictions on the movement of persons and goods, (b) prohibition of public transport and (c) resources by the state during lockdown. The government started to open the economy from the beginning of May 2020, although this was to be done in gradual steps. These measures would likely have negative effects on the economy as well as people’s welfare. Prior to the COVID-19 pandemic, the economy was already saddled with persistently low growth rates, a technical recession and the triple challenges of unemployment, poverty and inequality. Women and men will be impacted differently depending on their initial circumstances.

¹ Amended by the Disaster Management Amendment Act 16 of 2015.

While South Africa has very high unemployment and poverty, these are particularly higher for women than for men. Women's unemployment rate reached 31.3% against 27.2% for men in Quarter 4 of 2019 (Statistics South Africa, 2019), just before the pandemic. At all ages, women face higher unemployment than men, and this is particularly striking for the youth (aged 15 to 34), with 43.9% of women being unemployed compared to 36.4% for men, (Statistics South Africa, 2019).

Gender inequalities are predominant in labour markets as employment continues to have a gendered bias. Despite an increase in employment levels over the years, female labour force participation remains lower (at about 48.5%) compared to men's participation, (World Bank, 2018). Mosomi (2019) reports that there was an increase in the share of employed females from 38% in 1994 to about 45% in 2015. This is attributed to various factors including various post-apartheid legislations of equalising labour market entry as well as improved education. Tracking unemployment by gender between 1994 and 2014, Mosomi (2019) shows that women unemployment was unambiguously higher than that of men throughout that period. This is especially true in the formal occupations and high-paying jobs. Indeed, women are more likely to be hired in low-skilled occupations (36.2%) than in high-skilled occupations (11.7%), while these shares are respectively 14.4% and 24.8% for men. Only 5.7% of women are employed as managers compared to 10% for men. Other studies also confirm the same pattern of occupational segregation (Gradin 2018; Espi, et al. 2019). These studies go on to observe that in the lowest occupation ranks are Black and Coloured² women. In general, men occupy higher ranking positions than women.

Using Post-Apartheid Labour Market Series (PALMS) data, Mosomi (2019) shows that women are mostly represented in four sectors, domestic services (about 80%), finance (44%), trade (50%), and services (47%), where they largely occupy lower paid jobs and more elementary tasks (such as being clerks, roadside traders, etc.). In the more professional occupations, they are normally teachers and nurses. Men, on the other hand, mainly dominate in such sectors as services, trade, finance, manufacturing, and construction sectors, holding in general higher paying positions than their female counterparts (Mosoni, 2019).

According to the World Bank (2018), 84.2% of women work in the service sector, 12.1% in the industries sector and 3.7% in the agriculture sector. Within the services sector, two sub-sectors account for more than half of women's employment. These are, respectively, the community, social and personal services (CSP) sub-sector and the wholesale and retail sub-sector. The CSP services alone employs nearly one in three women (31.2%), while wholesale accounts for 21.9% of female employment (Kirkwood, 2018). For instance, over a million of women work as domestic workers, often without job security and on low wages (ILO, 2016). As pointed out by Mosoni (2019) and Kirkwood (2018), the fact that women are concentrated in the services sector and specifically in only four sectors (that is, domestic services, finance, trade, and services), places women in a more vulnerable position especially if the services sector is affected. Indeed, the main four industries accounts for more than 80% of women's employment, while it represents 62% for men (Kirkwood, 2018). Moreover, women have higher rates of temporary or seasonal employment, leading to a higher vulnerability than men (Kirkwood, 2018).

These gendered labour market differences lead to a significant income gap between men and women, with the median monthly income of men (3,600 rand) far exceeding that of women (R2,500) (Kirkwood, 2018). Consequently, women experience higher rates of poverty, especially if they are head of their household. There is ample evidence that individuals living

² In South Africa, Coloured is an official term for people from mixed races.

in female-headed households are more likely to be poor compared with individuals living in male-headed households (Gelb 2003; Posel 2014; Posel and Rogan 2000). As Sulla and Zikhali (2018) have shown, female headed households experience a higher poverty rate than male headed households across all periods and the gap between the poverty rate of the two groups has remained unchanged, at around 20 percentage points in each period. In 2019, 49.0% of women were poor against 30.0% of men. Moreover, there is a 10% higher chance of falling into poverty for a female-headed household while the likelihood of escaping poverty is higher for a male-headed household (Sulla and Zikhali, 2018).

