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The Gendered Impacts of Trade: Technology, Tasks and Import Competition

Asha Sundaram

Department of Economics, Northeastern University
Policy Research in International Services and Manufacturing (PRISM)
a.sundaram@northeastern.edu

Lawrence Edwards

School of Economics, University of Cape Town
Policy Research in International Services and Manufacturing (PRISM)
lawrence.edwards@uct.ac.za

Refilwe Lepelle

School of Economics, University of Cape Town
Policy Research in International Services and Manufacturing (PRISM)
refilwe.lepelle@uct.ac.za

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Abstract

We investigate the impact of import competition on the gender gap. Leveraging data on individual labour market outcomes from post-Apartheid South Africa, we show that an increase in import penetration from China between 1997 and 2003 is associated with a narrowing of the gender earnings gap. This effect comes from more robot-intensive, low markup and more unionised industries. We provide further evidence that the increase in import penetration is associated with a relative increase in women in occupations specialising in more manual tasks, consistent with technological upgrading reducing the comparative advantage of men in brawn-intensive activities. We therefore highlight the interactions between import competition, technology and task specialisation in driving relative labour market outcomes for women.

Keywords: China shock, Gender gap, Robots, South Africa

JEL Codes: F16, O14, O16

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School of Economics Building, Middle Campus,
University of Cape Town Private Bag,
Rondebosch 7700, CapeTown,
South Africa
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1. Introduction

A burgeoning literature focusing on the uneven impacts of trade has examined its differential impacts on men and women. It has far from reached a consensus, highlighting that gendered impacts of trade can be context-specific, depending on the nature of the trade shock an economy is facing and its level of economic development. We contribute to this literature by examining the impacts of an increase in import competition on the gender gap in earnings in the context of post-Apartheid South Africa (or S.A.). Our analysis highlights the role of technology, and a change in the nature of tasks as potential channels through which greater import competition impacts men and women differently.

South Africa is an excellent case for a study on the impacts of trade on inequality. After the democratically elected government came to power, it undertook steps to liberalise trade and capital movement. Aggregate tariff protection fell considerably, falling from above 19% in 1994 to around 8% in 2004 (Edwards, 2005), exposing a relatively large manufacturing base to increased international competition[1].

Further, though the country has committed sustained efforts to combat inequality, it remains one of the most unequal countries in the world as measured by the Gini index (Schiel et al., 2016). Trends in household income inequality are largely driven by changes in wage inequality, placing labour markets at the centre of the inequality challenge in South Africa (Wittenberg, 2017). While the primary source of this high inequality is the historical legacy of Apartheid, a World Bank inquiry into its sources identifies a high gender gap in earnings as a key driver of income inequality in the country (Sulla et al., 2022). In this setting, it is pertinent to ask whether increased exposure to international competition can exacerbate or mitigate the gender gap.

Finally, we are able to leverage individual data on demographic characteristics, employment, earnings and occupations over the period 1997 - 2003. The period corresponds with a significant increase in import competition from China as it acceded to the World Trade Organisation (WTO), which in turn has been associated with rising labour productivity and falling employment in South African manufacturing industries and firms (Edwards & Jenkins, 2015; Torreggiani & Andreoni, 2023). The data, therefore, allow us to use the exogenous increase in Chinese imports as a natural experiment to identify the impacts of greater import competition on the gender gap.

We delve into potential drivers of differences in the effect of the increase import competition on women relative to men. First, as argued by Becker (1957), increased competition should reduce economic rents required to sustain discrimination, thereby reducing it and leading to a decrease in the gender earnings gap. Next, greater import competition can raise incentives to upgrade technology. For example, as competition reduces the elasticity of demand, optimal firm output expands. This increases the gains from technological upgrading because a firm operating at a larger scale can spread the fixed costs of technology adoption over a larger quantity of output (Desmet et al., 2020). Other theories emphasise how increased international competition triggers defensive innovations by firms in order to survive (Wood, 1995; Thoenig

[1] Available estimates indicate that these tariff reductions contributed towards declines in manufacturing employment, with stronger effects in regions where employment was concentrated in industries facing relatively large tariff reductions (Erten, Leight, and Tregenna, 2019).

& Verdier, 2003). We argue that switching to modern technology, such as robots, reduces the relative advantage of ”brawn” in production because robots perform physical tasks, weakening the biologically rooted comparative advantage of men compared to women in production activities (Rendall, 2017).

Our empirical analysis relates import penetration from China to the gender gap in earnings between 1997-2003. To account for the possibility that shocks specific to the domestic economy drive imports from China, we follow standard practice in the literature to instrument for Chinese import penetration using China's exports to the rest of the world (ROW), except S.A. (Autor et al., 2013). Using this instrumental variables estimation strategy, we find that an increase in Chinese import penetration is associated with a decrease in earnings for both men and women, consistent with a negative impact of import competition on labour demand. However, this negative effect is significantly mitigated for women. Specifically, a one percentage point increase in Chinese import penetration is associated with a 2.08% decrease in earnings for men; but only a 0.82% decrease in earnings for women. We find no discernible impacts on margins of adjustment other than earnings, such as hours worked or informality. The difference between impacts on male and female earnings is statistically significant and is robust to employing alternate instruments, specifications, cuts of the data and accounting for other trade-related factors such as import tariffs and exports.

We look for evidence of the channels underlying our results in several ways. We begin by estimating our baseline model for industries where robot adoption is more likely, captured by the extent of robot capital employed in the industry in the United States. We show that the positive differential effect on women's earnings is stronger in these industries, consistent with the idea that technological upgrading in response to import competition is associated with diminished comparative advantage of men. We find that the positive differential effect is stronger for industries where markups are low, again pointing to the technology channel as dominant. Presumably, if a decrease in labour market discrimination were the predominant channel at play, we would expect to see a narrowing of the gender gap in sectors where markups are high, signalling high economic rents. Further, we find that the positive differential effect is stronger in more unionised sectors. Given that men are more unionised than women, this result indicates that greater import competition is associated with a narrowing of the union wage premium in highly unionised sectors.

Next, we explore direct evidence for an increase in import competition leading to a relative increase in women represented in more manual occupations. The idea is that technological upgrading and robotisation open up occupations requiring performance of brawn-intensive, physical tasks to women by narrowing the biological advantage of men in such tasks. For instance, while lifting and moving heavy loads is a manual task intensive in brawn, upgrading to a forklift, which is an industrial machine that can move heavy loads, eliminates the need for brawn by letting the forklift operator manoeuvre the machine to perform the same function. Exploiting data on the nature of tasks for occupations in the U.S. from Acemoglu and Autor (2011), we find that while an increase in Chinese import penetration is associated with a decline in occupations requiring manual tasks among men, the decrease is almost negligible among women. In other words, in a relative sense, we pick up an increase in women in manual occupations. This is consistent with women switching into more manual occupations, or with reduced demand for manual tasks within these occupations that are usually done by men. Importantly, we find no such patterns for occupations requiring cognitive tasks. Finally, when

we split the sample by skilled and unskilled workers (based on education), we find that the relative positive effect for women in manual tasks holds mainly for unskilled individuals that are more likely to be involved in production (as opposed to white-collar) work.

