Trade and Wage convergence: Do increased exports and decreased imports improve wage growth in developing countries?

Chung, Yick (William)

Master thesis: MA International Relations (Global Political Economy)

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Yick Chung (William) – s2823101

Supervisor: Dr. A.R. Shidiq

Second Reader: Dr. S. Bellucci

Word Count: 14518

Leiden University – Faculty of Humanities

Abstract

Does globalization increase inequality by exploiting the low wage of workers in developing countries? Or does it reduce inequality by allowing the wage to catch up? In this thesis, I study the effect of trade on wages in developing and developed countries using South Africa as a case study. Conducting a regression analysis using industry-level data in South Africa from 2013 to 2019, I find that export ratio and import penetration, as a proxy of trade openness, have no statistically significant effects on wages. Meanwhile, in a much simple supplementary test by comparing the differences in trade and wage growth in South Africa and Germany, I find some preliminary indication that the difference in wage growth between the two countries may be explained by the difference in export growth, but not in import growth.

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1 Introduction

Global inequality exists. Workers in different countries have different job conditions and wages. A worker in the United States could expect to receive 8.4 times more wage than a worker in Nigeria with the same skills, knowledge, and productivity (Clemens, Montenegro, & Pritchett, 2008). The World Bank studied this phenomenon and proposed to solve it by improving worker mobility. This means reducing border barriers and promoting immigration. However, immigration is controversial, and the prospect of advancement in labour market integration is not so optimistic.

Meanwhile, trade could be another way to equalize wages across countries. According to neoclassical economics, if countries trade, they can each specialize in the production of commodities in which they enjoy the comparative advantage and benefit mutually (Ricardo, 1965, pp. 81-82). This specialization also affects employment as the demand for workers in industries shifts. Workers in the exporting industries gain, while their counterparts in the importing industries may suffer. Therefore, workers in developing countries could gain if they specialize according to the theories. However, despite years of global trade, inequality still exists, if not deteriorated. This raises the question of whether the equalizing effect of trade exists.

I aim to revisit this issue in this thesis. My research question is: what is the effect of trade on wage convergence between developing and developed countries? The main hypothesis of this thesis is that the real wage in an industry increases with the real export and decreases with the real import.

This thesis tests the hypothesis by studying the data from South Africa. I collect data for the trade volume and wages at the industry level from the period of 2013 to 2019 using official statistic publications. I then conduct regression analyses to test the relationship between the real export, the real import, and the real wage. The main finding is that export and import do not have statistically significant effects on wages after controlling for socioeconomic and demographic variables. The study, therefore, does not confirm the hypothesis.

I also compare the wage and export between South Africa and Germany to study the effect of trade on wage convergence. There is some evidence showing that there is a "catching-up" in South African industries that exported more. This is however inconclusive as the other factors are not fully considered.

2 Background

Globalization and inequality

> *"Massive poverty and obscene inequality are such terrible scourges of our times - times in which the world boasts breathtaking advances in science, technology, industry and wealth accumulation - that they have to rank alongside slavery and apartheid as social evils. […] While poverty persists, there is no true freedom."*
>
> - *Nelson Mandela (2005)*

Global inequality is a pertinent issue in the global political economy. Inequality means the uneven distribution of costs and benefits (Tilly, 1998, p. 25). It is often measured in terms of income and wealth in Economics (Piketty & Saez, 2014). It is at the forefront of many global policy debates, and tackling it is one of the United Nation's policy goals (United Nations, 2020).

There is a conceptual distinction between poverty and inequality. One might argue, as Bill Gates did, that *some* inequality is acceptable as part of the capitalist system (Gates, 2014). However, it is difficult to argue that absolute poverty is good. Sadly, in the global economy, inequality between countries and poverty are two sides of the same coin. People in some parts of the world are struggling to fulfill their basic needs, while people in other continents are living affluently. Addressing these issues is therefore important for mankind.

According to the United Nations (2020), since the 1990s the inequality between countries improved and the inequality within countries deteriorated. This was attributed

to increasing globalization. The *Globalization, Growth and Poverty* report published by the World Bank argued that globalization reduces poverty in countries that are more integrated into the global economy and also reduces inequality among countries. Integration was measured by the ratio of trade volume to GDP (Collier & Dollar, 2002, p. 2). However, the interpretation of the data was contested. Much of the reduction in global inequality could be attributed to the rise of China and India. If the two countries were removed from the calculation, inequality among countries increased (Roccu, 2016, p. 186). This is not to discount the achievement made in alleviating poverty. It is a fact that tens of millions of people living in the less developed countries including China and India did improve their livelihood. It is also true that the extreme poverty rate has fallen substantially, although not necessarily to the full extent claimed by the United Nations (*ibid.,* P. 188).

The question of inequality is no less relevant nowadays, for both instrumental and intrinsic reasons. Intrinsically, the important questions of justice and fairness are tied to inequality. Instrumentally, the perception of the system as unjust or unfair may cause people to doubt the system itself, thus resulting in scepticism in globalisation or economic integration, and impeding the stability of the world system – for better or worse. The issue of inequality also manifested in developed countries. One of the biggest groups of people who lost out from globalization is the middle class in advanced economies. The middle class in developing countries caught up and the richest people became even richer, worsening the position of the old middle class (Lakner & Milanovic, 2015). Thus, this group of losers grew disgruntled and turned to populism. In other words, trade and globalization caused inequality and populism (PBS NewsHour, 2017). This wave of anti-globalisation sentiment was one of the factors for

the election of Trump in 2016, whose policy ironically made the world economy more unequal (Mayer & Phillips, 2017).

However, the proponents of globalization remain hopeful. They argue that the benefits of free trade and globalization still outweigh the costs if globalization is managed properly. For example, Anabel González, the Deputy Director-General of the World Trade Organization, said in an interview in 2016 that trade is "needed to eliminate poverty and to reduce global inequality", and that the anti-globalisation sentiment should and could be addressed by better management of globalization (González, 2016). Some argued that by better domestic policies, including social protections for those hurt by globalization, globalization could be made inclusive where the gains could be distributed fairly (Stiglitz, 2018).

Global inequality worsened since the COVID-19 pandemic, due partially to the uneven access to medical resources and uneven economic recovery. The income loss was particularly serious for the poorest workers in the world whose jobs tend to be more precarious, whereas the higher-paid workers could adapt to working from home with the white-nature job nature and better technological resources (Goldin & Muggah, 2020). As the world is recovering from the pandemic, the World Bank proposed that trade-driven growth is important for low-income countries in the recovery process (Gopalakrishnan, Wadhwa, Haddad, & Blake, 2021).

Therefore, the relationship between trade and wages is still relevant nowadays in at least two ways. It can help us understand whether globalization is good for growth so that better-informed economic policies can be made. It can also help identify the groups

of people who may lose out from globalization so that social policies can be designed to protect them from harm.

South Africa as the case study

This thesis tests the hypotheses are tested using the data from South Africa and Germany. This section briefly discusses the economic situation in South Africa and why it is chosen as the case study.

The economic history of South Africa is defined by a process of "conquest, dispossession, discrimination, and development". The abundant human and natural resources of the country were systematically extracted by the colonial institutions (Feinstein, 2005, pp. 1-3). Since the early 20th century, the country was the "only Sub-Saharan African country that achieved a more extended period of accelerated manufacturing output growth" from the inter-war period to the mid-Cold War period. One reason is that disenfranchised whites pressured the state to develop the import substitution industry (Neveling, 2019, p. 182). Since then, the economy experienced a 28.1% growth in real income per capita and a reduction in the poverty rate by almost half from 1996 to 2008. In 2010, it became one of the five members of BRICS with the hope to strengthen South-South trade relations (South African Government, 2022).

However, there are structural problems in the economy. There are significant inequalities due to years of apartheid policies, including segregation in citizenship, land, housing, education, and job access. The country's dependence on its rich natural resources arguably hindered its industrialization (Southall, 2010). This could be described as a "resource curse" or a "Dutch disease", where the exports of natural

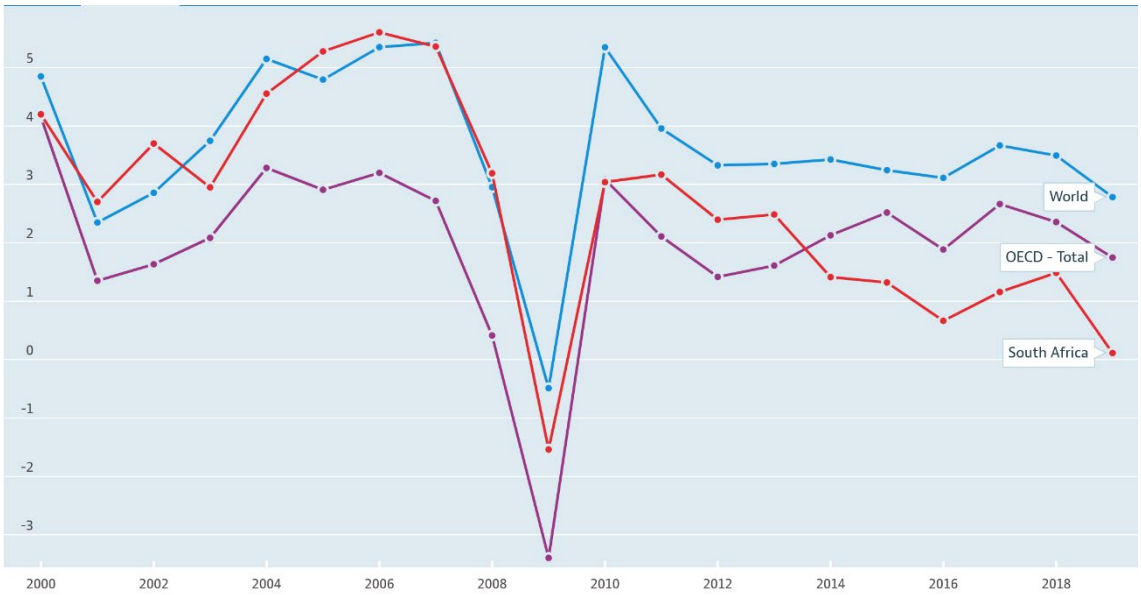
resources drive the national currency up and reduce the competitiveness of its other exports in the global market. These problems raised concerns that the economic growth is unsustainable and the economy would slip into decline.

To address these issues, the South African government launched the *National Industrial Policy Framework* in 2007, aiming to promote industrial development in the country, create jobs, and facilitate the diversification of industries. The proposed policies included industrial financing, promoting exports in higher value-added products, providing better access to vocational education, etc. (The Department of Trade and Industry, 2007)

The result of the scheme was mixed. According to OECD (2022a), the real GDP growth of South Africa lagged the world and the OCED countries' average since 2010, as shown in Figure 1. Further, it is not clear if the labour benefited from industrialization. The industrialization effort in Africa since the 1900s in general had little regard for the interest of the labour, and the labour relation remained “very precarious” in the region (Neveling, 2019, p. 193). Therefore, studying how the industrialization policy and the trade promotion since 2010 affected the labour is relevant.

Germany was chosen as the case for comparison because it is a developed economy with good industrial bases. Further, it has a close trade relation with South Africa. It is the second-largest trade partner of South Africa after China (German Missions in South Africa, Lesotho and Eswatini, n.d.). Thus, Germany is the most relevant developed economy to be compared against South Africa in terms of trade and wage convergence.

Figure 1 - Annual growth rate (%) of real GDP from 2000 to 2019 (OCED, 2022a)



3 Literature review and analytical framework

This section examines the theories of wage convergence and how trade affects wages. It aims to provide an overview of the discussion around wage convergence and how it is linked to the research question of this thesis.

3.1 Wage convergence

Price convergence has been debated in Economics for years. It was mentioned in the neoclassical international trade literature as early as ninety years ago (Ohlin, 1933). Wage convergence forms part of the debate, as the wage is the price of labour. Studies have been conducted to see where, when, and why wage convergence occurred. The empirical results are mixed and often limited by the contexts of the cases studied (Naz, Ahmad, & Naveed, 2017).

Here, I discuss two neoclassical economics theories for wage convergence – (1) Law of One Price, and (2) Factor-Price Equalization. I would then follow the discussion with a case study of the digital labour market and how these theories could be applied.

Immigration and convergence - Law of One Price

The insight of the Law of One Price ("LOOP") is that increasing labour mobility across markets causes wage convergence. This is the fundamental theory supporting the argument that immigration eliminates wage inequality. It states that price differentials for the same commodities between two markets would be eliminated by the market through direct arbitrage. Arbitrage means that one could buy low in one place and sell high in another, thus driving demand and supply and equalizing the price. The key

assumptions for perfect arbitrage are the absence of transport costs and trade restrictions (Isard, 1977; Mankiw, 2018, p. 161).