Using the National Income Dynamics Study (NIDS) – Coronavirus Rapid Mobile Survey (CRAM) data, Casale and Posel (2020), argue that the early evidence is that the ‘hard lockdown’ in South Africa disproportionately negatively affected women. The authors find that, not only did more women than men lose jobs, but also more women had to reduce their hours of work compared to men. Thus, the proportion of employed women, which was already lower than that for men, reduced more than for men due to the ‘hard lockdown’, meaning that the employment gender gap increased due to the pandemic. Furthermore, there is emerging evidence that women, more than men, are in danger of suffering more intense effects of the COVID-19 pandemic, apart from the economic effects assessed here. For instance, women are traditionally the caregivers, and are thus susceptible to getting infected while taking care of sick family members (Kapur, 2020; Casale and Posel 2020). Girls might be forced to reduce time devoted to education compared to boys, in order to attend to chores in the home. Women and girls furthermore are responsible for home hygiene and would be expected to provide water for sanitation, (Gender in Humanitarian Action (GiHA), 2020). This is a challenge in many rural areas as well as townships in South Africa, where water has to be obtained from outside of the house, often at a considerable distance for many households. At the same time, in many traditional societies, women and girls are not prioritised when it comes to health care allocations. These and other non-economic effects could leave women in very precarious positions. A combination of all these effects could have long term implications on the vulnerability of women and girls, further leaving them behind their male counterparts.

These differences become important to uncover because they can assist in appropriate policy response by government to ameliorate the effects of the pandemic. While the outlined facts imply that the impact of COVID-19 would have different impacts on men and women, unfortunately, not much is known yet about the economic impact of diseases such as COVID-19 on gender. As pointed out by Wenham et al. (2020), there is a need to analyse the gendered impacts of the multiple outbreaks caused by the COVID-19. According to Davies and Bennett (2020), considering recent disease outbreaks, between 2014 and 2016, only 1% of publications on Zika and Ebola outbreaks were gender focused and there is a need to integrate a gender lens in this type of outbreak (Smith, 2019). For instance, during the Ebola crisis, women experienced higher unemployment rates than men and it took them longer to find a job after the outbreak, increasing their vulnerability (Burki, 2020). As mentioned by Seguino (2020, p28), gender inequality in “education, health, unpaid labour, employment, and wages” manifests in important economy-wide effects.

The contribution of this paper is to provide a gender focused economy-wide analysis of the impacts of the COVID-19 pandemic. This study thus goes some way towards closing the dearth of economy-wide gender focussed research in the face of a pandemic. Moreover, the South African case is particularly interesting as it is currently the most affected country in Africa by the pandemic (Galal 2020, Salgotra et al. 2020). The general equilibrium effects of COVID-19 shocks in this paper allow for both direct and indirect impacts of the shock to be analysed. The model is also linked to a microsimulation model that allows for a discussion of poverty and its severity. Additionally, the data used for the modelling is disaggregated by

gender. The study is thus timely in providing, evidence of possible differential gendered effects of COVID-19 in the short run.

2. Methodology and Data

2.1 CGE model

To evaluate the impacts of the COVID-19 induced lockdown on South African women, a Computable General Equilibrium (CGE) model is used. The CGE model is then linked to a micro model in order to assess the redistributive impacts on poverty. CGE models are able to represent the whole economy including different institutions and more especially, women. CGE models enable the capturing of different impacts of the COVID-19 (international and domestic impacts) and are thus appropriate tools to use in this case. Indeed, they can capture the shocks coming from the rest of the world and transmit them to the national economy, capturing as well the impacts on households, firms and government. Interestingly, these models account for the existing intersectoral links, and also capture the different transmission effects between sectors. Therefore, these models are the appropriate tool to capture direct as well as indirect impacts induced by the COVID-19 shock (Maliszewska et al. 2020; Laborde et al. 2020) and have been used to evaluate pandemic impacts in the past (Beutel et al. 2009; Keogh-Brown et al. 2010; Fofana et al. 2015). The macro model we use builds from the PEP 1-1 model developed by Decaluwé et al. (2013) and modifies several assumptions in order to integrate the gender dimension and represent the realities of South Africa. A total of 21 activities and commodities are included in the model, with each activity using capital, labour and intermediate goods consumption to produce output. Given the specificity of the South African labour market, our labour factor is disaggregated according to skills (unskilled, semi-skilled and skilled), population groups (African, Coloured, Indian and White) and gender (male, female). Technically, the production function is a 5-level nested function. At the top, output is a Leontief between value added and intermediate consumption. The former is a CES function between composite labour and capital. At the third level, composite capital is disaggregated into skills following a CES type of function. Each skill category is further disaggregated into population groups that will be split between male and female at the fifth level. Activities use all the different types of labour, but in different proportions. For instance, the “other services” sector, which accounts notably for the community, social and personal services sector, is female intensive, and hires relatively more unskilled African women, while the mining sector, which is highly male intensive, hires mainly African semi-skilled men. This disaggregation according to gender and population groups is highly relevant for South Africa due to its unique historical legacy of racial discrimination. Job opportunities are not equal among the population, and despite policies to correct the inequalities inherited from the past, major differences still remain. This phenomenon of the labour market is translated into different unemployment rates. Women particularly face a higher unemployment rate for each population group (Statistics South Africa, 2019), a feature that our model directly takes into account.