Our study makes several contributions. First, it relates to the literature on trade and its impacts on the gender gap. Previous studies on trade and gender have primarily focused on the impacts of trade liberalisation, as measured by tariff reform or the signing of a Regional Trade Agreement (RTA), and have not reached a consensus on whether liberalisation has been beneficial or detrimental for women. Hakobyan and McLaren, 2018 find evidence of lower relative wage growth for married blue-collar women in areas of the U.S. that faced stiffest competition from Mexican imports following the North American Free Trade Agreement (NAFTA). On the contrary, Gaddis and Pieters (2017) document that the comprehensive tariff cuts across Brazil led to a reduction in the gender gap through a larger relative decrease in male labour force participation and employment. Juhn et al., 2014 find that tariff reductions associated with NAFTA induced Mexican firms to enter export markets, adopt new technologies that lower the demand for physically demanding tasks, and replace blue-collar male with blue-collar female workers.

However, the impacts of trade liberalisation that occur through tariff reform or RTAs are likely to be different from the impacts of an increase in import competition. For instance, RTAs and multi-lateral tariff liberalisation involve both, greater import competition and an increase in export market access. These two forces can jointly determine the gender gap as opportunities for women shift in the import-competing and export-oriented sectors, making it difficult to parse out the channels involved in determining trade liberalisation effects. Additionally, RTAs often involve reorganisation of global value chains (the Maquiladora sector in Mexico is an example) that might, in turn affect the gender gap. Further, RTAs are increasingly “deep” in that they reduce fixed trade costs in addition to variable trade costs such as tariffs (Bergstrand et al., 2023). Besides, tariff reform and RTAs are endogenous to local economic shocks, including inequality and technological progress, introducing challenges in empirically identifying their effects on the gender gap. Since we focus on an exogenous, external shock to imports that increases competition in the domestic economy, our study is less likely to suffer from these concerns.

Second, the bulk of the studies on the impacts of import competition on the gender gap focus on developed countries. Autor et al. (2015) find that areas in the U.S. that initially specialised in routine-intensive occupations experienced larger reductions in the employment-to-population rate of females compared to males in response to increased Chinese import competition. Besedeš et al. (2021) examine the impacts of trade liberalisation on gender gaps in local labour market outcomes in the U.S. and show that trade liberalisation with China reduced gender gaps in local labour markets, with this reduction driven by higher entry of women, specifically more educated women and exit of less educated men. Keller and Utar (2022) find that an increase in Chinese import competition was associated with an increase in the gender gap in Denmark and attribute this to prime-aged women focusing more on children and family.

To our knowledge, we are the only study to focus on the impacts of import competition on an emerging economy. This is relevant because import competition arising from the integration of developing countries into the world trading system may affect advanced countries in ways

that are different to other developing countries. Advanced countries can respond to import competition from developing countries by specialising in more hi-tech sectors or high-quality products, while other developing countries might face head-to-head competition in low-skilled labour-intensive sectors where they, too, have a comparative advantage. These adjustment channels might have varied effects on the gender gap.

Our study also delves into the technological upgrading channel underlying the effects of import competition on the gender gap. We investigate differential gender effects of import competition stemming from impacts on occupational structure and the tasks embedded therein. The study by Juhn et al. (2014) that also explores this channel does so in the context of NAFTA and finds no impact of changes in import market competition. Our study shows that though it leads to a decrease in earnings for both men and women, the negative effect of a rise in import competition can be mitigated for women, because it lowers relative demand for brawn-intensive tasks due to technological upgrading. These differences in results highlight how the impacts of import competition can vary depending on the country and the nature of the trade shock.

Finally, we contribute to the literature on robotisation and trade (Artuc et al. 2023), and to the task-based approach to examining inequality in labour market outcomes (Bhalotra et al., 2022). By proposing that the impacts of international trade can interact with robotisation to determine the nature of tasks performed by men and women, our study underscores the links between trade and technology in determining differential labour market outcomes for individuals based on comparative advantage.

The rest of the paper is organised as follows. Section 2 provides a conceptual framework to trace out the effects of import competition on the gender gap. Section 3 presents a background overview of South African trade with China. Section 4 details the empirical estimation strategy. Section 5 describes the data. Section 6 discusses results, and Section 7 concludes.

2. Conceptual Framework

In this section, we discuss a framework for analysing the impacts of import competition on the gender gap in earnings. We focus on two channels: labour market discrimination, and technological upgrading leading to differential demands for male and female labour given their comparative advantage in manual relative to other (cognitive or social) tasks.

2.1 Competition and Discrimination

As argued by Becker (1957), increased competition should reduce discrimination by reducing economic rents that are required to sustain discrimination. Theoretically, this should lead to a narrowing of the gender gap in earnings, though empirically, there is weak evidence for this effect (Ghani et al., 2016; Ederington & Sandford, 2016). To investigate this channel, we examine the impact of import competition on the gender gap in earnings separately for industries with high pre-period markups versus low markups. The idea is that a decrease in the gender gap through a decrease in discrimination should be stronger in industries with high economic rents needed to sustain such discrimination.

2.2 Technological Upgrading, Robots and Tasks

There are several models on how import competition from low-wage economies, such as China, can induce technological upgrading and innovation in firms. Aghion et al. (2005) show theoretically and empirically how product market competition leads to an inverted-U relationship where laggard firms are discouraged from innovating, but firms close to the world productivity frontier are incentivised to innovate. Greater import competition is also known to be associated with a pro-competitive effect, whereby the increase in the elasticity of demand associated with greater import competition raises optimal output of the surviving firm. In a setting where technological upgrading involves paying fixed costs to subsequently lower the variable costs of production, the gains from upgrading are now larger, because costs can be spread over a greater volume of output (Desmet et al., 2020). The increased competition also raises the incentive to incur search costs for cost-reducing defensive innovations in order to survive (Wood, 1995). 'Defensive innovation' to retain market share by domestic firms can also be driven by the threat of "technological leapfrogging or imitation" by foreign competitors (Thoenig & Verdier, 2003).

In the 'Trapped Factor' model of Bloom et al. (2013), reduced profits in import-competing firms lower the opportunity cost of fixed inputs, giving firms an incentive to redeploy those inputs away from producing old goods and towards innovation and development of new goods. Using this framework, Bloom et al. (2016) find evidence of increases in R&D, patenting, information technology and total factor productivity in a wide range of European firms in response to increased Chinese import competition over 1996-2007. Finally, import competition can drive firm reallocation effects whereby low-tech firms shrink and exit, thereby shifting the composition of firms towards relatively hi-tech firms. Torreggiani and Andreoni (2023) provide some evidence of this in South Africa, where within industries, firms that invest relatively more intensively in capital equipment, innovation and training programs tend to be less negatively affected by Chinese import penetration than other firms.