The simplicity of LOOP is both its strength and weakness. It is often violated in the real world as its assumptions prove restrictive in its real-life application. It has been tested in different times, places and for different commodities. It holds better: -

- across different regions in the same country (Ceglowski, 2003);
- for commodities from the same country after controlling for transport costs (Isard, 1977);
- in the long run with minimal transport costs (Baffes, 1991);
- with intensive integration efforts such as the European Single Market (Goldberg & Verboven, 2005);

LOOP has yet to be extensively applied to the global labour market, as it is restricted by the first three conditions. Since labour is relatively immobile and not homogeneous across countries, arbitrage is difficult. Further, some questioned whether labour as people can be treated as a pure commodity that responds only to price signals (Prado, Lundh, Collin, & Enflo, 2021). It can be argued that labour is a social relation embedded in the historical and societal context and cannot be traded with perfect mobility.

Nonetheless, the last observation about market integration opened the discussion of whether such policies could overcome the said restraints in the labour market. The World Bank research paper by Clemens, Montenegro, & Pritchett (2008) found a “place

premium". It studied the wage gap between workers in the US and foreign workers with observably equivalent determinants of productivity across 42 countries. It found a significant wage gap after accounting for unobservable determinants of productivity. It argued that the wage differential is a price distortion in the global market and suggested that poverty in developing countries could be alleviated by greater labour mobility. While the paper did not mention LOOP by name, the underlying logic is similar in terms of eliminating differences through the market mechanism. However, the proposed solution to immigration is potentially controversial. The immigration crises in Europe and the election of Trump with the border wall show the backlashes in advanced economies against immigrants. Therefore, the prospect of intense state effort promoting labour mobility is arguably much limited in the current political climate.

Trade and convergence - Heckscher-Ohlin Model and Factor-Price Equalization

An alternative to LOOP is the Heckscher-Ohlin Model ("HO Model"). Under this Model, wage convergence happens through free trade even in the absence of labour mobility. This is the underlying theory for the argument that trade in goods and services equalizes wages. It treats traded commodities as collectives of different factors of production. Thus, trading commodities means indirectly trading factors. The trade flow is determined by the comparative advantage of each country, which is based in turn on relative factor endowment (Leamer, 1995; Samuelson, 1948).

HO Model does not contradict LOOP but expands on its basic insight. Ohlin (1933, pp. 35-36) argued that trading not only equalizes the price of commodities but also the factors of production – assuming the absence of transport cost and trade impediments. Trade drives an economy to produce commodities in which it enjoys relative factor

abundance, thus changing the relative scarcity of the factors and equalizing the price. This is known as factor price equalization. Free trade of commodities reduces factor-price differences through indirect arbitrage. The strength of this model is that in addition to the mechanism of convergence, it explains the original differences in factor prices.

The HO Model was used to explain cases where wage convergence is observed without increases in labour mobility (Samuelson, 1948, p. 183) . For example, it was shown that wages across regions in Spain converged from 1850 to 1914, even though there was a limited increase in internal migration (Rosés & Sánchez-Alonso, 2004).

Table 1 - A summary of the theories of convergence

	Law of One Price	**Heckscher-Ohlin Model**
Wage convergence through the market?	Yes, through direct arbitrage.	Yes, through indirect arbitrage.
What is essential to wage convergence?	Labour mobility	Commodity mobility

Box 1 - Wage convergence in the digital labour market

This section discusses the theories of convergence with a case study of the online labour market.

The development of the Internet and e-Commerce facilitated the trade of goods and services. In the market of digital services and digital labour, the whole transaction can take place online across natural or national borders. One example is *UpWork*, where users can look for freelancers around the world to complete tasks from programming to accounting. Thus, digital workers from different countries can compete for business on the same platform, which may "level the playing field" globally (Lehdonvirta, Barnard, Graham, & Hjorth, 2014). Applying the theory, LOOP predicts that the wages of workers from different countries would converge in this single market. The removal of barriers improves factor mobility and allows for direct competition between workers around the world.

There are two pieces of literature on wage convergence in the digital labour market. They both studied the same marketplace (*UpWork*) and drew similar conclusions: There is some evidence of wage convergence, but the extent of convergence was limited by the inherent restraints of the online platforms (Lehdonvirta, Barnard, Graham, & Hjorth, 2014; Beerepoot & Lambregts, 2015). Table 2 summarizes the key findings.

Both papers highlighted the opportunities but also the constraints and barriers in the online job marketplace. While the Internet transcends the physical borders and improves market transparency and mobility, significant wage differentials remain. A

worker in web development located in the US earns on average 1.49 times more hourly than his counterpart in India, despite the same skills and qualifications (Beerepoot & Lambregts, 2015, p. 249). This does not conform with the theories of direct arbitrage. A possible explanation is the heterogeneity of labour. Workers from different countries have different cultural backgrounds and geographical locations, despite similar education and skill level. Therefore, European workers with an affinity for the European languages and business culture fare better than the Indian or the Chinese in competition for higher-paying jobs located in Europe.

Therefore, while the case of the digital labour market does not refute LOOP, it casts doubt on the factor-mobility convergence mechanism, as the labour in the digital labour market is arguably more mobile than it can ever be in the physical market. Here, this thesis shifts the focus from the effect of mobility to the effect of trade.

Table 2 - A summary of the literature on the digital labour market convergence

	Convergence?	**Issues with the online marketplace**
Beerepoot & Lambregts (2015)	Yes, but limited to skilled workers	Intense competition
Lehdonvirta, Barnard, Graham, & Hjorth (2014)	Yes, but only to a limited extent, and not in works involving formal institutions, complex tasks, or communication	Limited integration: favour towards local contractors because of time zone and the "liability of foreignness"

3.2 Trade and wages

> *"How can the actual effect of rising trade on wages be quantified? The answer, given the current state of the data, is that it can't." (Krugman P. R., 2008, p. 134)*

Trade and labour are prominent issues in political economy, and there is rich literature on the relationship in-between. Nonetheless, as hinted by the quote from Paul Krugman, the question is not yet solved. This section aims to provide a brief overview of this body of literature and how it relates to wage convergence.

The export wage premium

On the firm level, studies show that firms that export more pay better wages than their non-exporting counterparts (Bernard, Jensen, & Lawrence, 1995). This phenomenon is referred to as the "export wage premium". It has been tested in different economies using firm-level employer-employee linked data. The main reasons suggested are that exporting firms employ workers with better skills, have better types of machinery, purchase better inputs, and enjoy higher productivity (Brambilla, Chauvin, & Porto, 2017; Schank, Schnabel, & Wagner, 2007). The premia depend also on firm characteristics such as ownership, export orientation, and locations (Fu & Wu, 2013; Helpman, Itskhoki, & Redding, 2010).

As industries are the aggregate of firms, if a certain industry has more exporting firms, the export wage premium should also be found at the industry level. Thus, the theory predicts that workers in export-intensive industries would earn more than the workers in the non-exporting industries. For example, a study on the US industries

found a positive effect of exports on wages, because exporting industries have heavier investments in technology and capital (Riker, 2010). A similar effect was found in a small open economy such as Belgium (Du Caju, Rycx, & Tojerow, 2012). A study in China also found an inter-industry wage differential, where the wage premium is positively correlated with the export share and negatively with the import share of final goods (Wang, Milner, & Scheffel, 2018).

However, the quantification of the premium is not consistent across the studies. It varies with the samples, terminologies, and methods used. For example, the premium for blue-collar workers ranges from 1.8% in Germany to an average of 40% in African countries (Brambilla, Chauvin, & Porto, 2017, p. 456; Schank, Schnabel, & Wagner, 2007). For this thesis, it suffices to note that export is found to have a positive effect on wages in both developed and developing countries around the world, albeit to different degrees.

Import and wages

The effect of import trade on wages is less clear than that of export. The main differentiating factor is whether the import is intermediary goods or final goods.

In general, import penetration in final goods is found to reduce the wages, because the international competition erodes the rent in the imperfect, protected domestic markets, thus reducing the demand for labour. Studies found evidence in emerging markets like Brazil and Mexico when neoliberal reforms were undertaken and markets were open to foreign exports (Arbache, Dickerson, & Green, 2004; Revenga, 1997). A relevant factor is state policies in market liberalization. In New Zealand, for example,

the negative effect of imports on wages was mitigated by heavy protections for the affected workers (Lang, 1998).

On the other hand, the import of intermediary goods may have a positive impact on wages. The theory is that importing intermediary goods allows for specialization and better productivity. A study in Africa found that firms that import intermediate inputs have a positive correlation with exports, employment opportunities, and wages (Edwards, Sanfilippo, Sundaram, & Asha, 2018). However, a study in China found that trade in intermediary goods does not explain the differences in wage premia across industries (Wang, Milner, & Scheffel, 2018).

The effect of imports may also depend on the country of origin. A study in Belgium found a negative effect of imports from poorer economies on domestic wages, but an ambiguous effect on imports from richer economies (Du Caju, Rycx, & Tojerow, 2012). A possible explanation is the different types of goods imported from different countries. Another possible explanation is that import trade from poorer economies causes competition on the domestic workers because those imported goods tend to be labour-intensive, for which the poorer economies often enjoy a comparative advantage.

However, this theory was challenged by Krugman & Lawrence (1993) and Krugman (2008) in the context of the US. They found little evidence supporting the argument that the pressure of international competition negatively affected the wages for workers in the US even in the labour-intensive sectors where such effects are most expected. One way to account for this in the present discussion is the special position of the US economy, which is the largest in the world, with its currency being central to the global financial system. Thus, its behaviour in terms of trade and wages could be

different from a typical small open economy which is often a price taker, such as Belgium or Brazil.

Trade liberalization and wage structure

A related body of literature explored the effect of trade liberalization on inequality in countries, as trade has uneven effects on different groups of workers.

A distinction is often drawn between skilled and unskilled workers. For developing countries, as trade openness increases, the demand for skilled labour producing export goods increases, and thus the wages for skilled labour rise both absolutely and relatively to the unskilled labour. A panel study across 37 developed and developing countries confirmed this theory, It also found positive correlations between trade openness with both income level and income inequality in developing countries (Yenipazarli & Kucukkaya, 2016). A study in Brazil found that after trade liberalization, wages for skilled workers increased relatively to the unskilled workers, while the marginal return to college education also increased. These show a relative increase in demand for skilled workers (Arbache, Dickerson, & Green, 2004).

Meanwhile, the effect in developed countries is more nuanced. While the general understanding is that the lower-class workers in the developed countries would suffer from trade openness, there is limited evidence in the US (Krugman & Lawrence, 1993; Krugman P. R., 2008). Contrarily, it was found that increased trade openness improved the position of unskilled workers compared to skilled workers and equalized the income distribution (Yenipazarli & Kucukkaya, 2016).

These appear to conflict with the HO Model. As the labour cost is higher in the developed countries, for labour-intensive goods which do not require high skill inputs, the developing countries should enjoy the comparative advantage. Therefore, the wage for low-skilled labour in developing countries would go up while that in the developed countries would go down (Krugman P. R., 2008, p. 134). However, the empirical results showed the opposite. A possible reason is that the interpretation of the skilled-unskilled division based on goods traded is flawed. As developing countries are increasingly taking over the unskilled labour-intensive niches of vertically specialized industries, it gives an illusion that the developing countries are exporting skilled-labour goods. An example is the iPhone production chain – as China manufactured iPhones and exported them to the US, it appears that China is specializing in making iPhones. However, China only specialized in assimilation, and much of the high value-added inputs such as electronic components were imported from developed economies like Japan. Thus, the share of skilled labour exported from China is exaggerated on the face value of the goods exported (Krugman P. R., 2008). This suggests that the effect of trade on wage structure is difficult to quantify without an extensive effort in dissecting the production chain.

3.3 Critical perspectives – Race to the bottom

The theories discussed above follow the school of neoclassical economics and the market mechanism. However, there are counterarguments by the critical school that global trade intensified the exploitation of the poorer countries and the workers there. This section discusses the “race to the bottom” with regards to wages.

Race to the bottom is defined as the hypothesis that "international market pressures determine domestic social policy, and that the down-ward institutional convergence of policies and practices, which precludes adequate welfare protections for the poor, is inevitable" (Rudra, 2008, p. 3). It means that globalization put pressure on states to take measures to suppress the labour and reduce the production costs, in order to increase their attractiveness to the global capital. Rudra (2008, p. 19) further argued that the workers in the less developed countries are more likely to be harmed by the race because the labour market institutions are weaker, and the governments could push through the reforms relatively easily.