There are four different institutions that the model distinguishes, namely, households, firms, government and the rest of the world. Households are disaggregated into two categories, according to whether they are a female or male-headed household. Both households receive their income from labour, capital and transfers. Male-headed household receive a higher share of their income from labour (86.6%) compared to female-headed households who receive 71.6% of their income from labour. Transfers from the government represent 5% of female-headed households’ income, compared to 1% for male-headed

households. Both households spend the highest proportion of their income on final consumption with the proportion spent higher for women (87.9%) than for men (81.7%). The remainder of income is spent on direct taxes, transfers to other economic institutions and savings. Firms' income is derived from capital income and transfers from other agents. They distribute dividends to other agents, pay corporate taxes and save the remainder. Government collects direct taxes from households and firms, indirect taxes (such as production taxes, taxes on consumption and import duties) and receives transfers from other institutions (dividends, social contributions etc). It then spends its income mainly on the non-tradable sectors' production (education, health, public administration) and pays transfers to other institutions (pensions, grants to households). Government savings is the difference between income and what it consumes. At the base year, government's savings is negative. In his budget speech of February 2020, the minister of finance conceded that South Africa's budget deficit was higher than it had ever been in 27 years. The projections were at that stage for an increase gross government debt to 71.6% of gross domestic product (GDP) by 2022-23. At that time, the consolidated budget deficit was expected to reduce from 6.8 percent to 5.7 percent between 2020/21 and 2022/23 (National Treasury, 2020). Since then, COVID-19 pandemic has happened, worsening the situation substantially. Indeed, the country has had to table an adjustment budget and now anticipates the budget deficit to be more than double that anticipated in February 2020.

To link South Africa and the rest of the world, the Armington assumption is used whereby trade is modelled based on imperfect substitutability of commodities given their origin. This is a standard assumption used in traditional CGE modelling. On the exports side, South African producers can either sell their production on the local market or on the international market. However, it is assumed that these producers cannot export as much as they want, and if they want to increase their world market shares, they need to be more competitive than other international producers. Technically, this means a finite elasticity for the export demand, which reflects the competitiveness of local producers on the international markets is assumed.

South Africa has a very high unemployment rate as earlier mentioned, and this is captured in the model by assuming the so-called 'wage curve' of Blanchflower and Oswald (1995). The wage curve assumes that there is a relationship between wages and unemployment rate. For South Africa, Kingdon and Knight (2006) have estimated the corresponding elasticities and find a similar value than that of Blanchflower and Oswald (1995).

Several closure rules are imposed to close the CGE model. Firstly, the nominal exchange rate is the numeraire of the model. Secondly, South Africa is assumed to be a small open economy and therefore takes world prices as given. Thirdly, the current account balance is assumed exogenous. Fourthly, capital migration across sectors is not permitted in the short run while labour is mobile across sectors. Lastly, government's spending is assumed fixed. It should be noted that this paper does not evaluate any fiscal policy package intended to mitigate the adverse impacts of COVID-19. Instead, the paper is focused on evaluating how the COVID-19 is affecting women.

2.2 Data

The database used for the CGE model is a Social Accounting Matrix (SAM) by Davies and Thurlow (2013) and has been disaggregated to take into account the gender dimension and population groups using data of the South African industry by gender, occupation and population group (Statistics South Africa, 2012). Along with the SAM, additional data such as

income elasticity from Burger et al. (2017) and trade elasticities from Ntombela et al. (2018) are used to operationalise the rest of the model.

2.3 Micro simulation module

The CGE model does not allow us to explicitly assess the poverty and impacts of the COVID-19 pandemic. To deal with this, a micro module is linked to the CGE model using a top-down technique. This enables feeding of the macro results on households' income and prices into the micro component of the model. Foster et al. (1984) poverty indices are then computed by making use of the NIDS survey (NIDS, Wave 5) (SALDRU, 2018)). As reported in Statistics South Africa (2012), women's poverty is higher than that of men irrespective of the poverty line used. Using the upper bound poverty line on the NIDS data, we find that in the base year, 46% of women are poor compared to 30% of men.