We posit that technological innovation within firms and switching to more modern technology can have two opposing effects on the gender gap:

On the one hand, technological innovations like the introduction of robots that perform physical tasks replace "brawn" skills, weakening the biologically-rooted comparative advantage of men compared to women in production activities (Rendall, 2017). We might, therefore, expect such technological upgrading to lower the gender gap by eliminating the comparative advantage of men in manual, brawn-intensive tasks. Indeed Ronald and Gonschor (2022) focus on Germany and find that technological progress is associated with a strong increase in the share of women in manual and non-routine cognitive occupations. Additionally, if routine-replacing technologies increase return to social skills, which women tend to have a comparative advantage in, automation may be associated with a lower gender gap in labour market outcomes (Albinowski & Lewandowski, 2024; Anelli et al., 2024).

On the other hand, technological upgrading may be associated with an increase in the gender gap because skilled men are likely to be over-represented in science and engineering occupations, occupations that see a productivity increase with robotisation and computerisation (Aksoy et al., 2021; Reenen, 2011). Ge and Zhou (2020) focus on the U.S. labour market between 1990 and 2015 and confirm nuanced effects of technology. They find

that an increase in robots decreases the male wage more than the female wage, but that an increase in computers reduces female wage more than the male wage.

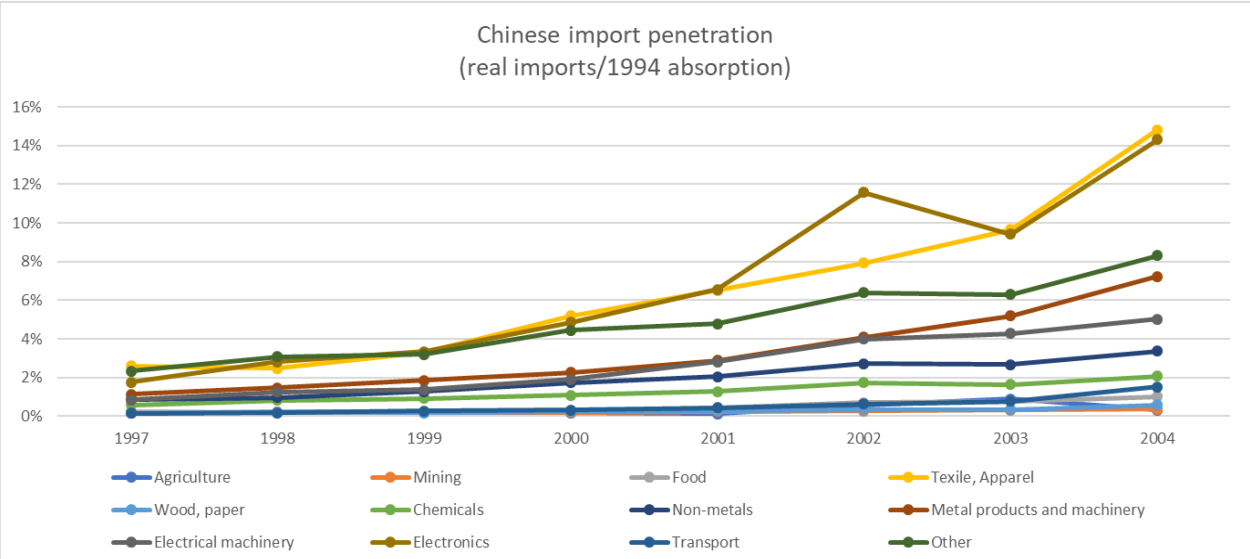
Therefore, the impact of import competition on the gender earnings gap through this channel is a priori ambiguous and is an empirical question. In subsequent sections, we attempt to tease out these channels using individual-level data on labour market outcomes for S.A.

3. Chinese Import Penetration in the South African Market

Since China joined the World Trade Organisation (WTO) in 2001, bilateral trade between South Africa and China has grown rapidly, with China becoming South Africa's largest export market, ahead of the United States, and its largest supplier of imports, ahead of Germany, in 2009 (Edwards & Jenkins, 2015). Imports, for example, rose sharply from less than $1 billion in 2000 to $3.5 billion in 2004, with further increases to $11.5 billion in 2010.

The growing presence of China in South African imports is revealed in the rising share of imports from China in domestic consumption. Figure 1 plots Chinese import penetration from 1997 to 2004, where import penetration is calculated as the ratio of real imports from China (in 1994 prices) to total consumption in 1994. Import penetration rose most strongly in clothing & textiles, and electronics, but increases were experienced in all the industries presented. The breadth of the increase in Chinese imports is also reflected at the less aggregated 3-digit level of the International Standard Industrial Classification, where all but one (other mining & quarrying) of 70 industries analysed experienced rising Chinese import penetration over the period.

Figure 1: Chinese import penetration in South Africa, 1997 to 2004



Notes: Import data sourced from UNcomtrade and aggregated to the 2-digit level of the International Standard Industrial Classification and deflated to 1994 prices using price deflators obtained from Statistics South Africa. Chinese import penetration is calculated as the ratio of real imports from China to total consumption in 1994, with the latter calculated as total domestic sales plus total imports minus total exports.

The rise in Chinese import penetration has fed concerns in South Africa regarding the potentially adverse effects on employment and output. Available empirical analysis has focused almost entirely on these two outcomes. Edwards and Jenkins (2015), for example, apply a Chenery-type decomposition to 44 South African manufacturing industries from

1992 to 2010 and calculate that increased import penetration from China caused output to be 5% lower and employment to be 8% lower in 2010 than they otherwise would have been. They also estimate the contribution of Chinese import penetration to rising labour productivity, measured as sales per worker, in South African manufacturing industries.

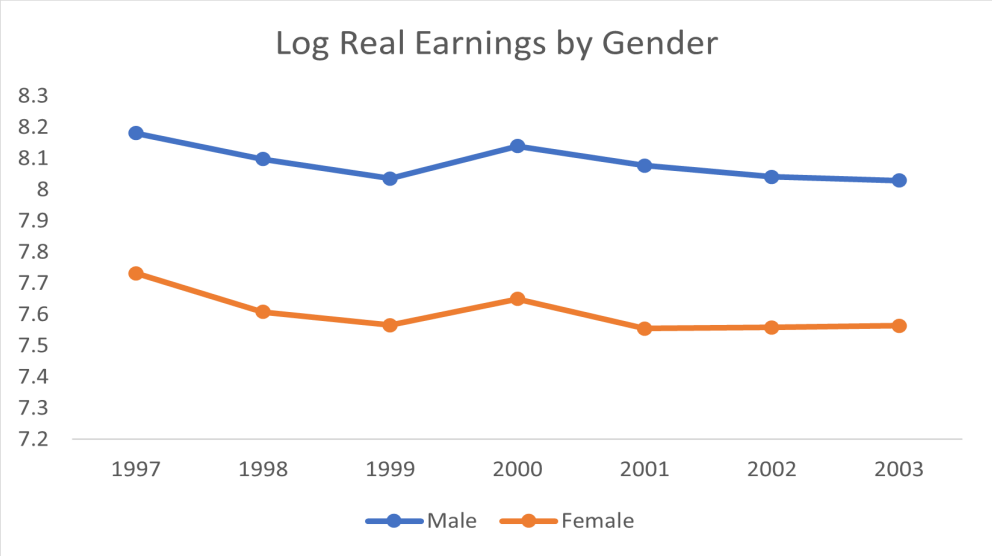
Their instrumental variable estimates suggest that a 1 percentage point increase in Chinese import penetration is associated with a 0.5% increase in output per worker within the industry. The impact on output per worker in low-wage industries is more than double the average. However, given their use of industry-level data, they are unable to isolate the relative contributions of within-firm technology upgrading and between firm composition effects in driving this outcome.