Suppression of labour takes different forms, one of which is the reduction of social welfare. A study surveyed the welfare reform and welfare migration in the United States in 1996 and found evidence of a race to the bottom. The general effect of the welfare reforms was imposing stricter conditions on unemployment benefits to make them less accessible, therefore driving more people to work and weakening their negotiation position against the employer (Brueckner, 2000). A similar study was conducted in Sweden and found evidence for a race to the bottom in terms of welfare, where a decrease in welfare in one municipality would reduce the welfare in neighbouring municipalities (Dahlberg & Edmark, 2008). In the global context, some argued that globalization reduces social welfare expenditures in the less developed countries because the labour there often lacks bargaining power (Rudra, 2008, p. 26).

Another form of suppression is the lowering of labour standards. A study in China during the 1990s showed evidence that China used its *hukou* (household registration) system to limit labour rights to boost its competitiveness in the global market (Chan,

2003). The issue of labour standards also caused a stalemate between the North and the South. The less developed countries resisted the attempts by the richer countries to impose stricter labour standards on them, on the suspicion that these are protective measures reducing their competitiveness (Singh & Zammit, 2004).

At the global level, multiple studies found evidence of a race to the bottom. A study found that since the 2008 financial crisis, the 13 OCED countries competed against each other by undercutting real unit labour costs (Kiefer & Rada, 2015). Another study for 135 countries across 17 years found a positive correlation between labour standards in one country and that in another. The correlation is stronger in poorer countries with weaker labour standards (Davies & Vadlamannati, 2013). This means that if one country lowers its labour standard, other countries would also lower theirs to keep up with the competition.

Theoretically, the states could co-operate to mutually benefit from the reduction of downward competition (Menashe, 2020; Singh & Zammit, 2004). A model was built to show that trade need not lead to a race to the bottom in labour standards if there are binding global trade rules (Chen & Dar-Brodeur, 2020). There is also indirect evidence that cooperation between states to reduce the race is possible. OECD reached an agreement on the Two-Pillar Solution in 2010, which set ground rules on the taxes levied by states on multinational companies. This reduced the tax competition among the states, and the tax money could be used for better development (Shaxson, 2021). This shows that, in theory, the race can be overcome.

In summary, the key difference between the critical perspectives and the neoclassical economics models discussed above is the agency of the actors. While the

economics model studies labour fundamentally as a factor of production and a commodity for trade, the critical perspectives took into consideration the power relations. Thus, the wage level is not only a product of demand and supply but also complicated by the institutions and the power struggles. Wage convergence is not an automatic outcome of globalization. Rather, wage differentials are sustained by the states and the global capitalist class, to reduce the returns to the workers and increase that to the capital.

4 Research design and Methodology

This thesis hypothesizes that the real wage in an industry increases with the real export and decreases with the real import. To test the hypothesis, I conduct industry-level regression analyses using trade and wage data from South Africa. I also included other variables such as productivity and demographic characteristics as control variables.

In addition to the regression analysis, this thesis is also interested in the international dimension. I compare the change in trade volume and wage growth in South Africa and Germany to study how the relative wage of the two countries changed with the relative trade position. However, this comparison is of a limited nature, as the control variables could not be fully factored in. The goal is to show the general trend and leave room for further research.

Econometric regression specification

This thesis studies the effect of the real export and the real import on the real wage across different industries in the same country in the given period. This is achieved through a simple Ordinary Least Squared (OLS) Regression based on the annual data of 14 selected manufacturing industries and 5 other sectors in South Africa for the period 2013-2019 (n = 133). While the data on wage and trade is available from 2010 onwards, the data is limited by the availability of the data on productivity. Thus, a shorter period of 7 years is studied instead. I reckon that a panel regression with a fixed-effect model would be more ideal, but it is not adopted here because of the limited sample size.

The dependent variable is the average real wage (constant 2021), derived from the total salary paid divided by the total amount of employees obtained and deflated by the consumer price index. The main explanatory variables are (1) labour productivity, (2) export ratio, and (3) import penetration. The other control variables are (4) percentage of male workers, (5) percentage of black workers, (6) percentage of tertiary-educated workers, (7) mean age of workers, (8) percentage of workers with a permanent contract, (9) percentage of unionized workers and (10) yearly dummies. The definition of the main explanatory variables is listed in Table 3. The operational definitions and preparation of the variables are discussed in Appendix C in more detail.

Table 3 - Definition of main explanatory variables

	Definition
Labour Productivity	Gross value added per labour hour
Export ratio	Ratio of export to output
Import penetration	Ratio of import to domestic consumption; where domestic consumption is defined as the total output minus net export

The selection of the control explanatory variables (4) – (9) is informed by the following three considerations. First, there exists gender and racial inequalities in South Africa. Second, the improvement of education of the workers improves their economic conditions. Third, labour formality and unionization affect the workers' bargaining power in wage negotiation.

These variables are studied in five models. The first model regresses the logarithm of real wage against the logarithm of labour productivity, as productivity often predicts

wages. The second model adds the export ratio and import penetration as the regressors. The third test adds the control variables as the regressors. The fourth model adds the yearly dummies as the regressors. The last model includes every explanatory variable, except the export and import variables. These are listed in the specification below, where *w* is the real wage, *p* is the labour productivity, *X* is the real export, *M* is the real import, and *Y* is the real output. log(y+1) is used for the logarithmic variables, to account for the data entries of zero on import and export.

$$\log(w+1) = \beta_0 + \beta_1 \log(p+1) \qquad \text{(Model 1)}$$

$$\log(w+1) = \beta_0 + \beta_1 \log(p+1) + \beta_2 \frac{X}{Y} + \beta_3 \frac{M}{Y-(X-M)} \qquad \text{(Model 2a)}$$

$$\log(w+1) = \beta_0 + \beta_1 \log(p+1) + \beta_2 \frac{X}{Y} + \beta_3 \frac{M}{Y-(X-M)} + \beta_4 P_{male} + \beta_5 P_{black} + \cdots + \beta_{10} P_{unionized} \qquad \text{(Model 3a)}$$

$$\log(w+1) = \beta_0 + \beta_1 \log(p+1) + \beta_2 \frac{X}{Y} + \beta_3 \frac{M}{Y-(X-M)} + \beta_4 P_{male} + \beta_5 P_{black} + \cdots + \beta_9 P_{unionized} + \beta_{year2013} + \beta_{year2014} + \cdots + \beta_{year2018} \qquad \text{(Model 4a)}$$

$$\log(w+1) = \beta_0 + \beta_1 \log(p+1) + \beta_4 P_{male} + \beta_5 P_{black} + \cdots + \beta_9 P_{unionized} + \beta_{year2013} + \beta_{year2014} + \cdots + \beta_{year2018} \qquad \text{(Model 5)}$$

To account for the effects of the actual volume of export and import instead of the ratios, another 3 models are built where the export ratio is replaced by the logarithm of

the real export value and import penetration is replaced by the logarithm of the real import value.

$$\log(w+1) = \beta_0 + \beta_1 \log(p+1) + \beta_2 \log(X+1) + \beta_3 \log(M+1)$$

(Model 2b)

$$\log(w+1) = \beta_0 + \beta_1 \log(p+1) + \beta_2 \log(X+1) + \beta_3 \log(M+1) + \beta_4 P_{male} + \beta_5 P_{black} + \cdots + \beta_9 P_{unionized}$$

(Model 3b)

$$\log(w+1) = \beta_0 + \beta_1 \log(p+1) + \beta_2 \log(X+1) + \beta_3 \log(M+1) + \beta_4 P_{male} + \beta_5 P_{black} + \cdots + \beta_9 P_{unionized} + \beta_{year2013} + \beta_{year2014} + \cdots + \beta_{year2018}$$

(Model 4b)

The supplementary test – Mean comparison between South Africa and Germany

To study the convergence between the two countries, this study opts to study the first derivative of the variables, that is, the differences between the two countries in the year-to-year percentage change in the real wage, the real export, and the real import. This method has the advantage of eliminating the need to calculate and interpret the exact difference between the variables.

I then conduct a mean comparison test. While a correlation analysis between the variables is more straightforward in testing the hypotheses, the disadvantage is that it assumes a concurrent effect of trade on wages. Such an effect may lag due to price rigidity for example. To avoid such presumptions and to reduce the fluctuation in data, the method of mean comparison is used. By comparing the means of differences from

the first 3 years (2010-2012) and the last 3 years (2017-2019) in the period, the trend and the correlation between the differences could be studied, thus testing the hypotheses of convergence.

However, the result of this test must be taken with caution, as the control variables are not considered. While I made efforts to collect the relevant data, there is a lack of reliable data on the demographic variables in Germany (only before 2015) and productivity data in South Africa (only after 2013). Therefore, I made a compromise to trim these variables and focus on the key variables instead.

Source and preparation of Data

Thi thesis uses the official data from South Africa, Germany, and the United Nations and combines a range of surveys on the industry level and household level. The datasets included and their descriptions are listed in Appendix B.

Some of the industries are aggregates of smaller industries. For example, the machinery industry is an aggregate of the general machinery industry and the specific machinery industry. The process of aggregation is described in Appendix D.

Population and Sample

I tried to include data from as many industries as possible, given that such data is available and comparable across all the databases. A challenge is that different datasets classified industries and goods differently, which leads to a smaller number of comparable industries. It also further limits the sample size in the international comparison. For example, the *UN Comtrade* database separates plastic products (HS39) and rubber products (HS27), and the South African statistics separate the plastic

industry (338) and rubber industry (339) as well. However, the German database grouped plastic and rubber in the same group of goods (GP19-22). As a result, the plastic and rubber industry are included in the South African regression, but not in the international comparison test.

The industries selected form a broad range, from labour-intensive industries such as apparel, dairy, and wood, to capital-intensive industries such as automobile, chemical, and machinery. A list of industries included in the study and their corresponding data code is presented in Appendix A.

In total, around half of the manufacturing workers in South Africa are represented in the analysis. In 2019 the total number of workers in the manufacturing industry is 1,187,404, while the number of workers in the industries included in the dataset for this thesis is 589,599, which is 49.65% of the population.

The labour characteristics variables, such as male ratio and education level, are derived from the South African *Quarterly Labour Force Survey*, which is a household-level survey. The sample size for each industry each year ranges from 40 to 600. A list of the sample size in this survey is presented in Appendix E.

5 Empirical Results

5.1 Descriptive analysis

Within the period studied, most manufacturing industries in South Africa studied saw an increase in the real wage. The real export value, real import value, and real net export value saw more fluctuation. The trade statistics are presented in Table 14 and the employment statistics in Table 15 in Appendix F.

The industries that saw the most growth in real next export are wood products (+131.77%), automobiles (+42.43%) and chemicals (+41.82%), while the bottom three are glass (-1,041.6%), furniture (-329.11%) and dairy (-134.14%). Meanwhile, the industries that saw the most growth in the real wage are machinery (+19.62%), automobile (+19.50%), and apparel (+16.18%), and the bottom are dairy (-3.10%), paper (-1.18%) and furniture (-0.64%).

Regarding the potential correlation between real net export and the real wage, Table 4 shows a list of industries with their respective rankings in the growth of real net export and that of the real wage weighed by percentage. A Spearman's rank correlation coefficient was computed to assess the rank correlation between the percentage changes in real net export and that of the real wage. There was a positive correlation between the two variables, $r(12) = .45$, $p = .104$. No statistically significant correlation can be reported. Therefore, no conclusive conclusion can be drawn from the analysis.

The relationship between real wage and (1) real export value, (2) real import value, (3) real net export, and (4) labour productivity is presented in plot graphs from Figure 2

to Figure 5 respectively. All variables except real net export have a statistically significant positive correlation with the real wage.

In the same period, all the selected manufacturing industries in Germany saw an increase in the real wage. Except for the wood industry, all selected industries showed a decrease in real net export. The trade statistics are presented in Table 16 and the employment statistics in Table 17 in Appendix F.