3. Results and findings

3.1 Scenarios

The COVID-19 pandemic is affecting the South African economy in many ways through international and domestic channels of transmission. On the international side, we identify three shocks induced by the COVID-19. Firstly, we expect that South Africa faces a decrease in demand for its exports as most of South Africa's major trading partners have had some form of lockdown. China, the United States and European countries are amongst the country's major trade partners (World Bank, 2018). The economic turmoil in these major trading partners leads them to reduce their imports, including those coming from South Africa. Secondly, the world had experienced a drop in oil price and mineral prices. While South Africa is a net oil importer it exports many different minerals, constituting 20% of the country's total exports. Finally, the last international channel is via remittances. South African households receive remittances from the rest of the world (relatives or friends residing and working overseas etc.), which are assumed to substantially reduce during the COVID-19 pandemic. Indeed, given the reduced-activity overseas, the incomes coming from abroad is likely to be reduced. On the domestic channels, we identify two channels. Firstly, the lockdown forces the majority of the population to stay at home, and where possible, to work remotely. However, for many workers, especially the low skilled telework is not a feasible option (Kerr and Thornton, 2020). Moreover, it places a very heavy burden on women, as they have to attend to many domestic chores including home care and schooling while schools are closed as well as preparing meals. As a result, women have very limited time to do other work. Being at home, workers are not using the capital in the factories, which becomes less productive. This decreased productivity of factors of production impacts the production of all sectors, although with different intensities. Following Arndt et al. (2020), Bhorat et al. (2020), as well as the pronouncements of the government on essential and non-essential sectors during lockdown, the sectors of the economy are classified according to their degree of exposure to the shock. For example, the food sector is considered mildly affected, as this is an essential good whose sale continues during lockdown, while the tourism as an example is considered non-essential and is hence considered severely affected. Bhorat et al (2020) using data from the Business Impact Survey from StatSA, compute that only a quarter of agricultural firms were operating at full capacity, while this share falls to less than 5% for firms in the trade sector and to 0% for firms in the construction sector. Secondly, it is expected that local transport costs will increase during the pandemic due for example to increased amount of time it now takes to load a truck fully.

A mild and a severe scenario are designed (see for example Calderon et al. (2020) for different scenarios on the global economy). Table 1 summarises the simulations. The severe scenario adds the mild scenario, an assumption that it will take longer for South Africa's major trading partners to recover fully and this assumption implies that South African import demand remains lower than in the mild scenario. We model this additional assumption by imposing a further reduction of exports by 15% to the mild scenario simulations. In fact, at the time of writing this paper, China is expected to reach a GDP growth of 1% in 2020, while the USA would experience a drop of 8% and the European countries experience a drop of 10.2% (IMF, 2020). It is important to point out that little is known about the magnitude of the shocks as the effects of the pandemic are ongoing. Therefore, to build a reasonable scenario, we have used some magnitudes from existing studies (Arndt et al. 2020; Calderon et al. 2020); Laborde et al. 2020) and adopted them to our model. For instance, while Laborde et al. (2020) evaluate the transport costs increase at 3% we impose a lower 2% increase given that our model is not a global model as that of Laborde et al. (2020). Inevitably, there has to be an element of learning from other studies as well as making some reasonable assumptions due to the novelty and still evolving nature of the coronavirus.

Table 1: Scenarios

	Mild Scenario	Severe Scenario
International channels		
Decrease in exports	-10% for all commodities	-15% for all commodities
Decrease in world prices for oil and minerals	20% decrease for oil price 8% decrease for minerals	20% decrease for oil price 8% decrease for minerals
Decrease in remittances	-10%	-10%
Domestic channels		
Decrease in productivity for the sectors	- 2% for mildly affected -5% for moderate -10% for largely affected -15% for severely affected	- 2% for mildly affected -5% for moderate -10% for largely affected -15% for severely affected
Decrease in labour productivity	-2% for skilled workers -3% for semi-skilled -10% for unskilled	-2% for skilled workers -3% for semi-skilled -10% for unskilled
Increase in transportation cost	2%	2%

3.2 Results

Macro and sectoral results

The macroeconomic impacts of the COVID-19 pandemic are substantial, since the economy simultaneously gets affected on the demand and the supply side as previously discussed. This combined effect results in a reduction by 9.20% in GDP in the mild scenario and 11.14% in the severe scenario (Table 2). On the supply side, given that workers are less productive either because they cannot work properly from home, especially low skilled workers, or because they lose some time when applying the social distancing and sanitation rules, as well as because capital is less used, production in all sectors is decreasing. The reduction in total production also leads to a fall of total labour demand for each industry,

increasing the unemployment rates for each labour category. The increase in unemployment rates and drop in wage rates for households lead to a decrease in their income, and consequently on their consumption, with female headed households experiencing higher reduction in consumption under both scenarios than male headed households.