In a more recent study, Torreggiani and Andreoni (2023) use firm-level tax administrative data to estimate the impact of Chinese import penetration on the growth of dynamics of manufacturing firms in South Africa from 2010 to 2017. They estimate that the increase in Chinese import penetration caused a 1% increase in the shutdown probability for manufacturing firms over this period, but the effect was confined to firms not undertaking significant investments in capital equipment, innovation and training programmes. Amongst surviving firms, Chinese import penetration accounted for 4.28% of the loss in manufacturing-wide firm employment growth over this period.

Missing from both these studies is the effect of import competition on gender disparities in employment and earnings, through either the technology upgrading or the discrimination channels. The gender wage gap in South Africa is high, with Mosomi (2019) estimating a relatively constant median wage of 23-25% over the period 1993 to 2014. Firms engaging in international trade have been sown to be one potential source of this gap, with trading firms exhibiting a 25% higher gender wage gap than non-traders in the South African manufacturing sector (Bezuidenhout & Stolzenburg, 2019). With a share of 44% of total employment in South African manufacturing sector, these trading firms potentially constitute a major driving force of the overall national gender wage gap (Bezuidenhout & Stolzenburg, 2019). Neither of these studies, however, analyse how import competition may have contributed towards both the level and change in the gender wage gap.

Trends in the level and gap in earnings can be seen in Figure 2 that plots the log real earnings by gender from 1997 to 2003 using individual-level data from the Post-Apartheid labour Market Series (PALMS) database (Kerr & Wittenberg, 2017). Real earnings of males in 2000 were around 65% higher than females. From 2001, however, as imports from China rose, the earnings gap narrowed slightly as real earnings of females rise marginally, and those of males falls. This decline in the average gender wage gap over this period is also found by Mosomi (2019), who controls for individual characteristics. This narrowing of the gender wage gap provides tentative support for the potential influence of increased imports from China on relative earnings of males and females via the competition and technology channels.

Figure 2: Log real earnings by gender, 1997 to 2003



Notes: Own calculations using data obtained from PALMS.

4. Empirical Estimation

To estimate the impact of import competition on earnings of men and women, we estimate the following equation:

$$lnY_{ijrt} = \alpha_0 + \alpha_1 IP_{jt} + \alpha_2 Z_{jt} + \alpha_3 X_{ijrt} + \gamma_j + \mu_{rt} + \epsilon_{ijrt} \quad (1)$$

Here, Y_{ijrt} is the natural log of earnings for individual *i* of working age employed in industry *j*, located in region *r* (where region is defined as a rural or urban area within a municipality) at time t. IP_{jt} is Chinese import penetration in a 3-digit ISIC industry *j* at time *t*,Z_{jt} is a vector of industry-level controls such as the import tariff and export orientation of the industry, X_{ijrt} is a vector of individual characteristics including education, age, age squared, race and marital status, γ_j and μrt are sets of industry and region-year fixed effects, respectively and ϵ_{ijrt} is the idiosyncratic error term. The fixed effects account for unobserved shocks common to regions and industries that drive import competition and earnings simultaneously. The inclusion of industry fixed effects further controls for differences in the gender composition of employment *between* industries. Our estimates, therefore, capture how Chinese import competition affects the gender gap in earnings *within* industries (and within regions) over time[2].

The coefficient of interest is α_1, which captures the impact of greater import competition on earnings. We expect $\alpha_1 < 0$, since greater import competition is associated with shrinking market size domestically, and therefore a decrease in labour demand. While this potentially applies to both male and female workers, the next specification explores the differential impact

[2] We focus on within-industry effects for several reasons. First, rigidities to mobility of workers across industries imply that the effects will be most prevalent within industries. Second, we wish to exclude aggregate labor demand effects that may be driven by differences in the degree of Chinese import penetration across industries. Chinese import penetration, for example, was much stronger in female-intensive clothing & textile industries, compared to male-intensive metals industries. These between industry associations may obscure the gender impacts of trade through the competition and technology channels that this paper focuses on.

of import competition on earnings of women relative to men. We estimate:

$$lnY_{ijrt} = \beta_0 + \beta_1 IP_{jt} + \beta_2 IP_{jt} * FEMALE + \beta_3 FEMALE + \beta_4 Z_{jt} + \beta_5 Z_{jt} * FEMALE + \beta_6 X_{ijrt} + \eta_j + \nu_{rt} + \epsilon_{ijrt} \quad (2)$$

with variables defined as in equation 1 and *Female* is an indicator variable that equals one if the individual is female. The coefficient β_2 captures the differential impact of import competition on earnings for women relative to men. We hypothesise that $\beta_2 > 0$. In other words, the negative impact of import competition on earnings is mitigated for women. This is because the increase in competition lowers discrimination (because it raises its costs), and incentivises firms to upgrade to more modern technology that diminishes the importance of physical labour (brawn) in production. Compositional shifts towards hi-tech firms within the industry will amplify this outcome.

To explore support for these channels, we estimate our baseline regression in equation 2 on samples split by the industry's capital intensity and the extent to which robots can be employed in production. If the dominant channel underlying a positive β_2 is technology upgrading, we would expect the coefficient to be positive and significant in industries that tend to be more capital-intensive, and where robot technology can be used. If a decrease in discrimination is the key channel, we would expect to see a positive coefficient on β_2 in both types of industries. To probe this idea, we estimate our baseline regressions on samples split by above and below median capital intensity and robot use (for the U.S.).

Next, we explore the role of market power and institutions in determining the differential impacts of import competition on women. We do this by splitting the sample into traded industries with above-median (high) versus below-median (low) markups in the pre-period (1990-94), and traded industries with a high versus low proportion of unionised workers in the pre-period (1997). In industries with low markups that are more competitive, the scope for gender discrimination is low, while the incentives to invest in technology upgrading as a result of the pro-competitive effect are high. We, therefore, posit that if technology upgrading (as opposed to discrimination) were the channel through which import competition differential affects women, the coefficient on β_2 would be positive and significant for low-markup as opposed to high-markup sectors.

It is established that unionisation is associated with a wage premium, which is likely to be reduced with greater import competition. Given that men are much more likely to be unionised than women, we expect the decline in the union wage premium to be much more pronounced for men than for women in highly unionised industries[3].