Table 4 - Table of ranking of 14 selected South African manufacturing industries by the percentage change of real net export and real wage

Industry	Ranking in percentage change of real net export	Ranking in percentage change of real wage
Electrical machinery	11	7
Motor vehicle and component	2	2
Beverage	4	10
Chemical	3	9
Paper	7	13
Furniture	13	12
Wood and wood product	1	5
Iron and steel	5	4
Machinery	9	1
Plastic	10	8
Rubber	6	6
Apparel	8	3
Glass	14	11
Dairy	12	14

Figure 2 - Relationship between real export and real wage ($r = .469$, $p < .000$)

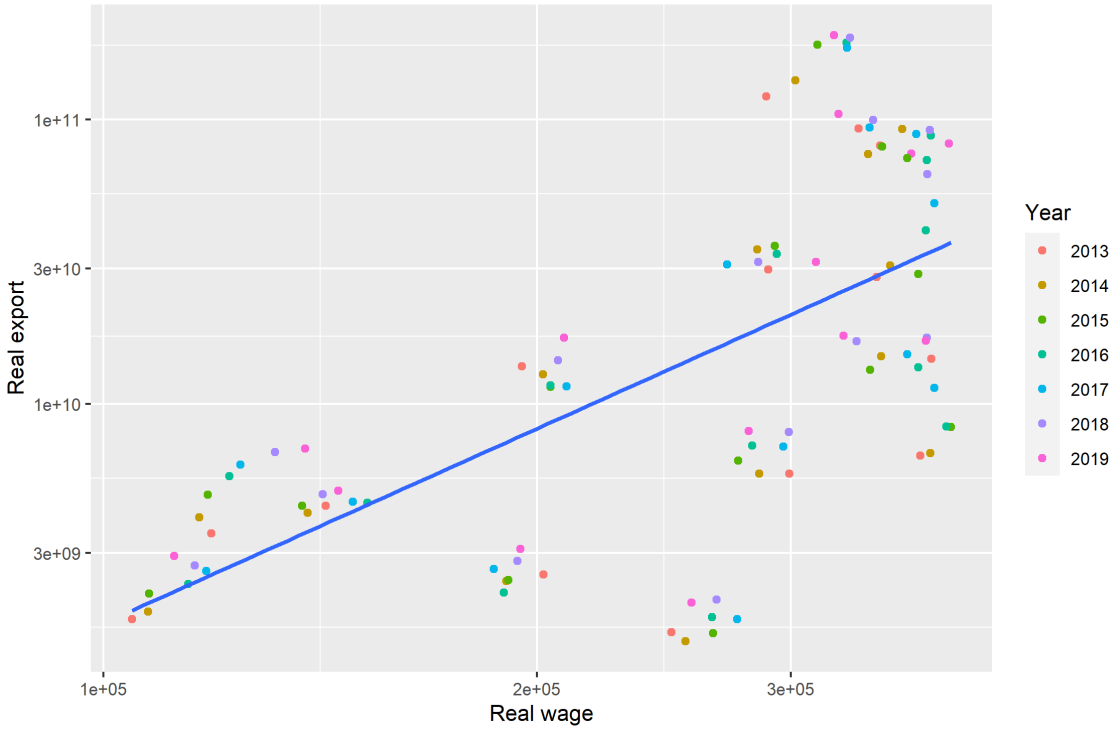


Figure 3 - Relationship between real import and real wage ($r = .427$, $p < .000$)

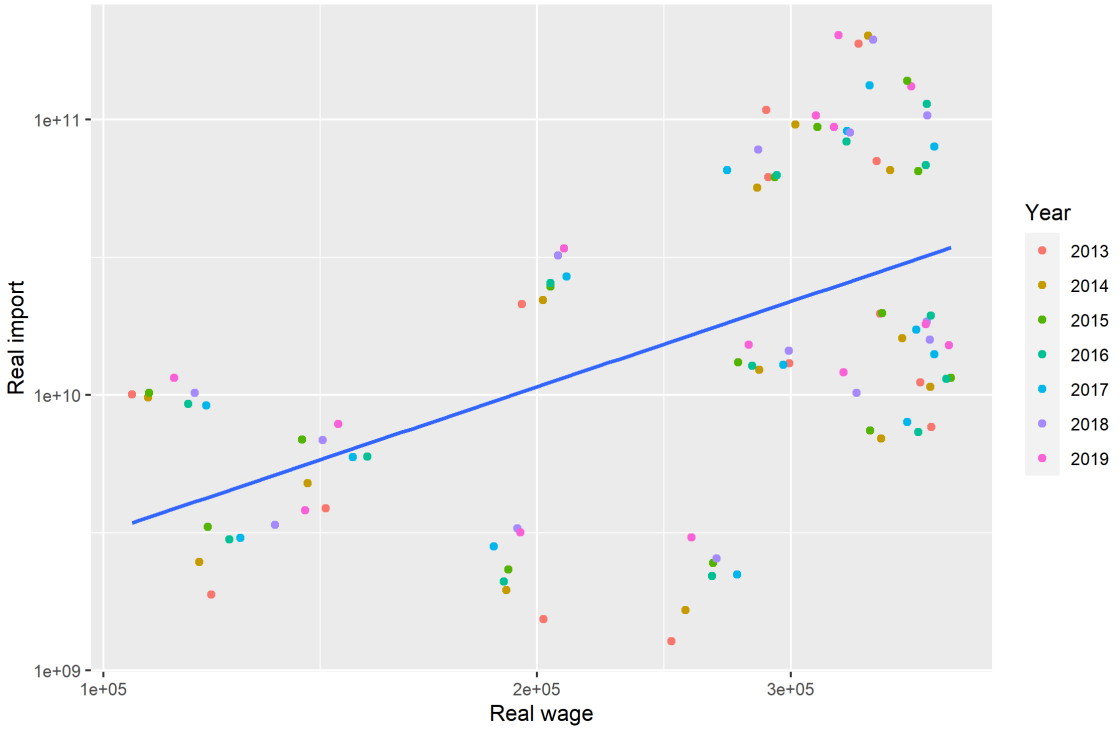


Figure 4 - Relationship between real net export and real wage (r = .046, p = .652)

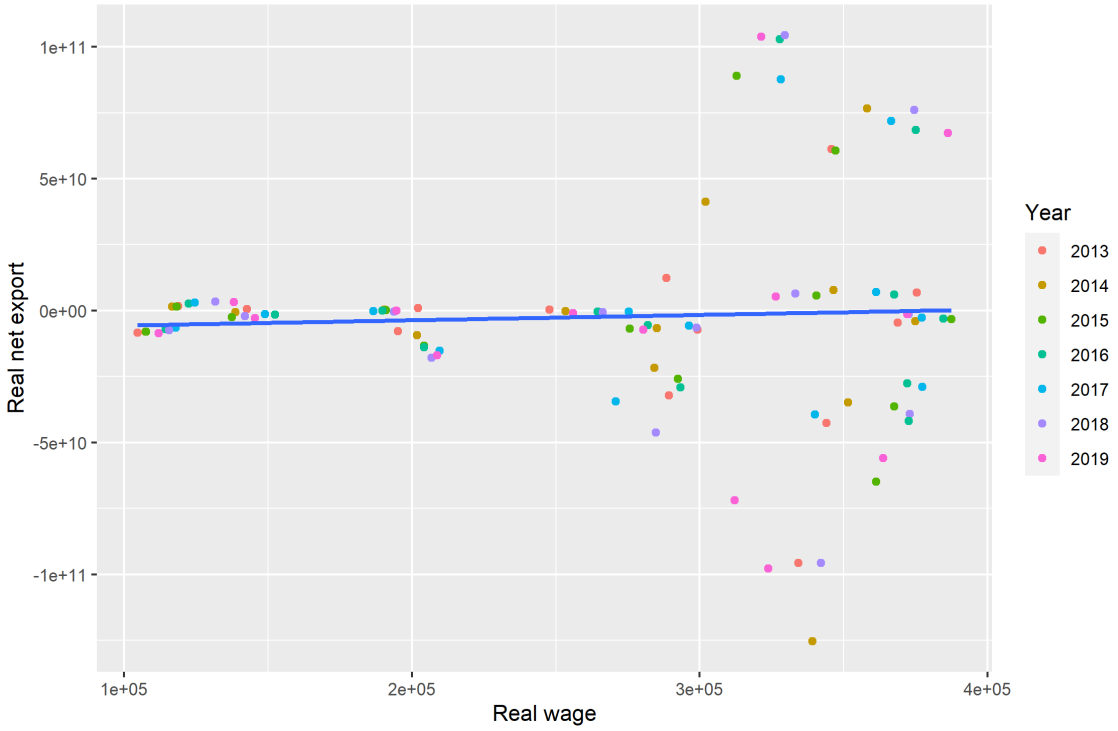
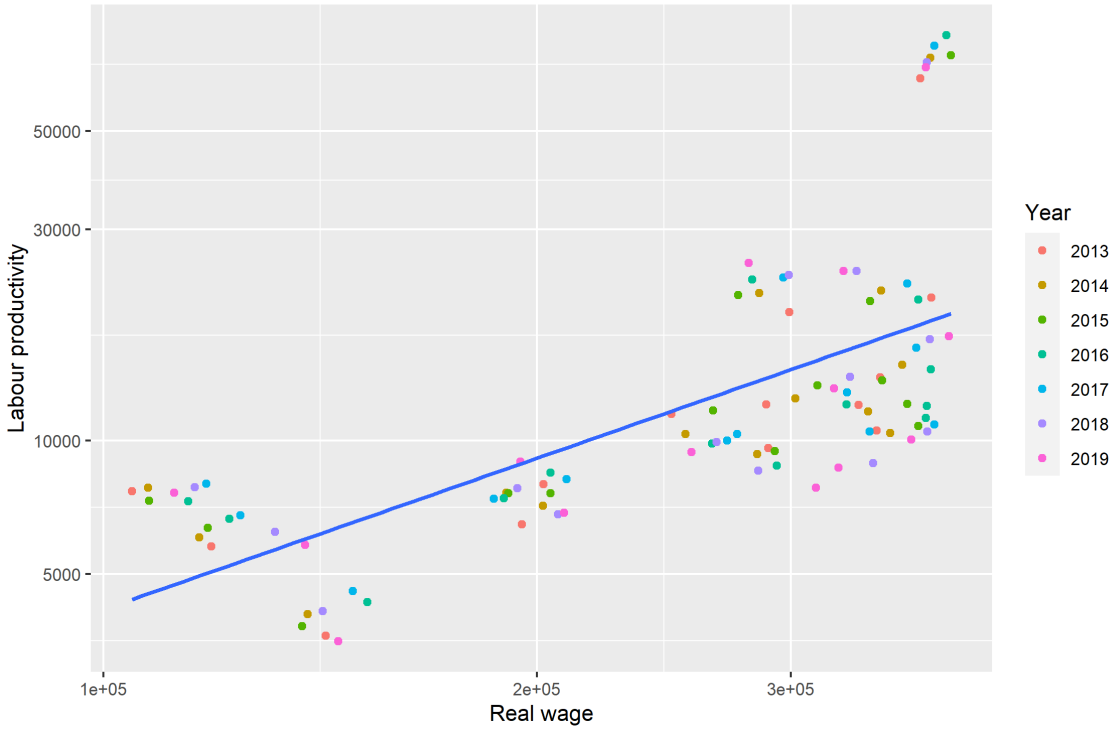


Figure 5 - Relationship between productivity and real wage (r = .507, p < .000)



5.2 Regression result

Table 5 presents the summary of statistics in the econometric regression. Table 6 and Table 7 present the findings of the regression analysis. In summary, the empirical findings did not confirm the hypotheses.

Table 5 - Summary of Statistics

	Mean	***SD***	**Number of observations**
log(wage+1)	5.425173	0.183266	133
log(Productivity+1)	4.077963	0.323071	133
Export ratio	0.355480	0.827025	133
log(Real Export value+1)	7.087164	4.685415	133
Import penetration	0.258767	0.387233	133
log(Real Import value+1)	7.135092	4.714389	133
% of male	0.708927	0.158038	133
% of black	0.713508	0.089902	133
% of tertiary-educated	0.167441	0.104919	133
% of permanent	0.708983	0.127200	133
% of unionized	0.345047	0.141215	133

My preferred finding is reported in Table 6. Productivity is a strong predictor of wages across all models. The coefficient is higher in Models 1 and 2a where the control variables are not added than in Models 3a, 4a, and 5 where the control variables are present. This suggests that part of the productivity could be explained by the control variables as well.

Table 6 - Regression models of real wage in South African industries using export ratio and import penetration

	Model 1	Model 2a	Model 3a	Model 4a	Model 5
Productivity	0.419***	0.425***	0.203***	0.200***	0.187***
	(<.000)	(<.000)	(<.000)	(<.000)	(<.000)
Export ratio		0.018	0.033	0.037	
		(.590)	(.175)	(.144)	
Import penetration		0.068	-0.009	-0.018	
		(.339)	(.873)	(.757)	
% of male			0.386***	0.385***	0.429***
			(<.000)	(<.000)	(<.000)
% of black			-0.125	-0.159	-0.168
			(.168)	(.126)	(.115)
% of tertiary-educated			0.929***	0.932***	0.871***
			(<.000)	(<.000)	(<.000)
% of permanent			-0.159	-0.165	-0.136
			(.104)	(.100)	(.155)
% of unionized			0.050	0.054	0.120
			(.487)	(.465)	(.104)
2013				-0.013	-0.018
				(.637)	(.506)
2014				-0.003	-0.008
				(.913)	(.781)
2015				0.002	-0.003
				(.935)	(.906)
2016				0.021	0.016
				(.404)	(.546)
2017				0.006	0.001
				(.831)	(.984)
2018				0.004	0.001
				(.874)	(.957)
Adjusted R^2	.542	.586	.827	.820	.808
n	133	133	133	133	133

‘***’ denotes a significance level of 0.001, ‘**’ 0.01, and ‘*’ 0.05.