Table 2 : Macroeconomic impacts (in % change)

	Mild	Severe
Real consumption (Male Headed Household)	-7.58	-7.84
Real consumption (Female Headed Household)	-7.86	-8.22
Real GDP	-9.20	-11.14
Consumer Index Price	-0.51	-2.15
Total investment	-22.06	-26.02

Source: Computation from the CGE model

As explained above, all the sectors face a decrease in their production induced by the drop in the productivity of production factors. However, the impacts are not uniform across sectors as some sectors may face as well a decrease in the external demand. Indeed, the sectoral impacts differ according to whether they have been characterised as essential or not and whether export-oriented or not. Thus, those sectors negatively affected experience reduced production, lay off workers and scale down on consumption of intermediate inputs which impacts other sectors of the economy. The indirect effects are significant to the extent that some of the sectors that had not been classified as severely affected before the pandemic now find themselves heavily impacted by the resultant decline in the activity of other sectors. A case in point is production in the mining sector that drops by more than 13%, 14% for the other services sector and slightly more than 5% for the food sector under the mild scenario. This is despite the food sector not identified as a heavily impacted sector ex-ante. All the sectors of the economy see their production declining but for three of them, the decrease is quite big: the construction sector experiences a drop by 17.20%. As 78% of the construction commodities are sold as investment goods, the drop in investment budget (-22.06%) is explained by the sharp drop in construction sector's output. The production of the electrical machineries and apparatus sector drops by 15.25% given the drop in investment and the drop in the construction sector, as the construction sector uses this commodity as an input. Finally, the production of the other services sector drops by more than 14%. This sector is particularly interesting as it is highly labour-intensive utilising more women as they represent a little more than 60% of the labour force. The drop of production in this sector leads to a drop by 14.07% of its labour demand, mainly affecting women. Indeed, in this sector the labour demand for unskilled African and Coloured women decreases by more than 10% for each type. Unemployment rates are increasing for all categories of workers, but it is mainly unskilled workers who are experiencing the biggest increase, and among them, Coloured and Indian women are most affected given that they work in the highly affected sectors. For instance, 25% of unskilled Coloured women work in the "other services" sector. This granular information on the effects of the pandemic will be important for targeted policy responses.

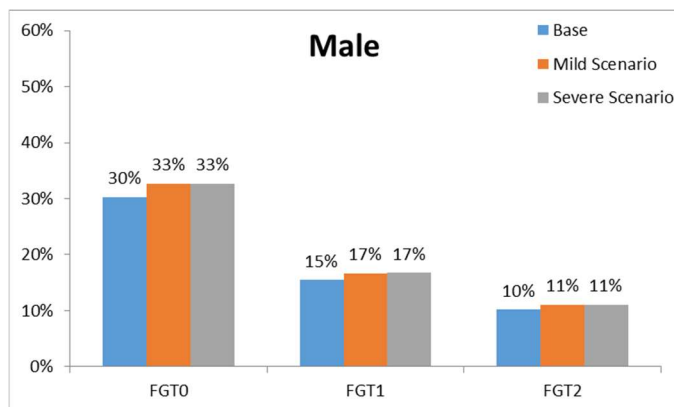
The decline in the output of the sectors has a direct impact on exports, which are decreasing. The reductions in factor demands as well have a negative impact on the remuneration of people working in those sectors. Indeed, given the general slowdown, sectors are retrenching workers and wage rates are decreasing.

Gendered results and poverty impacts

Overall, households face a decrease in income by 8.04% for male headed households and 8.33% for female headed households in the mild scenario and 9.82% and 10.19% for male and female headed households respectively in the severe scenario. Given this decrease, households reduce their consumption levels. Firms' income, which is mainly based on capital income, is decreasing respectively by 9.63% in the mild scenario and 11.81% in the severe scenario. This drop in firms' income leads to a decrease in their savings and direct taxes paid. Government's income is dropping as well given the decrease in direct taxes from households and firms, and the decrease in the receipts of indirect taxes. All in all, government's income decreases by 9.91% in the mild scenario against 11.88% in the severe one. This drop in government's income and fixed spending leads to a massive increase of the government's current deficit, which was already worrying before the crisis. The decrease in the income and savings of each of the agents leads to a decrease in the total investment budget (see Table 2), which will particularly affect sectors such as construction or machinery.

