The impact of Chinese textile imports on employment and value added in the manufacturing sector of the South African economy.

Bonga-Bonga, Lumengo and Biyase, Mduduzi

University of Johannesburg, University of Johannesburg

2018

The impact of Chinese textile imports on employment and value added in the manufacturing sector of the South African economy.

Lumengo Bonga-Bonga,[1], Mduduzi Biyase[2]

Abstract

With the increased trade linkage between China and African economies, this paper endeavours to assess the dynamic impacts of Chinese textile imports on the employment and value added in the manufacturing sector of the South African economy. The paper makes use of the structural vector autoregressive (SVAR) methodology with sign restriction. Moreover, based on this methodology, the paper conducts a counterfactual analysis to uncover what would have happened to employment and value added trends in the manufacturing sector in South African textile in the absence of trade with china. The results of the empirical analysis show that total employment responds negatively to shocks to import from China. Moreover, total value added in the manufacturing sector reacts negatively to positive shocks to textile imports from China.

1. INTRODUCTION

China has been one of the world's fastest-growing economy, with its real annual gross domestic product averaging 10% during the period 1979 to 2013, reaching an historical high of 15.2% in 1984 (World Bank, 2014). This rapid growth is mostly attributed to rising foreign trade and investment with the rest of the world as well as free market reforms pursued by the Chinese government since 1979 (Morrison, 2014). The phenomenal rise of the Chinese economy has brought mixed reaction: some countries see China as an opportunity and others see it as a threat. For example, a number of policy makers in the United States (US) see the surge of U.S. imports from China as a threat to various U.S. economic sectors, particularly in manufacturing. Moreover, China's low-cost labour that has contributed to the rise of its manufacturing sector is viewed as a serious competitive threat to U.S. manufacturing and is blamed for job losses in the US due to the relocation of many US industries and plants to China (Elwell et al., 2007). This perceived threat is not limited to developed economies but also affect emerging and developing economies. For example, some South African organizations, such as trade unions and non-governmental

---

[1] Corresponding author: School of Economics, University of Johannesburg, lbonga@uj.ac.za
[2] School of Economics, University of Johannesburg, mbiyase@uj.ac.za

organisations (NGO), have attributed the demise of textile and clothing sectors in South Africa to cheap imports from China. More particularly, thousands of jobs have been lost over the past decade in the textile and clothing sectors while the volume of Chinese imports increased substantially in these sectors (City Press, April 2005). In view of this perceived threat, calls for renegotiation to restructure trade with China have enjoyed popular support in a number of countries.

However, a number of studies have indicated the benefit that many countries derived from trade with China. For example, Kinfack and Bonga-Bonga (2015) show that Chinese enterprises have helped a number of African countries to establish an up-stream-downstream-integrated industry chain, transforming their resource advantages into economic growth opportunities Moreover, as part of trade agreements, China has helped a number of African countries to build the infrastructure that is needed for their economic growth (Global Times, 2013). Munemo (2013) finds robust evidence in support of the hypothesis that capital goods from China are an important technology transfer channel that improves economic growth in Africa. The author suggests that trade liberalization policies aimed at attracting Chinese capital on a non-preferential basis are important. Adekunle and Gitau (2013) assess the trade flow between China and Sub-Saharan Africa (SSA) with the use of gravity model. The authors show that GDP of SSA countries and exchange rate are important predictors of exports to china, while GDP per capita on non-oil - producing SSA countries determine the volume of imports from China by these countries.

It is important to note that Chinese textile industry counts among the fast-growing industries in China. its total output was 3.25 trillion RMB (531.6 billion USD) in 2014, representing approximately 57% of the world's textile industry total output, making China the largest exporter of textile products (WTO, 2014). China's entry into the WTO in 2001 coupled with the massive growth of its manufacturing sectors provided easier access to international markets, especially for its cheap textile and clothing products. While cheap textile and clothing imports from China has provided an opportunity for consumer surplus in a number of countries as well as the possibility for trade creations in sectors such wholesale and retails worldwide, producers in the textile and clothing industries in a number of countries have sought the intervention of their respective governments to restrict textile imports from China. For example, the call for trade restriction between China and South Africa has been materialized in July 2006 when the South African's trade and industry department   signed the agreement with the Chinese government placing limitation

on 31 product categories until the end of 2008 (Business Report, 2006). While a number of studies attempt to assess the benefit or/and cost of Chinese imports to the African economies (Kinfack and Bonga-Bonga, 2015; Munemo, 2013; Zhang et al., 2013), there is no study, to the best of our knowledge that have attempted to empirically assess the effect of Chinese textile imports on employment and value added on emerging markets, especially on the South African economy. Thus, the contribution of this paper is to provide an empirical analysis based on structural vector autoregressive (SVAR) method, with sign restriction, on how imports from china affect employment and value added in South Africa. Moreover, based on this method, counterfactual analyses are conducted in order to assess the dynamic effects of textile imports from China on employment and value added in South Africa. Such analysis will uncover what would have happened to employment and value added without import from China. South Africa is chosen as a proxy of countries in emerging markets with important trade relationship with China[3]. The remainder of the paper is structured as follows; section 2 presents a brief background on the textile industry in South Africa. Section 3 discusses the trend of employment in the textile and clothing industries in South Africa. Section 4 presents the methodology used in the paper, Section 5 discusses the data, the estimation and results of the empirical analysis. Section 6 concludes the paper.