My main finding is that there are no statistically significant effects of export ratio and import penetration on wages – see the coefficients and t-statistics for these variables in Models 2a, 3a, and 4a. Notably, in Model 2a, import penetration has a positive but not statistically significant effect on wages with a coefficient higher than the export ratio. In Models 3a, 4a where the control variables are added, the effect of import penetration on wages is found to be negative but not statistically significant, while that of export ratio still is positive.

Regarding the effects of the control variables on wages, I found that the percentage of male workers and the percentage of tertiary-educated workers both have a positive and statistically significant effect on real wages. From Model 4a and 5, none of the yearly dummy variables has any statistically significant effect on wages, and therefore the yearly variation could be excluded as being relevant in the model.

Table 7 presents the results for the regression using the different proxies for trade – the values of real export and real import. The results about productivity are similar, as it is still a strong predictor of wages. However, the result for the other variables is slightly different from the first five Models.

Table 7 - Regression models of real wage in South African industries using real export value and real import value

	Model 1	Model 2b	Model 3b	Model 4b	Model 5
Productivity	0.419***	0.403***	0.193***	0.198***	0.187***
	(<.000)	(<.000)	(<.000)	(<.000)	(<.000)
Real Export value		0.094**	-0.031	-0.033	
		(.008)	(.212)	(.189)	
Real Import value		-0.102**	0.017	0.018	
		(.004)	(.476)	(.461)	
% of male			0.453***	0.456***	0.429***
			(<.000)	(<.000)	(<.000)
% of black			-0.238**	-0.345***	-0.168
			(.004)	(.000)	(.115)
% of tertiary-educated			0.445***	0.383***	0.871***
			(<.000)	(.001)	(<.000)
% of permanent			0.220*	0.217*	-0.136
			(.019)	(.021)	(.155)
% of unionized			0.159*	0.168*	0.120
			(.010)	(.031)	(.104)
2013				-0.051*	-0.018
				(.031)	(.506)
2014				-0.040	-0.008
				(.102)	(.781)
2015				-0.027	-0.003
				(.243)	(.906)
2016				-0.004	0.016
				(.857)	(.546)
2017				-0.018	0.001
				(.421)	(.984)
2018				-0.009	0.001
				(.685)	(.957)
Adjusted R^2	.542	.598	.865	.866	.808
n	133	133	133	133	133

‘***’ denotes a significance level of 0.001, ‘**’ 0.01, and ‘*’ 0.05.

In Model 2b, I found that real export value has a statistically significant positive effect on wages, while real import value has a statistically significant negative effect. This is consistent with the general theory. However, once the control variables are added in Models 3b and 4b, the effects disappear. In both Models 3b and 4b, real export value has a statistically insignificant negative effect on wages, while real import value has a statistically insignificant positive effect.

Another observation is that in Models 3b and 4b, all non-dummy control variables are found to have statistically significant effects on wages. Thus, percentages of male, tertiary-educated, permanent, and unionized workers have a positive effect on wages, while the percentage of black workers has a negative effect on wages. These are consistent with general predictions. However, once the trade variables are removed in Model 5, only the male percentage and tertiary-educated percentage are still found to have a statistically significant effect on wages.

Regarding the dummy variables, in Model 4b all yearly dummies except 2013 returned no statistically significant effects. Since only one dummy variable out of six has a statistically significant effect, the effect of yearly fluctuation on the model cannot be proved.

5.3 Mean Comparison between South Africa and Germany

The calculated percentage changes in wage, export, and growth in the eight included industries in South Africa and Germany are presented in

Table 18 in Appendix F. The comparison of the numbers between South Africa and Germany is presented in Table 8. In summary, there is evidence that the difference in real export growth is positively correlated with the difference in real wage growth. However, there is no evidence for the correlation between the difference in real import growth and in wage growth.

Table 8 – The difference between the growth rate in real import, real export and real wage in South Africa and Germany from 2010 to 2019 (3-year average) (Germany minus South Africa)

	Difference in import growth	Difference in export growth	Difference in wage growth
Electrical machinery	-38.69%	+0.32%	+6.20%
Motor vehicle and component	+33.89%	-18.78%	-6.70%
Beverage	-55.49%	-38.98%	+3.59%
Chemical	-43.67%	-77.93%	+1.81%
Paper	-16.29%	-23.47%	+5.77%
Furniture	-31.94%	+30.71%	+9.45%
Wood and wood product	-84.60%	-110.61%	-0.87%
Machinery	-80.35%	-133.98%	-7.93%

The German wage level was and is higher than the South African wage level. Thus, a positive value in the difference in wage growth in Table 8 means that the German wage grew more than the South African wage and thus the levels diverged. A negative value implies convergence. Therefore, if there is a positive correlation between the difference in export growth and the difference in wage growth, it implies that growth in export trade is a factor of wage convergence. A negative correlation between the difference in import growth and the difference in wage growth means that growth in import trade is a factor of wage divergence.

From Table 8, five of the eight industries showed wage divergence, where South African workers lagged their German counterparts in wage growth. Meanwhile, the difference in import growth is negative in seven out of eight industries and real export in six out of eight. It means that South Africa experienced a growth in both imports and export compared to Germany and that its trade intensified.

Regarding the correlation between trade and wage convergence, a Pearson product-moment correlation coefficient was computed to assess the linear relationship between the difference in percentage changes in real wage and that of real export. There was a positive correlation between the two variables, $r(7) = .69$, $p = .040$. This implies that as an industry in South Africa grows in real export compared to that in Germany, the wages of workers in that industry in South Africa grows also relative to their counterparts in Germany, thus the wages converged.

Also, the same coefficient was computed to assess the linear relationship between the difference in percentage changes in real wage and that of real import. There was a positive correlation between the two variables, $r(7) = .01$, $p = .981$. As the p-value is

high, the null hypothesis cannot be rejected, and no conclusion can be drawn as to the effect of relative import growth on wage differences.

6 Discussion and Caveats

The results of the empirical analysis do not confirm the hypotheses. This contradicts the literature and the theories. This section raises some possible interpretations and explanations of this result to leave room for further discussion, without aiming to provide a concrete answer.

6.1 Omitted variables and measurement errors

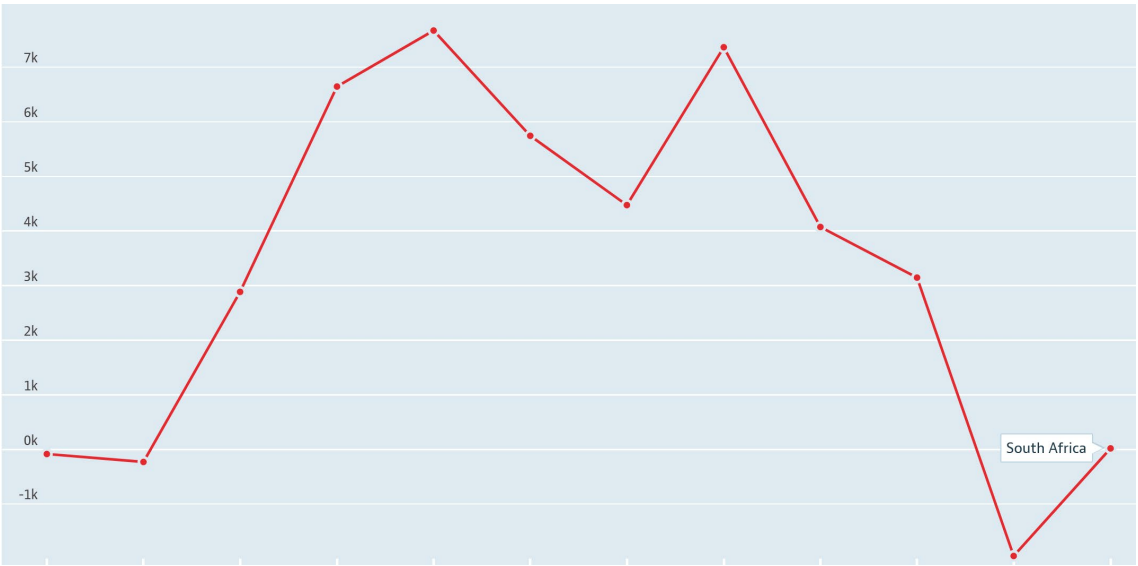
The results may be different because of the variables included. Riker (2010) adopted a similar method of simple OLS for 21 industries in the US, and the dependent variables included workers' education, experience, union status, gender, race, and living in metropolitan areas. In comparison, this thesis did not include the factors of experience and living area, which could affect wages as well. While I included the variable of average productivity, I did not consider the geographic distribution of industries. A study in China for example conducted tests on industries in the coastal region and the other parts separately, as inequality between the regions exists (Wang, Milner, & Scheffel, 2018). While geography is a possible contributing factor, such data is not readily available in the survey, and thus it presents a limitation here.

Another set of variables not taken into consideration by this thesis is the factors concerning capital. Possibly relevant variables include foreign direct investment (FDI) share and foreign investment in fixed asset (FIFA) share, since foreign investments in industries may also have positive effects on wages (Wang, Milner, & Scheffel, 2018). In the case of South Africa, the FDI data on the industry level is not readily available. This is a limitation. It should be noted however that the capital data is not always included in wage studies (Du Caju, Rycx, & Tojerow, 2012; Riker, 2010). Further, as shown in

Figure 6, South Africa is different from China during the reform and opening-up policy era in that South Africa suffers from a net FDI outflow. It is therefore unlikely that inward FPI plays a significant role in determining wages as in the case of China, and the omission thereof can be justified.

Overall, with the robustness of the statistical model in the other variables and the relatively minor omissions, it is unlikely that the discrepancies between the results and the theories can be fully explained by the omission alone.

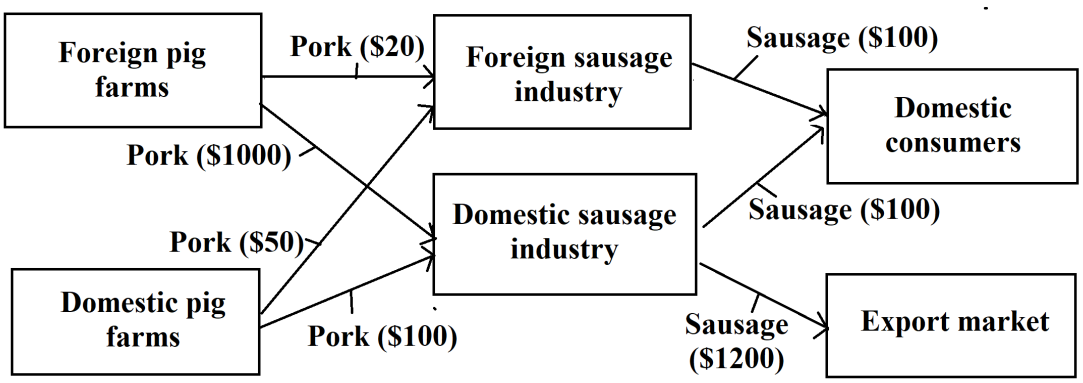
Figure 6 - FDI flows, Outward, Million US dollars, 2010 – 2021 (OECD, 2022b)



A further issue with the variables is that the operational definition of import penetration is imperfect. The official definition of import penetration adopted by the OECD, $\frac{M}{D}$ where D is domestic consumption. D is further defined as $GDP - (X - M)$. Thus, the formula of $\frac{M}{Y-(X-M)}$ is used in this thesis (OECD, 2005). Some argued that this measurement is inaccurate because it assumed that (1) total production output does not contain any foreign value and (2) the value of the imported goods is only of foreign

origin (Fronczek, 2017). I demonstrate these issues with a hypothetical scenario in Figure 7 using the example of a sausage production chain.