Finally, to pin down the technology upgrading channel, we delve into the impacts of import competition on the nature of tasks. Our argument is that technology upgrading reduces the brawn-intensity of tasks involved in production. This should mean that with greater import competition, more women should be in manual occupations in a relative sense. We examine

[3] We confirm that in the data, men are 10 percentage points more likely to be in a unionised job, and this difference is statistically significant.

whether this is the case using data from O*Net and Acemoglu and Autor (2011) on tasks linked to occupations. We thus estimate:

$$T_{iojrt} = \delta_0 + \delta_1 IP_{jt} + \delta_2 IP_{jt} * FEMALE + \delta_3 FEMALE + \delta_4 Z_{jt} + \delta_5 Z_{jt} * FEMALE + \delta_6 X_{ijrt} + \omega_j + \zeta_{rt} + \pi_{ot} + \epsilon_{iojrt} \quad (3)$$

Where T_{iojrt} refers to the nature of task (cognitive or manual) associated with occupation *o* that individual *i*, working in industry *j*, located in *r* at time *t* performs[4]. Independent variables are as defined in equation 2, and π_{ot} is a set of 2-digit occupation-year fixed effects. They account for unobserved shocks to occupations associated with import competition that also drive the nature of tasks.

5. Data

Our analysis uses cross-section, individual-level data from the Post-Apartheid labour Market Series (PALMS) database (Kerr & Wittenberg, 2017). The database consists of microdata from 69 household surveys conducted by Statistics S.A., including the October Household Surveys and the bi-annual labour Force Surveys. This database has been used in previous studies on trade and its impacts on the labour market in S.A., such as by Erten et al., (2019). Further detail on the data is available in the Data Appendix. We use data for the years 1997 - 2003 spanning China's WTO accession.

We construct measures of Chinese import penetration and instrument for it using Chinese exports to the rest of the world using trade data sourced from UNComtrade and industry-level sales data for South Africa obtained from Statistics South Africa (see Data Appendix for a list of variables). Pre-period data on industry-level markups are obtained from Edwards and van de Winkel (2005), and unionisation rates are calculated from the PALMS. Robot use by industry for the U.S. is sourced from Ge and Zhou (2020).

We source data on the task content of occupations from Acemoglu and Autor (2011) for the U.S.. Task measures are composite measures of O*NET Work Activities and Work Context Important scales, broadly broken down into Non-routine Cognitive: Analytical, Non-routine Cognitive: Interpersonal, Routine Cognitive, Routine Manual and Non-routine Manual Physical. We merge these data to the PALMS using 4-digit occupation codes.

6. Results

6.1 Import Competition and the Gender Earnings Gap

We begin by examining the impact of import competition on individual earnings in Table 1. Column 1 presents results for an OLS specification, while column 2 instruments for Chinese import penetration using Chinese exports to the rest of the world, except S.A[5]. Across both columns, greater import competition from China is associated with a decrease in earnings,

[4] In Appendix Table 7, we explore further classifications such as routine cognitive, non-routine cognitive analytical, non-routine cognitive personal, routine manual and non-routine manual physical tasks.
[5] The first stage for this IV-2SLS regression is presented in Table A1. The Kleibergen-Paap rk Wald F statistic is 58, suggesting that the instrument is strong.

and the coefficient is statistically significant in Column 2. These results are consistent with the negative impact of greater import competition on labour demand from the decreasing market share of domestic firms.

Table 1: Chinese Import Competition and Ln(Earnings) 1997-2003

	(1)	(2)	(3)	(4)
	OLS	IV-All	IV-Female	IV-Male
Chinese IP	-0.56	-1.22*	-0.05	-1.80**
	(0.46)	(0.65)	(0.95)	(0.77)
Observations	169140	169140	75073	93778
R^2	0.648	0.251	0.185	0.279

Observations at Individual x Year level, restrict to working age. (2) - (4): IV Chinese Import Penetration with Chinese Exports to ROW. (3) and (4) restrict the sample to females and males, respectively. Controls for import tariffs, education, age, race, marital status, indicators Urban. All columns include 3-digit industry, Urban x Municipality x Year fixed effects. Survey population weights used. Standard errors clustered at Industry x Year level. * p<0.10, ** p<0.05, *** p<0.01

Columns 3 and 4 split the sample into female and male, respectively. While the coefficient Chinese on import penetration is negative for both sets of individuals, we find that it is much larger in magnitude and statistically significant only for men. We now probe this baseline result further in Table 2.

In Table 2, we focus on the differential effect of Chinese import penetration, by including both the import penetration variable and its interaction with an indicator for female. Thus, while the coefficient on Chinese import penetration captures the impact of import competition from China on male earnings, the interaction captures the differential effect on female earnings. Additionally, we explore two other margins of adjustment. First, we ask whether the effects on earnings come from changes in hours worked. Next, we ascertain if greater import competition is associated with greater informalisation of the workforce, in line with the literature on trade and informality (Goldberg & Pavcnik, 2003; Ulyssea, 2018).

Table 2: Chinese Import Competition and Labour Market Outcomes 1997-2003

	(1)	(2)	(3)	(4)	(5)	(6)
	Ln(Earn)	Ln(Earn)	Ln(Hrs)	Ln(Hrs)	Informal	Informal
Chinese IP	-1.17**	-2.08***	-0.28	0.00	-0.23	0.31
	(0.52)	(0.76)	(0.26)	(0.47)	(0.31)	(0.38)
Dfemale*Chinese IP	0.91***	1.26**	0.25	-0.09	-0.23	0.27
	(0.33)	(0.51)	(0.18)	(0.24)	(0.25)	(0.34)
Observations	169140	169140	167088	167088	167551	167551
R^2	0.648	0.251	0.165	0.008	0.573	0.014
widstat		28.20		28.22		28.15

Observations at Individual x Year level, restrict to working age. (2), (4) and (6): IV Chinese Import Penetration with Chinese Exports to ROW. Controls for import tariffs, education, age, race, marital status, indicators Urban. All columns include 3-digit industry, Urban x Municipality x Year fixed effects. Survey population weights used. Standard errors clustered at Industry x Year level. * p<0.10, ** p<0.05, *** p<0.01

Columns 1, 3 and 5 present OLS results, while columns 2, 4 and 6 present IV results, with Chinese import penetration instrumented with Chinese exports to the rest of the world, and the interaction term instrumented with the female indicator and the instrument. F-statistics are provided in the table and show that the instruments are strong. Focusing on the baseline IV result in Column 2, we find that while greater import competition from China is associated with

a negative effect on the earnings of both men and women, the effect on women is mitigated. Specifically, a one percentage point increase in Chinese import penetration is associated with a 2.08 percent decline in male earnings, and only a 0.82 percent decline in female earnings. The coefficient on the interaction term picks up this positive differential effect, suggesting that, in a relative sense, import competition favours women.

Results in Columns 3 and 4 show no significant impact of import competition on hours worked. This suggests that the earnings effect comes from changes in the wage, not from changes in the extent of participation in the labour market. Similarly, results in Columns 5 and 6 show no evidence for an impact of import competition on informality.

We conduct a battery of robustness tests in Table 3 as follows:

Clustering of standard errors. We ensure that our inference is robust to clustering standard errors at the municipality-industry level, rather than at the level of treatment, industry-year. We find that our qualitative results are retained.