2. Brief background on the textile industry in South Africa

Textiles and clothing sectors have traditionally been protected by a high level of import barriers (such as tariffs, quotas, and export incentives) from international competition (Truett and Truett, 2010). In 1994, the new Government of National Unity (GNU) undertook an accelerated and extensive trade liberalization programme as agreed upon under the General Agreement on Tariffs and Trade (GATT) and put into operation by the World Trade Organisation (WTO). The WTO's agreement on textile and Clothing, made official in 1995, required that WTO members gradually reduce quotas on textile import over 10 years and bring their industries in line with the regulation decided upon under the GATT accord. Unsurprisingly, South Africa's entry into the WTO in 1995 opened doors for many foreign firms to penetrate various sectors that were previously protected. The process of opening up to the global market had unintended consequences for some sectors of the South African economy, especially the textiles and clothing sectors. For example, preliminary data suggest that total import from China increased substantially by close to 293%

---

[3] China is South Africa's number one trade partner with total export sales approximating US$6.8 billion in 2016 and total imports of US$13.5 billion the same year (World Bank (2017)).

from September 2001 to January 2006. Truett and Truett, (2010) show that South Africa's total employment in the textile and clothing industries declined from 228 053 in 1996 to 142 863 in March 2005". In view of the problems experienced by the textiles and clothing sectors, South African government imposed quantitative restrictions on selected textile and clothing imports from China. The rationale behind this quota was to try give these industries a chance to restructure and become more competitive in the global textile and clothing industry (Park and Alden, 2013).

This intervention by the government was deemed necessary, given the important role played by these sectors in the economy — (i) they are highly labour intensive (Truett and Truett, 2010) (ii) They keep a significant number of households from desperate poverty situations (van der Westhuizen, 2007) (iii) Textile industry represents the country's sixth largest manufacturing sector employer and the eleventh largest exporter of manufactured goods, employing an estimated 230 000 workers (Wild 2009: 12, Truett and Truett, 2010).
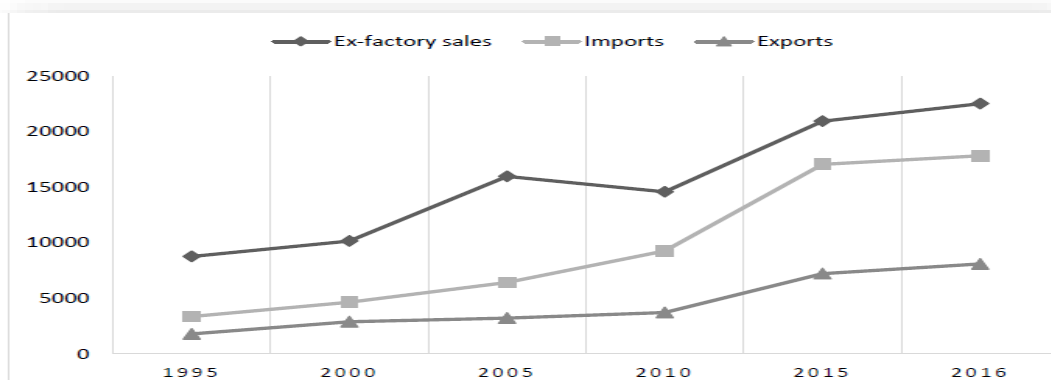
3.   Trends in employment and trade by sector

This section provides a descriptive analysis on the trends in employment for the clothing and textile sectors. What stands out here (see Figure 1) is that both the textile and clothing sectors have experienced a decline in employment in South Africa over the past years. Specifically, Figure 1 indicates that employment decreased from 32293 to 32214 in the textile sector between 2012 and 2016. This varied from one period to another: between 2012 and 2014, the textile employment dropped from 32293 to 29947. It stayed at about (29 million) until 2015, after which it partially returned to 2012 level (although slightly lower than the 2012 employment level). The clothing sector employment decreased significantly from 47319 in 2012 to just 41130 in 2015, and remained at the same sort of level until 2016.

Source: own derived from data from the Stats SA

Figure 2 shows the trends (Ex-factory sales, imports and exports) in the textile sector. An interesting observation emerges when comparing the trends in the imports and exports. While both import and export show an increasing trend, imports appear to have consistently trended above exports. Moreover, the value of imports displayed a steep rise for the period 2010 onwards. The trends in clothing sector (which is not shown here) follow remarkably similar patterns—imports consistently trended above exports.