Figure 1 and 2 show the gendered impacts on poverty of the two scenarios. The results in terms of poverty show that poverty rates, (FGT0) among women increase by 3 to 5 percentage points depending on the scenario, ending up with 51% of female headed households who are poor in the severe scenario (Figure 2). Poverty rates also increase for male headed households but by a slightly lower magnitude compared to women (increases by only 3 percentage points for men in the severe scenario). Furthermore, the increase in the poverty depth (FGT2) indicator tells us that the poorest among women will be particularly more affected. As a result, COVID-19 will increase women's vulnerability.

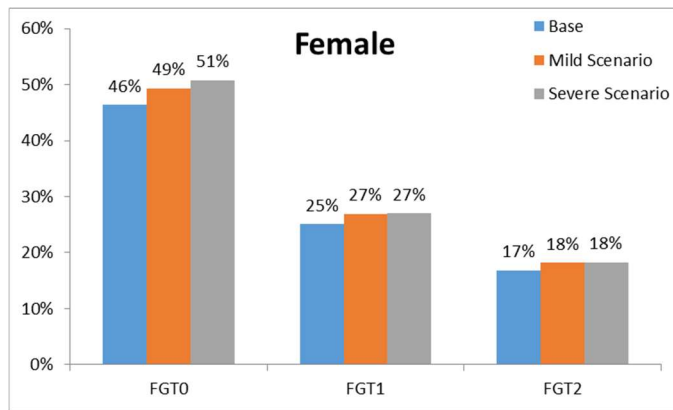
Figure 1: Impacts on male poverty



Source: Computations from the micro model

Note: FGT0 is poverty head count ratio; FGT1 is poverty gap index and FGT2 is poverty depth.

Figure 2: Impacts on female poverty



Source: Computations from the micro model

Note: FGT0 is poverty head count ratio; FGT1 is poverty gap index and FGT2 is poverty depth.

4. Conclusion

This paper, by using a general equilibrium model that is linked to a microsimulation model, investigates the economic and gender effects of COVID-19 in South Africa. Responses to COVID-19 pandemic are shown to have varied and devastating effects on the economy and the population. With the reduction in economic activity being more pronounced the more severe are assumptions about severity of the scenario, the main findings are that there are differences by gender in the way employment and poverty are impacted. Women suffer disproportionately more negative impacts of the pandemic compared to men even though the differences are small. Our results, that women have been affected relatively more than men go in the same direction as Casale and Posel (2020). The negative effect on women in our analysis is because the sectors that are female labour intensive see more negative effects as a result of both the direct and indirect effects caused by the pandemic. This leads to women receiving less labour incomes than their male counterparts. Concerning poverty, given that poverty for female headed households was already higher in South Africa, than for male headed households, this pandemic worsens the vulnerability of females. These results are important in informing evidence-based responses by government to the COVID-19 pandemic. Although this study is for South Africa, many other African countries can take lessons from this study as the situation of inequality in women employment is comparable to that of many developing countries where most women are employed in service sectors (International Labour Office (ILO, 2016)) and tend to occupy low-skilled positions. For governments to respond in a manner that responds to such labour market biases, such detail as uncovered in this study would be crucial. In concluding, we must urge caution to be exercised when interpreting the results in this paper as pointed out, much uncertainty about data, magnitude of the shocks and future evolution of the disease exists at this stage of the pandemic. Furthermore, as was already mentioned, our model does not take into account any fiscal stimulus or social transfer plan set up by the government which is an important subject of further research.

References:

Arndt, C., Davies, R., Gabriel S., Harris, L., Makrelov, K., Modise, B., Robinson, S, Simbanegavi, W, van Seventer, D, and Anderson, L . (2020) “Impact of COVID-19 on the South African economy-An initial analysis”, SA-TIED Working Paper 111

Beutels P, Jia N, Zhou QY, Smith R, Cao Wu-Chun and de Vlas Sake J.(2009) “The economic impact of SARS in Beijing, China“, *Tropical Medicine and International Health* 14 (1) 85-91 doi:10.1111/j.1365-3156.2008.02210.x

Bhorat, H., Köhler, T., Oosthuizen, M., Stanwix, B., Steenkamp, F. and Thornton, A. (2020). “The Economics of COVID-19 in South Africa: Early Impressions”. Development Policy Research Unit Working Paper 202004. DPRU, University of Cape Town.

Blanchflower DG. and Oswald, A. (1995). “An introduction to the wage curve”, *Journal of Economic Perspectives*, 9(3), 153-167.