Figure 7 - Illustration of calculation of import penetration



Using the formula $\frac{M}{D}$, the import penetration ratio is calculated as follows.

$$\frac{M}{D} = \frac{1000 + 100}{100 + 100} = \frac{1100}{200} = 550\%$$

Alternatively, by considering $D = GDP - (X - M)$, and by using the value-added approach to calculate the GDP, the same ratio can also be calculated as follows.

$$\frac{M}{Y - (X - M)}$$
$$= \frac{1000 + 100}{\big((100 + 50) + (100 + 1200 - 1000 - 100)\big) - ((1200 + 50) - (1000 + 100))}$$
$$= \frac{1100}{200} = 550\%$$

However, the ratio of 550% is counter-intuitive, as it is inconceivable that 550% of the domestic consumption is imported. Here, the total domestic consumption is $200. $100 of the sausage is imported, $50 of which is made from pork exported from the

domestic industry. Therefore, the more common sense import value should be estimated at $100 - 50 = 50$, and the import penetration should be $\frac{50}{200} = 25\%$. The reason for the gross overestimation is that the domestic output does not consider the $1000 import of pork (thus the denominator is underestimated), and the $100 import of sausage does not consider the $50 worth of pork exported from the domestic country (thus the numerator overestimated). Thus, the calculation of import penetration could be misleading with the contemporary, highly-integrated global production chain. In this thesis, the maximum value of import penetration calculated is the rubber industry (>400%, compared to the mean value of 25.88%) because of the large import and export trade relative to the domestic consumption. Such extreme values may arguably have distorted the regression results.

I noted that this definition is also generally adopted in the literature, thus the deviation of the current study from the literature may not be fully due to this issue. Future studies may consider revising the definitions as suggested by the more contemporary literature (Fronczek, 2017).

Another possible explanation for the discrepancies is that South Africa is not a suitable case study. During the period 2009 to 2018, Jacob Zuma was in power in South Africa, and some accused his administration of corruption and undemocratic practices. A study showed that during his time in power, his poor governance and "lack of honesty, transparency, and accountability" caused the problem of illicit financial flows to deteriorate (Rapanyane & Ngoepe, 2020). According to an Index of Economic Freedom published by a think tank in the US, South Africa was ranked as "mostly unfree" and barely above Russia (The Heritage Foundation, 2022). Therefore, an

argument could be made that the market of South Africa may not behave like a free market and that it may not conform to the neoclassical economies.

However, the fact that a market is not “free” does not prevent the application of the theory. For example, there is literature studying the effect of trade in China (Wang, Milner, & Scheffel, 2018). During the post-war period, many of the East-Asian economies which achieved significant growth in output and wages, such as Taiwan, Japan, and South Korea, also arguably did not qualify as a free market by modern standards. Yet, the East Asian model is well-researched. Therefore, unfreedom is not fatal to the application of the theories.

A relevant issue is the integrity of the data. One might speculate that the South African government under Zuma was not transparent or honest, and the data presented by the official source might not be correct. Nonetheless, here it cannot be proved to the positive or negative, and the integrity of the statistics must be assumed.

Another line of critique could be made in that the survey data does not include the informal labour sector. Labour informality is a significant issue in developing countries including South Africa (Heintz & Posel, 2008). It is difficult to study from the official data what is not reported to the government. Therefore, by choosing to use official data sets, this thesis limited its inquiry to the formal sector. Although this is sound, it does not invalidate the empirical results, as there is no obvious argument why the effect of trade on wages in the formal sector would be significantly different from that on wages in the informal sector.

6.2 Distortion in the labour market

If the discrepancies do not stem from the method, they must be accounted for by theories. Without raising a strict theory, this section suggests that wages are irresponsive to the change in trade potentially because of the labour market structure in the country.

South Africa has a serious unemployment problem. Unemployment rose from 23.2% in 2018 to 34.5% in the first quarter of 2022, which is the highest in the world (Statistics South Africa, 2022f). One of the reasons is that since the end of the Apartheid, there were a lot of entrants to the labour market which could not be absorbed by the job creation (Festus, Kasongo, Moses, & Yu, 2016). As such, the workers are in a weak position in the labour market.

In such a market, therefore, changes in labour demand may cause little changes in the wage level. I propose two possible models for explaining this phenomenon. This first model assumes that the labour market is at equilibrium. The high unemployment rate means that the labour supply is ample and the demand is weak. It can be theorised that the current wage level the supply elasticity is extremely high because there are so many people looking for jobs, they would take any job created even with a slight increase in wages. The model is presented in Figure 9. An increase (decrease) in labour demand in this market would cause only a much smaller increase (decrease) in the wage level.

Another possible model assumes instead that the current wage level is fixed on a price floor higher than the equilibrium rate, possibly due to the provision of social welfare or minimum wage, and there is unemployment. The model is presented in

Figure 10. In such a market, any vacancy created (destroyed) would at once be filled (vacated) without affecting the wage level, so long as the current wage level is still higher than the equilibrium wage. Therefore, a shift in demand does not have any effect on wage level.

These models are admittedly an oversimplification of the labour markets, as labour is not homogenous and there are different markets for labour. Nonetheless, I aimed to provide basic insights as to why export and import trade do not have significant impacts on wages in an economy with an extremely high unemployment rate. Under this explanation, the basic theories may still be correct, but the current case study presents a labour market too distorted for the theories to apply perfectly.

Figure 8 - The unemployment rate in South Africa from 2008 to 2022

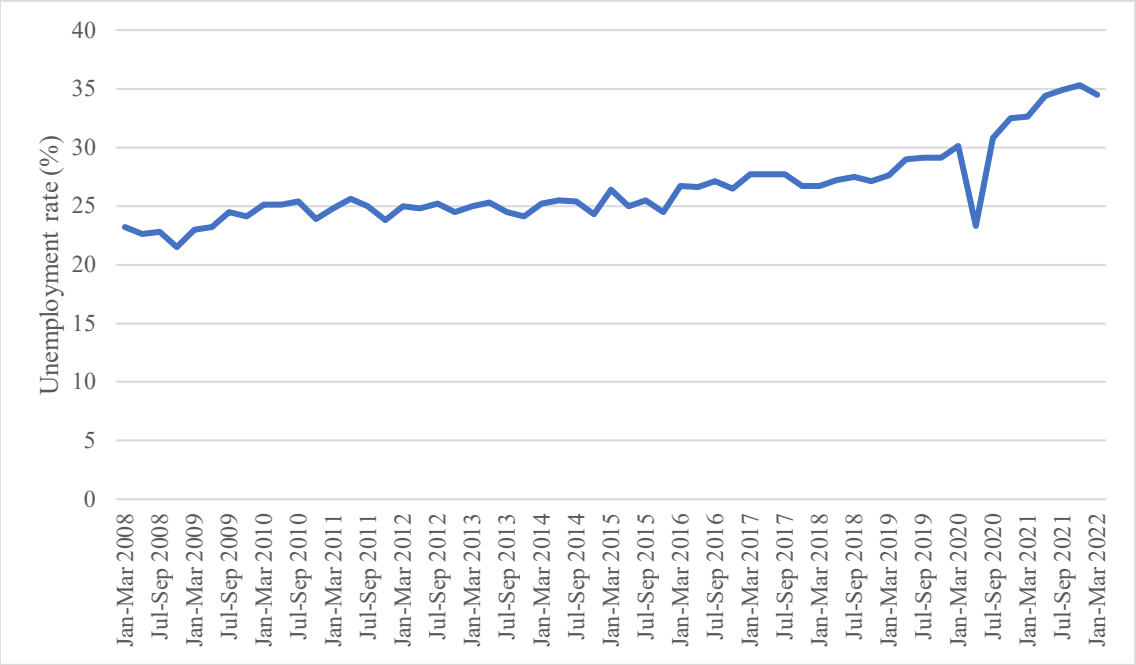


Figure 9 - Demand-supply curve of a labour market with high supply elasticity

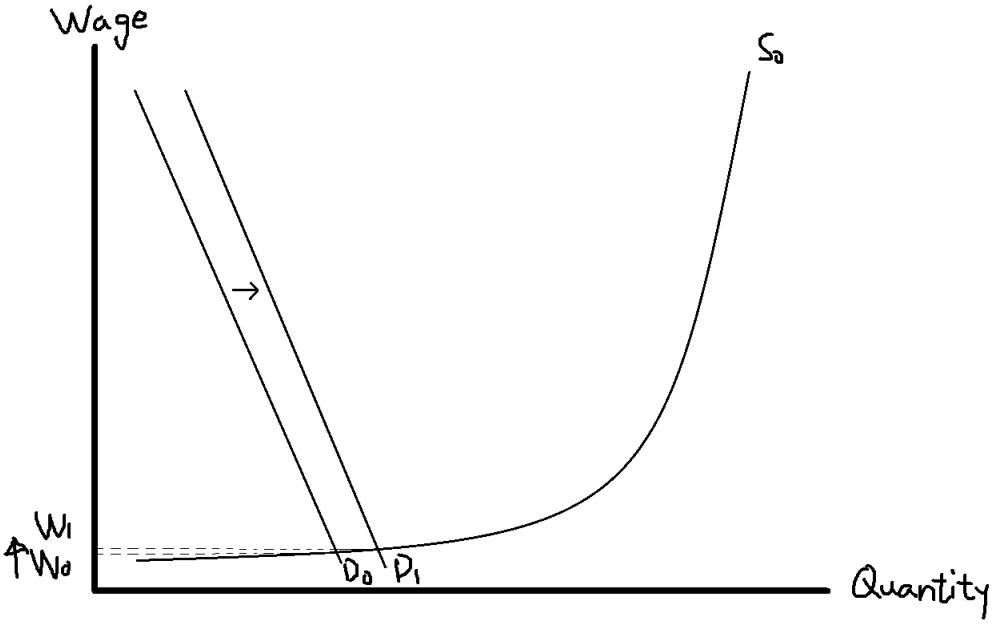
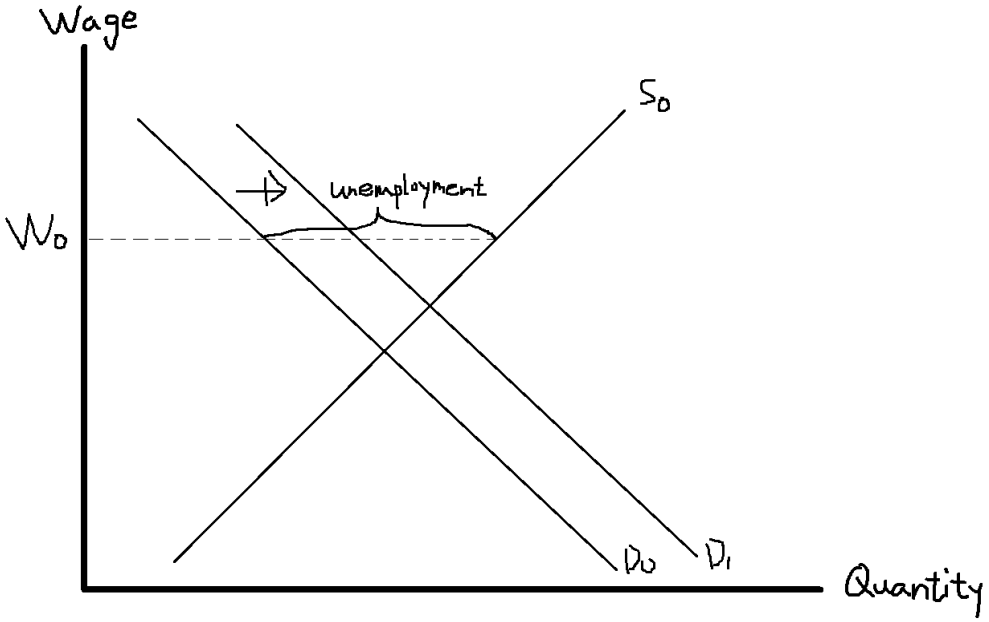


Figure 10 - Demand-supply curve of a labour market with unemployment



6.3 Critical political economy perspectives

The critical political economy perspective may also explain why the neoclassical economics theories do not fit in the case of South Africa.

As discussed before, globalization causes competition pressure on individual states to create favourable conditions for the global capital, resulting in a race to the bottom. The government interventions include lowering the labour standards and reducing social welfare could reduce the labour bargaining power in general.

For South Africa, one possible explanation for the lack of correlation between trade and wage is that the effects of trade are set off by state interventions. For example, the government may have changed the labour supply by amending the welfare law or supplying re-training, thus lowering the labour cost for some sectors, and mitigating the effect of wage rise brought by an increase in export. Labour retraining is one of the policies in the official *National Industrial Framework Policy*, which may have achieved its purpose in this regard (The Department of Trade and Industry, 2007, p. 31). However, the data does not directly support the race to the bottom argument either and negate the neoclassical theories, as it is not shown that export trades negatively affect wage levels in South Africa. I propose that both the neoclassical economics theories and critical perspectives may hold some truth, and the positive and negative effects of trade co-exist and counteract, resulting in the apparent lack of correlation.