Alternate instrumental variable strategy. We pursue an alternate instrumental variable estimation strategy, where we instrument for Chinese import penetration with both Chinese Exports to ROW, except (S.A.) and an interaction of this variable with 1995 imports- weighted distance to S.A.'s trading partners. The idea is that in industries where transport costs to alternate trading partners are higher, we expect an increase in China's export potential to lead to more imports from China. Our results remain robust to this alternate strategy.

Traded sectors. We restrict our sample to traded sectors, where we expect a direct impact of an increase in Chinese import competition, with impacts on non-traded industries being indirect in nature. We find that results for the traded sector are similar in flavour to results for the overall economy.

Accounting for exports. We control for the export orientation of the industry, and its interaction with the female indicator. Note that we restrict attention to traded sectors. The idea is that Chinese import penetration might be correlated with export opportunities in third-country markets, driving the gender gap in earnings through this alternate channel. We find that accounting for the export channel does not qualitatively change our result, except that now, the negative impact on female earnings is almost zero.

Lagged independent variables. We explore employing lagged Chinese import pene- tration and its interaction with the female indicator to see whether there are lagged effects of import competition on the gender gap. We find that results are similar in magnitude and significance to the baseline result in Column (2) of Table 2.

Table 3: Chinese Import Competition and Ln(Earnings) 1997-2003: Robustness

	(1) Cluster	(2) Instrument	(3) Traded	(4) Exports	(5) Lagged
Chinese IP	-2.08***	-1.95***	-1.84**	-1.82**	
	(0.72)	(0.67)	(0.85)	(0.84)	
Dfemale*Chinese IP	1.26**	1.02**	1.58***	1.82***	
	(0.50)	(0.48)	(0.49)	(0.52)	
Lagged Chinese IP					-2.12**
					(0.97)
Lagged Dfemale*Chinese IP					1.43**
					(0.63)
Observations	169140	169140	55676	55676	169140
R^2	0.251	0.251	0.290	0.290	0.251

Observations at Individual x Year level, restrict to working age. IV Chinese Import Penetration with Chinese Exports to ROW, except in (2) where an additional instrument for Chinese Import Penetration is the interaction of 1995 import-weighted distance to S.A.'s trading partners and Chinese exports to ROW, except S.A.. Column (3) restricts to traded sectors. Column (4) includes an additional control for the industry's export orientation and its interaction with the female indicator. Controls for import tariffs, education, age, race, marital status, indicators Urban. All columns include 3-digit industry, Urban x Municipality x Year fixed effects. Survey population weights used. Standard errors clustered at Industry x Year level, except in (1), where they are clustered by municipality-industry. * p<0.10, ** p<0.05, *** p<0.01

6.2 Heterogeneous Effects

6.2.1 Technology and Robots

To explore channels underlying the impact of import competition on the gender gap, we adopt two strategies. First, we split our sample into industries with high vs. low (above versus below median) capital intensity and adoption of robots (in the U.S.) and estimate our baseline equation separately on these samples. If one channel driving our result is that import competition induces firms to upgrade technology to robots that lower demand for manual, brawn-intensive tasks, we should expect to see the mitigated impact on female earnings, captured by the positive coefficient on the interaction between Chinese import penetration and the female indicator, to be magnified for sectors where robot adoption is feasible (which also tend to be the more capital-intensive industries). Note that our use of data on robots in the U.S. is motivated by the idea that the U.S. presents the technological frontier for robot adoption. Globally, the ability of firms to acquire robot technology is thus closely related to adoption in the U.S.

Results are presented in Panel A of Table 4. Columns 1 and 3 present results for industries with high and low capital intensity, while columns 2 and 4 for industries with higher versus lower robot capital in the U.S. Results provide support for the technology channel. They show that the positive coefficient on the interaction between Chinese import penetration and the female indicator is stronger for capital-intensive industries and industries where robot adoption is high. We further study this channel in an analysis of tasks in a subsequent section of the paper.

6.2.2 Market Power and Institutions

We turn to an analysis of market power and the institutional environment, and its role in determining the relationship between import competition and the gender gap. This investigation also allows us to interrogate additional channels driving our key result. First, if greater import competition lowers the gender gap by reducing labour market discrimination against women, then we would expect to find the mitigated effect on female earnings to apply primarily to industries where market rents were high prior to the increase in competition. To ascertain whether this is the case, we split our sample into industries with high and low (above and below median) markups in the pre-period and estimate our baseline model.

Next, we enquire if labour market institutions, such as unions, play a role in mediating the impacts of import competition on the gender gap in earnings. We note here that women are substantially less likely to be part of a union[6]. This means that the union wage premium, if one exists, is likely to be higher for men. If import competition reduces the power of unions to negotiate, we would expect a convergence in wages between men and women in highly unionised industries. We explore this idea by estimating our baseline equation after splitting the sample into industries with a higher proportion of workers in unions in the pre-period versus other industries.

Results are presented in Panel B of Table 4. Columns 1 and 3 present results for industries with high versus low markups, while columns 2 and 4 focus on industries with high versus low unionisation. We find that in fact, our results on a mitigation of the gender gap comes from industries with low markups, as opposed to with high markups. This result is more in line with import competition narrowing the gender gap through the technology channel as opposed to the labour market discrimination channel. Results from columns 2 and 4 show that, indeed, the narrowing of the gender gap with import competition comes from highly unionised industries. This result supports the idea that greater import competition may contribute towards eliminating the union wage premium as workers lose their bargaining power.

Table 4: Chinese Import Competition and Ln(Earnings) 1997-2003: Heterogeneous Effects

Panel A: Technology

	(1) K/L Hi	(2) Robots Hi	(3) K/L Lo	(4) Robots Lo
Chinese IP	14.97 (9.90)	3.15 (3.55)	-0.91 (0.86)	-1.40 (0.92)
Dfemale * Chinese IP	8.56* (4.72)	4.37* (2.60)	0.08 (0.48)	0.38 (0.52)
Observations	20819	10159	34227	44930
R^2	0.371	0.369	0.226	0.263

Panel B: Market Power and Institutions

	Markup Hi	Unions Hi	Markup Lo	Unions Lo
Chinese IP	3.64 (2.52)	-4.24*** (1.44)	-1.81** (0.81)	-0.92 (1.10)
Dfemale * Chinese IP	-1.50 (1.50)	1.53* (0.79)	1.73*** (0.46)	0.77 (0.50)

[6] Women in our data are statistically significantly less likely to be in a union.

Observations	29990	51921	25030	116712
R^2	0.255	0.296	0.314	0.239

Observations at Individual x Urban x Year level, restricted to working age. IV Chinese Import Penetration with Chinese Exports to ROW, except in (2) where an additional instrument for Chinese Import Penetration is. Controls for import tariffs, education, age, race, marital status, indicators Urban. All columns include 3-digit industry, Urban x Municipality x Year fixed effects. Survey errors clustered at Industry x Year level. * p<0.10, ** p<0.05, *** p<0.01

6.3 Employment Effects

We ask whether the effects we observe on earnings are reflected in employment. If the impact of an increase in import competition operates through a leftward shift of the labour demand curve, we would see earnings effects mirrored in employment, and in the gender gap therein. To look at employment, we collapse the data by gender at the level of the municipality, urban/rural area, industry and year. We then estimate the relationship between employment and Chinese import penetration.