Burger, R., Coetzee, L., Kreuser, C., Rankin, N. (2017) “Income and price elasticities of demand In South Africa: An application of the linear expenditure system”. *South African Journal of Economics*, 85(4), 491-514.

Burki, T (2020) “The indirect impact of COVID-19 on women”, *The Lancet*, vol 20, August 2020: 904-905

Calderon, C., Kambou, K., Djioufack, C., Korman, V., Kubota, M., and Canales, C. (2020) “Africa’s Pulse, No. 21” (April), World Bank, Washington, DC. Doi: 10.1596/978-1-4648-1568-3. License: Creative Commons Attribution CC BY 3.0 IGO

Casale, D. and Posel, D. (2020) “Gender and the early effects of the COVID-19 crisis in the paid and unpaid economies in South Africa”. National Income Dynamics Study (NIDS) – Coronavirus Rapid Mobile Survey (CRAM)

Davies, S. and Bennett, B. (2020) “A Gendered Human Rights Analysis Of Ebola And Zika: Locating Gender In Global Health Emergencies,” *International Affairs* 92, no. 5, accessed May 24, 2020, <https://doi.org/10.1111/1468-2346.12704>.

Davies, R. and Thurlow, J. (2013). “A 2009 Social Accounting Matrix (SAM) for South Africa”. Washington DC, USA: International Food Policy Research Institute. <https://www.ifpri.org/publication/2009-social-accounting-matrix-sam-south-africa>

Decaluwé, B., Lemelin, A., Robichaud, V., and Maisonnave, H. 2013. “PEP-1-1 (Single-Country, Static Version)”. PEP. <https://www.pep-net.org/pep-1-1-single-country-static-version>

Espi, G., Francis., D and Valodia., I. (2019) “Gender inequality in the South African labour market: Insights from the Employment Equity Act data”. *Agenda*, 33:4, 44-61, DOI: 10.1080/10130950.2019.1674675

Fofana, I, Odjo, S, and Collins, J. (2015) An assessment of Ebola-related food security threat in Guinea. Selected Paper prepared for presentation at the 18th Annual Conference on Global Economic Analysis "Information for the Policy Maker: Practical Economic Modelling for

Tomorrow" Dakar, Senegal, June 17-19, 2015. Center for Global Trade Analysis, Purdue University.

Foster, J, Greer J and Thorbecke E, (1984). "A class of decomposable poverty measures", *Econometrica: Journal of the Econometric Society*, 52(3):761-766.

Galal, S. (2020) "Coronavirus (COVID-19) cases in South Africa as of October 12, 2020, by region" *Statista*. Oct 13, 2020. URL: <https://www.statista.com/statistics/1108127/coronavirus-cases-in-south-africa-by-region/#statisticContainer> [2020-10-15]

Gelb, S. (2003). "Inequality in South Africa: Nature, Causes and Responses". Johannesburg: Edge Institute.

Gender in Humanitarian Action (GiHA) Asia and the Pacific, 2020 "The COVID-19 Outbreak And Gender: Key Advocacy Points From Asia And The Pacific," GiHA, March 2020, <https://www2.unwomen.org/media/field%20office%20eseasia/docs/publications/2020/03/ap-giha-wg-advocacy.pdf?la=en&vs=2145> Accessed May 2020

Gradín C. (2018) "Occupational gender segregation in post-apartheid South Africa". WIDER Working Paper No. No. 2018/53. The United Nations University World Institute for Development Economics Research (UNU-WIDER), Helsinki.

International Labour Office (ILO) (2016) "Women at Work: Trends". Geneva: ILO, 2016 available at: https://www.ilo.org/wcmsp5/groups/public/dgreports/dcomm/publ/documents/publication/wcms_457317.pdf Accessed May 2020.

International Monetary Fund (2020) World Economic Outlook Update, June, available at <https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020>

Kapur, N. (2020) "Gender Analysis: Prevention and Response to Ebola Virus Disease in the Democratic Republic of Congo" [January 2020] CARE, https://www.care-international.org/files/files/Ebola_Gender_Analysis_English_v2.pdf Accessed May 2020

Keogh-Brown, M. Wren-Lewis S, Edmundsa W. J, Beutels P and Smith RD(2010)The Possible Macroeconomic Impact On The Uk Of An Influenza Pandemic, *Health Econ.* 19: 1345–1360 DOI: 10.1002/hec.1554

Kerr, A. and Thornton, A. (2020) "Essential workers, working from home and job loss vulnerability in South Africa". A DataFirst Technical Paper 41. Cape Town: DataFirst, University of Cape Town.