The inconsistency between the results and the theories might also be caused by corruption in the bureaucracy, collusion between the capitalist and the government officials, or other political factors. The local officials may not have enforced the labour

law strictly, allowing the employers to underpay the employees. Such scenarios are conceivable with Zuma's administration and with the high unemployment rate in the country, but this thesis raises no evidence supporting such a claim. This could be left for further study.

7 Conclusion

In this thesis. I find an absence of trade effects on wages in South Africa. Utilizing a regression analysis conducted on the industries in South Africa, I find that both export ratio and income penetration had no statistically significant effect on real wage after controlling for the demographic variables. The result was the same when export value and import value were used in the regression model instead. No conclusive explanations could be given as to why the results did not conform with the theoretical prediction, but several methodological limitations (omitted variables and measurement errors) and part of counter theoretical explanations (race to the bottom) may explain the absence of correlation. A mean comparison between South Africa and Germany shows some preliminary evidence to support the hypothesis that export may promote wage convergence, but no conclusive evidence was found about imports.

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Appendix A: List of industries included

(* denotes that the industry is also included in the South Africa-Germany comparison)

(# denotes that the data of the industry is aggregated)

1. Electrical machinery *
2. Motor vehicle and component *#
3. Beverage *
4. Chemical *#
5. Paper *
6. Furniture *
7. Wood and wood product *#
8. Iron and steel
9. Machinery *#
10. Plastic
11. Rubber
12. Apparel *
13. Glass
14. Dairy

15. Electricity, gas and water

16. Construction

17. Trade, catering and accommodation

18. Transport, storage and communication

19. Finance, real estate and business services

Table 9 - Code list for industries in corresponding dataset (# denotes aggregated)

ID	Descripton	HS	QLFS	QES	XUVI	MUVI	GXM	GQES	SUT	PPI
1	Electrical machinery	85	360	36	UVI45000	UVI55600	GP19-27	WZ08-27	360	PPC40000
2	Motor vehicle and component	87	1004#	1004#	UVI45400	UVI55900	GP19-29	WZ08-29	380	PPC38000
3	Beverage	22	305	305c	UVI42000	UVI52000	GP19-11	WZ08-11	305	PPC31200
4	Chemical	28	1001#	1001#	c01#	d02#	GP19-20	WZ08-20	1001#	PPC34200
5	Paper	48	323	323	UVI44000	UVI54100	GP19-17	WZ08-17	323	PPC33100
6	Furniture	94	391	391	UVI44000	UVI54600	GP19-31	WZ08-31	391	PPC39000
7	Wood and wood product	44	1003#	1003#	UVI44000	UVI54600	GP19-16	WZ08-16	1003#	PPC33100
9	Iron and steel	72	351	351	UVI45110	UVI55100			351	PPD35100
10	Machinery	84	1002#	1002#	c02#	d01#	GP19-28	WZ08-28	1002#	PPC36200
11	Plastic	39	338	338	UVI44500	UVI54500			338	PPC34300
13	Rubber	27	337	337	UVI44500	UVI54500			337	PPC34300
14	Apparel	61	314	314c	UVI44000	UVI53100	GP19-14	WZ08-14	314	PPC32200
15	Glass	70	341	341	UVI44000	UVI54600			341	PPD34000
16	Dairy	4	302	302	UVI41000	UVI52000			302	PPC31115
101	Electricity, gas and water		400	4					400	PPE10000
102	Construction		500	5					500	PPB40000
103	Trade, catering and accommodation		600	6					600	PPB40000
104	Transport, storage and communication		700	7					700	PPB40000
105	Finance, real estate and business services		800	8					800	PPB40000

Appendix B: Source of data

Dataset (Abbreviation)	Description	Period
South Africa		
Quarterly Labour Force Survey ("QLFS")	This survey measures the dynamics of the labour market in South Africa. It is a household-level survey, where individual households are surveyed as to their personal background, their employment status, and their job conditions per quarter. The data is compiled annually in the publication "Labour market dynamics in South Africa", which this thesis consulted. Citations: Statistics South Africa (2011), Statistics South Africa (2012), Statistics South Africa (2013), Statistics South Africa (2014), Statistics South Africa (2015), Statistics South Africa (2016), Statistics South Africa (2017), Statistics South Africa (2018), Statistics South Africa (2019), Statistics South Africa (2020)	2010-2019
Quarterly Employment Statistics ("QES")	This is an industry-level survey, where employers are surveyed as to how many employees they employ, and the gross number of wages paid per quarter. Citation: Statistics South Africa (2022d)	2010-2019
Supply and use tables ("SUT")	The tables provide the basis for the economic data contained in the national accounts. Specifically of interest is the value-added and output in each industry, which is used in this paper to estimate labour productivity.	2013-2019

	The historical tables are not found on the Statistics South Africa website, but were obtained through e-mail liaison with the data officer of Statistics South Africa, a correspondence record of which is attached in Appendix G. According to the data officer, the tables are only available for the period after 2013. The tables prior are incompatible due to rebasing and change of industry grouping. Citation: Statistics South Africa (2022e)	
Selected Historical Rates ("SHR")	This dataset contains the daily exchange rate of US dollar (USD) to South African Rand (ZAR), used to convert data from the UN Comtrade Database to ZAR. Citation: South African Reserve Bank (2022)	2010-2019
Export and import unit value indices ("XMUVI")	This dataset contains the monthly export and import unit value indices, which measure the value of export per unit of volume. It is used to deflate trade value data. Citation: Statistics South Africa (2022b)	2010-2019
Consumer Price Index (CPI)	This dataset contains results of the monthly Survey of Consumer (Retail) Prices, which supplies information about changes in the overall prices of goods and services bought by the average household. It is used to deflate the nominal wage to obtain the real wage across the years. Citation: Statistics South Africa (2022a)	2010-2019
Producer Price Index (PPI)	This publication contains results of the monthly Surveys of Prices of Locally Produced Commodities, both locally sold or exported. It is used to deflate the nominal gross value added	2010-2019

	obtained from SUT to obtain the real gross value added. Citation: Statistics South Africa (2022c)	
Germany		
Quarterly earnings survey ("GQES")	This database contains data on the number of employees and gross salary paid in each industry per quarter. Citation: Federal Statistical Office Germany (2022c)	2010-2019
Exports and imports (volume, indices) (foreign trade): Germany, years, country groups, product classification ("GXM")	This database contains data on the volume of goods imported and exported by product categories per year. Citation: Federal Statistical Office Germany (2022b)	2010-2019
Consumer price index for Germany ("GCPI")	This is the counterpart of the South African CPI. Citation: Federal Statistical Office Germany (2022a)	2010-2019
United Nations		
UN Comtrade Database ("Comtrade")	This database contains the reported data of export and import from each country in each product category by year. Citation: United Nations (2022)	2010-2019

Appendix C: Definition and preparation of variables

Table 10 – Variables for the South African regression and the preparation thereof

Variable	Source	Preparation
Real wage	*QES, CPI*	From *QES*, the number of employees and gross salary paid in each industry each quarter is obtained. First, the mean value of employees employed each year is calculated. The sum of salary paid each year is then divided by the yearly average number of employees, to obtain the average salary per year. The CPI (constant 2020) data is reported monthly, and thus the yearly CPI is calculated by the average of 12 months. The average salary is then deflated by the corresponding CPI for each year and each industry to obtain the average real wage.
Real import value **Real export value**	*Comtrade, SHR, XMUVI*	The yearly nominal import (export) value in USD of a type of goods is obtained from *Comtrade*. It is then converted to ZAR, using the yearly average of USD: ZAR rate calculated from the daily rate obtained from *SHR*. The nominal import (export) value in ZAR is then deflated by the export (import) price index (constant 2020) obtained from *XMUVI* to obtain the real import (export) value (constant 2020).
Import penetration	*SUT*	Import penetration is the ratio of import to domestic consumption ($\frac{M}{Y-(X-M)}$). The value on real output per industry is obtained from *SUT,*

		and the real import and export values are derived from the above.
Export ratio	*SUT*	Import penetration is the ratio of export to output ($\frac{X}{Y}$). The value of real output per industry is obtained from *SUT,* and the real export value is derived from the above.
Percentage of male workers **Percentage of black workers** **Percentage of tertiary-educated workers** **Mean age of workers** **Percentage of workers with a stable formal contract** **Percentage of unionized workers**	*QLFS*	For the dataset of each year, the survey results are first grouped by the industries in which the employees surveyed report to be working (Q43 of the survey). For each industry, the weighted response to the following questions is counted: • Gender (Q13) • Age (Q14) • Population group (Q15) • Highest education level (Q17) • Contract duration (Q41) • Union membership (Q41) The count is then divided by the total number of respondents in the industry to obtain the percentage.
Labour productivity	*SUT, PPI, QLFS, QES*	Labour productivity is defined as gross value added per labour hour. First, the nominal yearly gross value-added of each industry is obtained from *SUT*. It is then deflated by the corresponding PPI in each industry to obtain the real gross value-added.

The PPI (constant 2020) data is reported monthly, and thus the yearly PPI is calculated by the average of 12 months.

Labour hour is a product of the total number of employees and average working hours. The total number of employees in each industry is obtained from *QES,* by calculating the average number of employees obtained in each quarter per year. The average working hour is obtained from *QLFS*, by grouping the survey results in industries and calculating the mean working hours reported in Q41

The real gross value-added is then divided by the labour hour to obtain the real labour productivity (constant 2020).

Table 11 – Variables for the comparison test and the preparation thereof

Variable	Source	Preparation
Percentage change in real import in South Africa	*Comtrade, SHR, XMUVI*	The import and export values calculated for the domestic-level test are used here. The percentage change is calculated between the sum of the import (export) value from 2010 to 2012 and the sum from 2017 to 2019 for each industry.
Percentage change in real export in South Africa		
Percentage change in real wage in South Africa	*QES, CPI*	The wage data calculated for the domestic-level test is used here. The percentage change is calculated between the average wage from 2010 to 2012 and the average from 2017 to 2019 for each industry.
Percentage change in real import in Germany	*GXM*	The import (export) value of Germany in each type of goods is obtained from *GXM*. The value included in the dataset represents the import (export) value with constant unit values (constant 2010), and thus it represents the real value. The percentage change is calculated between the sum of the import (export) value from 2010 to 2012 and the sum from 2017 to 2019 for each industry.
Percentage change in real export in Germany		
Percentage change in real wage in Germany	*GQES, GCPI*	The monthly average nominal wage (in EUR) in each industry is obtained from *GQES*. The yearly average nominal wage is then calculated by summing the monthly average.

		The yearly CPI data is obtained from *GCPI*, and the yearly average nominal wage is deflated by the CPI to obtain the yearly real wage. The percentage change is calculated between the sum of the import (export) value from 2010 to 2012 and the sum from 2017 to 2019 for each industry.
Difference in percentage change in export	*N/A*	The difference is calculated by the German percentage change minus the South African percentage change in the corresponding value.
Difference in percentage change in import		
Difference in percentage change in wage		

Appendix D: Aggregation of industries

This section discusses how the industry data from each dataset is aggregated.

QLFS

For each data entry, the industry code of the substituted industries is replaced with the new code. The data analysis is then conducted based on the grouping of data entries based on the new codes. The code reference is listed in Table 12.

QES

For each new industry code, a new row of data is created, where the number of employees and total gross salaries paid is summed for each column, which is the data for each quarter. The data analysis is then conducted with the new rows of data. The code of *QES* is shared with *QLFS*, and the reference is listed in Table 12.

SUT

For each new industry code, a new row of data is created, where the gross value-added is aggregated. The code of *SUT* is largely shared with *QLFS* except for motor vehicles. The code reference is listed in Table 12.

XMUVI

XMUVI measures the unit value of each type of goods traded. For each new industry, the composition of the constituent goods traded could vary per year, and thus the aggregated *XMUVI* is calculated by the weighted mean of the *XMUVI* of each constituent goods, weighed by the weight.

The weight of each good is recalibrated annually by Statistics South Africa and is retrievable from the *XMUVI* publications. However, despite the liaison with the relevant data officer, record of which is attached in Appendix G, the data before 2014 is missing. Therefore, for the weight before 2014, the weight in 2014 is used as an estimate. It is acknowledged that this is a potential source of error, but there is no indication that the composition changed significantly from 2010 to 2014. The code reference is listed in Table 13.