Results for the IV specification are presented in Table 5[7]. From column 1, we find that an increase in Chinese import penetration is associated with a 1.74% decline in employment. Columns 2 and 3 reveal that this decline is driven by a decline in male employment. While the coefficient on Chinese import penetration for women is negative, it is much smaller in magnitude and not statistically significant. Thus, our results for employment are in line with earnings results, consistent with a leftward shift in labour demand following an increase in import competition. However, this negative effect is substantially attenuated for women.

Table 5: Chinese Import Competition and Ln(Employment) 1997-2003

	All	Female	Male
Chinese IP	-1.74**	-0.52	-7.50**
	(0.76)	(3.97)	(2.98)
Observations	48012	48012	48012
R^2	0.000	0.000	0.000

Observations at Municipality x Urban x Year level. Survey population weights used. Controls for import tariffs, fixed effects for 3-digit industry, Municipality x Urban x Year. Standard errors clustered at the Industry x Year level. * p<0.10, ** p<0.05, *** p<0.01

6.4 Tasks

In this section, we examine whether the increase in import competition is associated with a change in the nature of production tasks performed by men and women. If greater import competition leads to technological upgrading and robotisation, which reduces the advantage of brawn-intensive skills relative to other skills, we would expect to see a relative shift towards female workers in occupations that specialise in more manual tasks. Such a shift should not apply to cognitive tasks.

We explore this idea using individual data on 4-digit occupations and the nature of tasks these occupations entail. We match occupations in the PALMS to occupation categories and associated tasks from Acemoglu and Autor (2011), who use O*NET data for the U.S. for their classification. The nature of tasks is measured on a scale standardised to mean zero and

[7] OLS specifications yield similar results, which are available upon request.

standard deviation of one, and as it applies to the U.S., can be interpreted as a higher value representing an occupation that is more specialised in that type of task.

Appendix Tables A3 and A2 provide average values for the nature of tasks related to occupations performed by men and women in South Africa. The table shows that women are in occupations that specialise in less cognitive and manual tasks. This is consistent with evidence from Fana et al. (2021), who find that in Europe, women not only perform fewer manual tasks than men, but also appear less involved in intellectual tasks and particularly, management and coordination tasks. However, the table reveals a clear comparative advantage of women in cognitive, relative to manual tasks: the differential between men and women in cognitive tasks is much lower than in manual tasks. The differential is largest in non-routine manual tasks and lowest in routine cognitive tasks.

We estimate our baseline IV specification, but with the nature of the task associated with an individual's occupation as the dependent variable, rather than earnings. Results are presented in Table 6. Columns 1 and 2 look at cognitive and manual tasks using the overall sample. Columns 3 - 6 split the sample into unskilled (columns 3 and 4) and skilled (columns 5 and 6) individuals, where a skilled individual is one with at least secondary education. Results are remarkably consistent with the idea that greater import competition is associated with a relative increase in women in occupations more intensive in manual tasks. This is captured by the positive and statistically significant coefficient on the interaction between Chinese import penetration and the female indicator. Moreover, this gendered effect for manual tasks is pertinent for unskilled individuals that we would expect to be employed in production, as opposed to more white-collar activities. We find no statistically significant effects for cognitive tasks.

Table 6: Chinese Import Competition and Tasks 1997-2003

	(1) Cognitive	(2) Manual	(3) Unskilled Cognitive	(4) Unskilled Manual	(5) Skilled Cognitive	(6) Skilled Manual
Chinese IP	-0.24	-0.80**	-0.20	-0.58	-0.24	-0.78**
	(0.28)	(0.34)	(0.60)	(0.69)	(0.29)	(0.32)
Dfemale*Chinese IP	0.31	0.71**	0.06	1.27**	0.20	0.49
	(0.27)	(0.31)	(0.48)	(0.53)	(0.30)	(0.30)
Observations	144767	144767	83640	83640	60655	60655
R^2	0.016	0.007	0.016	0.002	0.011	0.006

Observations at Individual x Year level, restrict to working age. The dependent variable is the nature of tasks associated with the individual's occupation. Skilled is defined as individuals with secondary-school education and above. IV Chinese Import Penetration with Chinese Exports to ROW. Controls for import tariffs, education, age, race, marital status, indicators Urban. All columns include 3-digit industry, 2-digit occupation x Year, Urban x Municipality x Year fixed effects. Survey population weights used. Standard errors clustered at Industry x Year level. * p<0.10, ** p<0.05, *** p<0.01

In Appendix Table A4, we break cognitive and manual tasks further into their components. Results are instructive in showing compositional shifts within these broad categories. Particularly, consistent with the international literature, we find that within cognitive tasks, there is a shift towards men in occupations emphasising non-routine cognitive personal tasks (such as managers), but an opposite switch in occupations specialising in routine cognitive tasks (such as administrative roles). For manual tasks, the gendered effect of import competition is

strongest for occupations emphasising non-routine manual, physical tasks. Overall, our results in this section reinforce that the channel whereby an increase in import competition narrows the gender gap through technological upgrading that reduces the comparative advantage of brawn-intensive skills is a plausible one. We therefore highlight the interaction between trade and technology in determining differential labour-market outcomes for men and women.

7. Conclusion

This paper analysis the impact of import competition on the gender gap in earnings in post-Apartheid South Africa. In particular, it focuses on the role of technology upgrading in response to the increase in import competition from China, and how this impacts men and women differently. We posit that switching to modern technology, such as robots, reduces the relative advantage of brawn in production, thereby reducing the gender wage gap. We draw on detailed individual survey data on employment, earnings and occupations over the period 1997 to 2003, and use the sharp increase in Chinese import penetration following its accession to the WTO as a natural experiment to identify the impacts of import competition on the gender gap.

We find that while the increase in Chinese import penetration reduced earnings for both men and women, the negative effect is significantly mitigated for women. Our preferred estimates where we instrument Chinese import penetration with China's exports to the rest of the world (excluding SA) show that a one percentage point increase in Chinese import penetration is associated with a 2.08 percent decrease in earnings for men compared to a 0.82 percent decrease in earnings for women. These earnings results are corroborated by employment effects, with relatively large decreases in employment of men compared to women within industries in the face of increased import competition.

Our results points strongly to the primacy of the technology channel in driving these outcomes as opposed to other channels such as a decrease in labour market discrimination in the face of increased competition. Firstly, we find that the positive differential effect on women's earnings is stronger in industries more likely to adopt robots. Secondly, the effect is stronger in industries where markups are low and not in industries with high rents where the labour market discrimination channel would be strongest. Finally, we find that import penetration is associated with a decline in occupations requiring manual tasks among men, with almost negligible effects for women. This is consistent with the idea that technological upgrading and robotisation in response to import competition reduce the relative demand for brawn-intensive manual tasks, thereby narrowing the biological advantage of men in such tasks. Overall, our results show how the interactions between import competition, technology and task specialisation can be effective in driving relative labour market outcomes for women.