Kingdon, G G, and J Knight (2006). "How Flexible are Wages in Response to Local Unemployment in South Africa?" *Industrial and Labor Relations Review* 59(3):471–95. <https://doi.org/10.1177/001979390605900308>

Kirkwood, D J. (2018). "Gender in South Africa: background note for the South Africa systematic country diagnostic" Washington, D.C. World Bank Group. <http://documents.worldbank.org/curated/en/206711529305148222/Gender-in-South-Africa-background-note-for-the-South-Africa-systematic-country-diagnostic>

Laborde, D, Martin, W and Vos, R. (2020) “Poverty and food insecurity could grow dramatically as COVID-19 spreads. In COVID-19 and global food security”. eds. Johan Swinnen and John McDermott. Part One: Food security, poverty, and inequality, Chapter 2, Pp. 16-19. Washington, DC: International Food Policy Research Institute (IFPRI).
https://doi.org/10.2499/p15738coll2.133762_02

Maliszewska, M, Mattoo A., and van der Mensbrugge D. (2020) “The Potential Impact of COVID-19 on GDP and Trade: A Preliminary Assessment. Policy Research Working Paper 9211. The World Bank. Available at:
<http://documents.worldbank.org/curated/en/295991586526445673/pdf/The-Potential-Impact-of-COVID-19-on-GDP-and-Trade-A-Preliminary-Assessment.pdf>

Mosomi, J. (2019) “Distributional changes in the gender wage gap in the post-apartheid South African labour market”. WIDER Working Paper No. 2019/ 17, Cape Town: UNU World Institute for Development Economics Research.

National Treasury South Africa (2020) “Budget review 2020“, National Treasury Pretoria, South Africa. URL:
<http://www.treasury.gov.za/documents/National%20Budget/2020/review/FullBR.pdf>
[Accessed October 2020]

Ntombela, S., Kalaba, M., Bohlmann, H. (2018) Estimating trade elasticities for South Africa’s agricultural commodities for use in policy modeling. *Agrekon* 57(3–4):221–232

Posel, D. (2014) “Gender Inequality”. In H. Bhorat, A. Hirsch, R. Kanbur, and M. Ncube (eds), *The Oxford Companion to the Economics of South Africa*. Oxford: Oxford University Press.

Posel, D., and M. Rogan (2000) “Gendered Trends in Income Poverty in Post-Apartheid South Africa”. 1997–2006’. *Development Southern Africa*, 29(1): 97–113.

Salgotra, R., Gandomi, M. and Gandomi, A H. (2020) “Evolutionary modelling of the COVID-19 pandemic in fifteen most affected countries“, *Chaos, Solitons & Fractals*, Volume 140, <https://doi.org/10.1016/j.chaos.2020.110118>

Seguino, S. (2020) “Engendering Macroeconomic Theory and Policy”, *Feminist Economics*, 26:2, 27-61, DOI: [10.1080/13545701.2019.1609691](https://doi.org/10.1080/13545701.2019.1609691)

Smith, J. (2019) “Overcoming the ‘tyranny of the urgent’: integrating gender into disease outbreak preparedness and response”. *Gender & Development*, 27:2, 355-369, DOI: 10.1080/13552074.2019.1615288

Southern Africa Labour and Development Research Unit (2018). National Income Dynamics Study 2017, Wave 5 [dataset]. Version 1. Pretoria: Department of Planning, Monitoring, and Evaluation [funding agency]. Cape Town: Southern Africa Labour and Development Research Unit [implementer], 2018. Cape Town: DataFirst [distributor], 2018. DOI: <https://doi.org/10.25828/fw3h-v708>

Statistics South Africa (2012) Gender Statistics in South Africa, 2011. Pretoria: Statistics South Africa, 2012

Statistics South Africa (2019). Quarterly Labour Force Survey, Quarter 4, available online <http://www.statssa.gov.za/publications/P0211/P02114thQuarter2019.pdf>

Sulla, V. and Zikhali, P. (2018) “Overcoming Poverty and Inequality in South Africa: An Assessment of Drivers, Constraints and Opportunities” (English). Washington, D.C.: World Bank Group. <http://documents.worldbank.org/curated/en/530481521735906534/Overcoming-Poverty-and-Inequality-in-South-Africa-An-Assessment-of-Drivers-Constraints-and-Opportunities>

Wenham, C., Smith, J., and Morgan, R. (2020) “COVID-19: the gendered impacts of the outbreak”. *The Lancet*, Published Online March 6, 2020 [https://doi.org/10.1016/S0140-6736\(20\)30526-2](https://doi.org/10.1016/S0140-6736(20)30526-2)

World Bank (2018) “World Development Indicators Online database.”