Table 12 - Coding for QLFS, QES and SUT

	Old Code	New Code
Motor vehicle and component	380 (motor vehicles), 381 (bodies for motor vehicles), 382 (parts and accessories for motor vehicles and their engines)	1004#
Chemical	334 (basic chemicals), 335 (other chemical products)	1001
Wood and wood product	321 (wood), 322 (products of wood)	1003
Machinery	356 (general purpose machinery), 357 (special purpose machinery)	1002

- not applicable for SUT

Table 13 - Coding for XMUVI

	Old Code	New Code
Chemical (import)	UVI54300 (basic chemicals), UVI54420 (other chemical products)	d02
Chemical (export)	UVI44200 (basic chemicals), UVI44300 (other chemical products)	c01
Machinery (import)	UVI55300 (general purpose machinery), UVI55400 (special purpose machinery)	d01
Machinery (export)	UVI45200 (general purpose machinery), UVI45300 (special purpose machinery)	c02

Appendix E: Sample size for *Quarterly Labour Force Survey ("QLFS")* by year and industry

Industry	2013	2014	2015	2016	2017	2018	2019
Electrical machinery	139	130	90	81	69	65	74
Motor vehicle and component	453	443	397	327	281	293	300
Beverage	274	284	232	175	183	168	127
Chemical	458	418	404	308	332	337	333
Paper	149	156	139	122	114	105	125
Furniture	146	184	193	99	103	100	172
Wood and wood product	292	262	275	194	253	227	165
Iron and steel	420	327	376	332	317	331	329
Machinery	320	234	257	211	190	186	189
Plastic	262	225	160	167	147	148	170
Rubber	117	79	85	72	90	62	45
Apparel	567	600	405	349	343	362	349
Glass	55	59	59	40	53	59	49
Dairy	202	145	142	122	126	89	108
Electricity, gas and water	581	508	544	435	485	481	433
Construction	8706	8950	9098	8238	8038	7774	6662
Trade, catering and accommodation	11106	10934	9232	8290	8193	7938	7648
Transport, storage and communication	3583	3359	2964	2650	2770	2587	2548
Finance, real estate and business services	8149	7739	7524	6668	6947	7063	6891

Appendix F: Supplementary statistics for the empirical results

Table 14 - Trend in international trade in 14 selected manufacturing industries in South Africa from 2010 to 2019

Industry	Percentage change in Real Import	Percentage change in Real Export	Sum of Real Net Export in 10-13 (ZAR, b)	Sum of Real Net Export in 17-19 (ZAR, b)	Percentage change in Real Net Export
Wood and wood product	48.11%	79.65%	4.17	9.67	131.77%
Motor vehicle and component	-5.19%	14.71%	207.82	296.01	42.43%
Chemical	45.91%	78.22%	-9.34	-5.43	41.82%
Beverage	49.93%	30.88%	17.27	18.76	8.62%
Iron and steel	15.80%	4.85%	209.51	215.11	2.67%
Rubber	10.31%	18.93%	-230.78	-232.98	-0.96%
Paper	13.85%	20.49%	-18.20	-19.44	-6.85%
Apparel	24.34%	75.12%	-20.14	-22.66	-12.50%
Machinery	86.77%	135.84%	-87.73	-124.11	-41.48%
Plastic	64.75%	27.50%	-22.77	-50.05	-119.78%
Electrical machinery	60.71%	7.40%	-65.86	-152.56	-131.63%
Dairy	105.97%	28.39%	2.15	-0.73	-134.13%
Furniture	51.63%	-12.71%	2.77	-6.34	-329.11%
Glass	58.54%	22.19%	-0.18	-2.01	-1041.16%

Table 15 - Trend in the employment situation in 14 selected manufacturing industries in South Africa from 2010 to 2019)

Industry	Average Employee in 10-13	Average Employee in 17-19	Percentage change in employee	Average Real Wage in 10-13 (ZAR)	Average Real Wage in 10-13 (ZAR)	Percentage change in Real Wage
Machinery	97475	109323	12.16%	310404	371313	19.62%
Motor vehicle and component	89254	96856	8.52%	273114	326371	19.50%
Apparel	47548	37833	-20.43%	99183	115230	16.18%
Iron and steel	42595	29516	-30.70%	327060	375753	14.89%
Wood and wood product	40691	44012	8.16%	119780	131395	9.70%
Rubber	12435	12592	1.26%	312160	335338	7.42%
Electrical machinery	40828	41136	0.75%	270031	289247	7.12%
Plastic	39977	46095	15.30%	195798	208403	6.44%
Chemical	23709	22820	-3.75%	351879	373960	6.28%
Beverage	36882	41090	11.41%	327567	340275	3.88%
Glass	9967	8644	-13.28%	259662	265907	2.41%
Furniture	30842	29307	-4.98%	146462	145520	-0.64%
Paper	37446	35216	-5.96%	295354	291874	-1.18%
Dairy	18677	24533	31.36%	197807	191679	-3.10%

Table 16 - Trend in international trade in 9 selected manufacturing industries in Germany from 2010 to 2019

Industry	Percentage change in Real Import	Percentage change in Real Export	Sum of Real Net Export in 10-13 (EUR, b)	Sum of Real Net Export in 17-19 (EUR, b)	Percentage change in Real Net Export
Wood and wood product	-36.48%	-30.95%	1.98	2.23	12.21%
Machinery	6.42%	1.86%	262.54	258.19	-1.66%
Apparel	12.10%	21.48%	-34.65	-35.39	-2.13%
Chemical	2.24%	0.29%	90.81	87.37	-3.78%
Paper	-2.44%	-2.98%	13.48	12.85	-4.66%
Electrical machinery	22.03%	7.72%	67.42	55.18	-18.16%
Beverage	-5.56%	-8.10%	-1.07	-1.35	-25.91%
Motor vehicle and component	28.70%	-4.07%	290.20	202.99	-30.05%
Furniture	19.69%	17.99%	-3.87	-5.04	-30.29%

Table 17 - Trend in the employment situation in 9 selected manufacturing industries in Germany from 2010 to 2019

Industry	Average Real Wage in 10-13 (EUR)	Average Real Wage in 10-13 (EUR)	Percentage change in Real Wage
Apparel	36006	42294	17.46%
Electrical machinery	44778	50740	13.32%
Motor vehicle and component	51056	57590	12.80%
Machinery	46958	52449	11.69%
Wood and wood product	33071	35989	8.82%
Furniture	35147	38243	8.81%
Chemical	51301	55449	8.09%
Beverage	41882	45011	7.47%
Paper	39935	41771	4.60%

Table 18 - Growth rate in real import, real export and real wage in South Africa and Germany from 2010 to 2019 (3-year average)

	Import			Export			Wage		
Industry	ZAF	GER	Diff	ZAF	GER	Diff	ZAF	GER	Diff
Electrical machinery	60.71%	22.03%	-38.69%	7.40%	7.72%	0.32%	7.12%	13.32%	6.20%
Motor vehicle and component	-5.19%	28.70%	33.89%	14.71%	-4.07%	-18.78%	19.50%	12.80%	-6.70%
Beverage	49.93%	-5.56%	-55.49%	30.88%	-8.10%	-38.98%	3.88%	7.47%	3.59%
Chemical	45.91%	2.24%	-43.67%	78.22%	0.29%	-77.93%	6.28%	8.09%	1.81%
Paper	13.85%	-2.44%	-16.29%	20.49%	-2.98%	-23.47%	-1.18%	4.60%	5.77%
Furniture	51.63%	19.69%	-31.94%	-12.71%	17.99%	30.71%	-0.64%	8.81%	9.45%
Wood and wood product	48.11%	-36.48%	-84.60%	79.65%	-30.95%	-110.61%	9.70%	8.82%	-0.87%
Machinery	86.77%	6.42%	-80.35%	135.84%	1.86%	-133.98%	19.62%	11.69%	-7.93%

Appendix G: Liaison with Statistics South Africa

Record of liaison with data officer Mr. Kevin Geddes regarding SUT

Sent at: 2022/05/27 14:03:52

Re: P3041.2 - Manufacturing: Production and sales - Indicators of value-added?

From: Kevin Geddes <keving@statssa.gov.za>
To: Chung, Y. (William) <y.chung.2@umail.leidenuniv.nl>
Cc: Nicolai Claassen <nicolaic@statssa.gov.za>, Robert Mabunda <robertmab@statssa.gov.za>

Dear William

Thank you for your interest in the Supply and Use tables. Please find attached the Supply and Use tables from 2013 - 2019.

We do not keep a record of value-added of each product over time, however we do keep value-added per industry over time. The gross value added (GVA) per industry is in row 113 (B1) on the Use tables.

I hope this helps?

Kind regards
Kevin Geddes

https://getcounted.statssa.gov.za/#/home

>>> "Chung, Y. (William)" <y.chung.2@umail.leidenuniv.nl> 27/05/2022 12:13 pm >>>
Dear Mr. Kevin Geddes,

I write with regards to the Supply and Use Tables from National Accounts by referral of your colleague Mr. Nicolai Claassen, specifically as to whether you keep record of the value-added of each product over time.

I am a student in Leiden University, and for my thesis I'm studying the relations between trade and wages using South Africa as a case study.

I would like to estimate the labour productivity of workers in each industry. For purpose of my research I would like to have the value-added of each branch of the manufacturing industry (e.g. car, chemical, furniture...). I would like to ask if you keep such data. I am looking specifically for yearly data from 2010-2018.

Thank you and I look forward to your reply.

Best regards,
William Chung

> On 2022/05/27 8:52:39, Nicolai Claassen <nicolaic@statssa.gov.za> wrote:
> Hi William, value-added data are available in the Supply and Use Tables from National Accounts.
>
> You can inquire from Kevin Geddes kevinG@statssa.gov.za on availability of the value added data.
>
> Regards
> Nicolai
>
> 
>
>
> https://getcounted.statssa.gov.za/#/home
>
> >>> "Chung, Y. (William)" <y.chung.2@umail.leidenuniv.nl> 5/27/2022 8:58 AM >>>
> Dear Nicolai Claassen,
>
> I am a student in Leiden University, and for my thesis I'm studying the relations between trade and wages using South Africa as a case study. I am writing to inquire about the P3041.2 dataset, specifically whether you keep record of the value-added of each product over time.
>
> I would like to estimate the labour productivity of workers in each industry. I understand that the captioned dataset includes value of sales. However, for purpose of my research I would like to have the value-added (thus sales minus inputs) of each branch of the manufacturing industry (e.g. car, furniture...). I would like to ask if you keep such data.
>
> Thank you and I look forward to your reply.
>
> Best regards,
> William Chung

Attachments:

Supply and use tables 2013 - 2019.xlsx (1 MB)

Record of liaison with data officer Ms. Marietjie Bennett regarding XMUVI

Sent at: 2022/05/16 12:19:22

RE: P0142.7 - Time series of weight

From: Marietjie Bennett <marietjieb@statssa.gov.za>
To: Chung, Y. (William) <y.chung.2@umail.leidenuniv.nl>

Good day

Unfortunately we can not find anything before 2014

regards

Marietjie Bennett
Director:
Price Statistics Compilation
Statistics South Africa
+27 (0) 12 310 8077 (Tel)
+27 (0) 82 888 2194 (mobile)
marietjieb@statssa.gov.za

https://getcounted.statssa.gov.za/#!/home

>>> "Chung, Y. (William)" <y.chung.2@umail.leidenuniv.nl> 2022/05/13 14:39 >>>
Dear Ms. Bennett,

Thank you for your prompt and helpful response. Is the publication from 2010 to 2014 retrievable as well?

Best regards,
William Chung

From: Marietjie Bennett <MarietjieB@statssa.gov.za>
Sent: Friday, May 13, 2022 2:29 PM
To: Chung, Y. (William) <y.chung.2@umail.leidenuniv.nl>
Subject: Re: P0142.7 - Time series of weight

Good day

The weights for the UVI's changed every year in January.
Attached all publications for January of each year from 2014. The weights are available from there.

regards

Marietjie Bennett
Director:
Price Statistics Compilation
Statistics South Africa
+27 (0) 12 310 8077 (Tel)
+27 (0) 82 888 2194 (mobile)
marietjieb@statssa.gov.za

https://getcounted.statssa.gov.za/#!/home

>>> "Chung, Y. (William)" <y.chung.2@umail.leidenuniv.nl> 2022/05/13 09:43 >>>
Dear Ms.Bennett,

I am writing to inquire about the P0142.7 dataset, specifically whether you keep record of the weight of each product over time.

I am a student in Leiden University, and for my thesis I'm studying the relations between trade and wages. For computing the real value of exports, I would like to use the Export Unit Value Indices for specific sector, and I was able to access the time series data for it.

However I would also need to use the weight of each product in the index. For example, I would like to get the EPI for machinery, and I would have to combine the general purpose and the specific purpose. But as the weight

fluctuates overtime, I cannot ascertain the combined value each year/month. I would therefore be grateful if you could provide me with a time series of such weight.

,

Thank you, and I look forward to your reply.

Best regards,
William Chung
MA(International relations)
Leiden University