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Appendices

Data Appendix

Individual Data

We use data from the Post-Apartheid Labour Market Series (PALMS) version 3.3 cross-section database created by DataFirst, University of Cape Town (Kerr & Wittenberg, 2017) and utilised by Erten, Leight, and Tregenna, 2019, to analyse the impacts of trade liberalisation on the labour market in S.A.. The PALMS dataset consists of microdata from 69 household surveys conducted by Statistics S.A. between 1994 and 2019. The Statistics S.A. surveys include the October Household Surveys from 1994 to 1999 and the bi-annual Labour Force Surveys from 2000 to 2007. We use data from We use data for the years 1997 - 2003 spanning China's WTO accession.

Household sampling follows a complex two-stage sampling procedure and all members of sampled households are included in the survey. The variables included are mainly those to do with individual demographic information and the labour market, such as employment status, industry of employment, earnings, hours worked and the informal nature of the job. The surveys are regarded as one of the more reliable sources of labour market data, including labour income data in S.A.

Industry Variables

The PALMS data give us 3-digit industry codes that we match to ISIC Rev 3 3-digit industries. Tariff data at the industry level are simple average of the tariff at the 8-digit level of the Harmonized System tariffs and is constructed using the raw tariff schedules obtained from UNCTAD Trade Analysis Information System (TRAINS). Ad valorem equivalents for specific import tariffs are calculated using import unit values using data on South African import values and quantity sourced from UNComtrade. Import penetration from China is calculated as the ratio of annual imports valued in 1994 prices to the value of domestic absorption (sales+imports-exports) in 1994. The annual import values are deflated to 1994 values using

disaggregated Producer Price Indices obtained from Statistics South Africa. Sales data for 1994 are obtained from various publications of Statistics South Africa, including Mining Production and Sales (P2041), Manufacturing Production and Sales (P3041.2), and the Agricultural Abstract. Export orientation is calculated as real exports in 1994 prices over the value of sales by domestic firms in 1994.

Industry-level markups are obtained for the years 1990-1994 from Edwards and van de Winkel, 2005. Capital intensity at the industry level is obtained from Quantec data for 2006. Capital-intensive sectors are those with above-median capital intensity, and the rest are categorised as labour-intensive. Robot use is captured by the stock of robot capital in the industry for the U.S. for the year 2000 sourced from Ge and Zhou (2020).

Tasks

We utilise data on the task content of occupations sourced from Acemoglu and Autor (2011) for the U.S.. Task measures are composite measures of O*NET Work Activities and Work Context Important scales, broadly broken down into Non-routine Cognitive: Analytical, Non-routine Cognitive: Interpersonal, Routine Cognitive, Routine Manual and Non-routine Manual Physical. O*NET scales are created using the O*NET-SOC occupational classification scheme, which is collapsed into SOC occupations and then standardised to have a mean of zero and a standard deviation of one, using labour supply weights from the pooled 2005/6/7 Occupational Employment Statistics (OES) survey.

The PALMS database provides 4-digit occupation codes under the ISCO88 occupational classification (Bhorat et al., 2023). To merge the task measures to the PALMS data, we use a concordance between SOC00 and the 4-digit ISCO88 sourced from Hardy et al. (2018).

List of Variables

Real Earnings: Monthly REAL earnings variable generated from the earnings amount data (not bracket information), deflated to 2015 Rands using the CPI. Many individuals surveyed refused to answer this question but responded in brackets to the categorical income question. As suggested by Wittenberg (2008), we use a bracket weight variable to account for these individuals since ignoring the bracket responses incorrectly ignores responses at the top end of the distribution.
Skilled: Indicator for whether the individual has at least secondary school (Grade 10) education.
Informality: Indicator for job is informal, defined as employee considers the enterprise they work for or own as informal.
Union: Indicator for whether an employed individual belongs to a union (Not relevant for the self-employed).
Chinese IP: Ratio of S.A. imports from China to domestic absorption (sales + total imports - total exports).
Export Orientation: Ratio of exports to domestic sales.
Chinese Exports to ROW: Chinese exports to ROW excluding S.A..
Distance Weighted Imports*Chinese Exports to ROW: Interaction between Chi- nese exports to ROW excluding S.A., and distance weighted S.A. imports from all importing partners

in 1995, where distance is distance between most populated cities weighted by population sourced from CEPII.

Tables

Table A1: First stage regression: Chinese IP instrumented with Chinese World Exports

	(1) Chinese IP
Chinese World Exports	3.81***
	(0.50)
Observations	169196
R^2	0.928

Observations at Individual x Year level, restrict to working age. Chinese world exports are scaled by 1000. Controls for import tariffs, education, age, race, marital status, indicators Urban. The column includes 3-digit industry, 2-digit occupation x Year, Urban x Municipality x Year fixed effects. Survey population weights used. Standard errors clustered at Industry x Year level. * p<0.10, ** p<0.05, *** p<0.01

Table A2: Mean Tasks: Cognitive

Dfemale	Overall	Routine	Mean Non-routine Analytical	Non-routine Interpersonal
0 (55%)	-0.1	-0.2	-0.1	-0.0
1 (44%)	-0.4	-0.4	-0.5	-0.3
Total (100%)	-0.2	-0.2	-0.3	-0.1

Mean across observations. PALMS 1997-2003.

Table A3: Mean Tasks: Manual

Dfemale	Overall	Mean Routine	Non-routine (Manual)
0 (55%)	0.4	0.3	0.5
1 (44%)	-0.2	-0.0	-0.3
Total (100%)	0.2	0.2	0.2

Mean across observations. PALMS 1997-2003.

Table A4: Chinese Import Competition and Tasks 1997-2003

	(1) R_{Cog}	(2) $NR_{CogAnal}$	(3) $NR_{CogPers}$	(4) R_{Man}	(5) $NR_{ManPhys}$
Chinese IP	-1.92***	0.09	1.11***	-1.07**	-0.53
	(0.56)	(0.51)	(0.42)	(0.45)	(0.40)
Dfemale*Chinese IP	1.15**	0.53*	-0.76*	0.26	1.16***
	(0.53)	(0.32)	(0.40)	(0.32)	(0.42)
Observations	144767	144767	144767	144767	144767
R^2	0.003	0.019	0.005	0.008	0.014

Observations at Individual x Year level, restrict to working age. The dependent variable is the nature of tasks associated with the individual's occupation and includes routine cognitive, non-routine cognitive analytical, non-routine cognitive personal, routine manual and routine manual physical tasks. IV Chinese Import Penetration with Chinese Exports to ROW. Controls for import tariffs, education, age, race, marital status, indicators Urban. All columns include 3-digit industry, 2-digit occupation x Year, Urban

x Municipality x Year fixed effects. Survey population weights used. Standard errors clustered at Industry x Year level. * p<0.10, ** p<0.05, *** p<0.01