Figure 2: ex-factory sales, imports and exports, 1995-2016

4. METHODOLOGY

This paper makes use of structural vector autoregressive (SVAR) model with sign restrictions to identify textile import shocks from China and their effects on the total value added and employment in South Africa. It is important to note that the "traditional" VAR approach to modelling dynamic behaviours of economic variables was widely used and provided interesting insights in forecasting the dynamic of variables through its impulse response function analysis. Nevertheless since there are little economic inputs in a VAR modelling, it should not be surprising that there is a little economic content in the results provided from the IRF or the variance decomposition analysis.

To emphasise the shortcoming of the VAR model, Cooley and LeRoy (1985), cited by LutKepohl *et al* (2004) argued that VAR have the status of "reduced form" models and therefore are only vehicles to summarise the dynamic properties of the data as they lack any reference to a specific economic structure.

Contrary to traditional or unrestricted VAR models, The structural VAR models intends to provide a frameworks whereby outcomes such as impulse response functions are motivated by economic theories. Thus, SVAR models aim to deduce a structural form relationship from a reduced form VAR. and in this way, a SVAR model goes beyond simple recursive structure when identifying shocks relevant for the analysis of IRF by imposing restrictions that are motivated by economic theories. This paper chooses structural restrictions that are informed by sign restrictions in order to assess the effects of textile imports from China on sectoral employment and output in South Africa.

Given the following structural vector autoregressive model:

$$\Gamma Y_t = \beta(L)Y_t + \varepsilon_t \tag{1}$$

From which the following reduced-form VAR can be deduced:

$$Y_t = \beta *(L)Y_t + \mu_t \tag{2}$$

Where L stands for the lag operator and that $\beta *=\Gamma^{-1}\beta$ and

$$\mu_t = \Gamma^{-1}\varepsilon_t \tag{3}$$

The moving average representation of Equation 2 can be expressed as:

$$Y_t = (I - \beta *(L))^{-1}\mu_t = \Theta(L)\mu_t \tag{5}$$

Assume a two-variable VAR, the strategy for choosing different variable orderings can be applied by defining an orthogonal matrix Q defined as:

$$Q = \begin{vmatrix} \cos\lambda & -\sin\lambda \\ \sin\lambda & \cos\lambda \end{vmatrix} \quad \text{with } 0 \le \lambda \le \pi,$$

In that $QQ'=Q'Q=In$, an identity matrix. Given the orthogonal matrix Q, Equation 3 can be re-written as:

$$\mu_t = \Gamma^{-1} Q Q' \varepsilon_t = \Gamma^{-1} Q \upsilon t \quad \text{where} \quad \upsilon_t = Q' \varepsilon_t \tag{6}$$

It is clear that a specific sign ordering can be chosen by identifying Γ^{-1} and choosing a specific value of λ. for example, from the moving average representation expressed in term of structural shocks such as:

$$\begin{vmatrix} y_{1t} \\ y_{2t} \end{vmatrix} = \begin{vmatrix} \Theta 11 & \Theta 12 \\ \Theta 21 & \Theta 22 \end{vmatrix} \begin{vmatrix} \cos \lambda & -\sin \lambda \\ \sin \lambda & \cos \lambda \end{vmatrix} \begin{vmatrix} \varepsilon_{y1,t} \\ \varepsilon_{y2,t} \end{vmatrix} \tag{7}$$

From expression (7), one can deduce:

$$\frac{\delta Y_{1t}}{\delta \varepsilon y_{1,t}} = \Theta_{11} \cos \lambda + \Theta_{12} \sin \lambda$$

It is clear that the sign of the reaction of Y_{1t} to shocks to $\varepsilon_{y1,t}$ will depend on whether λ is in the subset $[-\pi, \pi]$.

5. DATA, ESTIMATION AND RESULTS

In order to assess the effects of textile imports from China on value added on the manufacturing sector as well total employment in South Africa, this paper makes use of structural VAR with sign restriction. The data use are made of total value added (TVA) for the manufacturing sector, total employment and labour cost in South Africa as well as the total value of textile import from China. Data are collected from COMTRADE and the World Economic Indicators provided by the World Bank. All the variables are log linearised. The test of the stability of the VAR system is conducted in order to ascertain that the results of the impulse response functions credible. Juselius and Johansen (1990) demonstrate that the necessary and sufficient conditions for the stability of the VAR system is that all characteristic roots lie within the unit circle. These conditions warrant that the impacts of the shocks (the impulse response functions) eventually die out rather than explode.

The results of VAR stability reported in Table 1 show that the eigenvalues and the modulus (the absolute value of the root) of the VAR system's characteristic equation are less than unity. The results guarantee the stability of the VAR system.

Table 1 Stability of the VAR system

Root	Modulus
0.975766	0.975766
0.887985	0.887985
0.834282	0.834282
0.803686 - 0.168188i	0.821096
0.803686 + 0.168188i	0.821096
0.648396	0.648396
0.505462 - 0.108077i	0.516888
0.505462 + 0.108077i	0.516888

No root lies outside the unit circle.

VAR satisfies the stability condition.

Figure 1 reports the results of the IRFs of the responses of total employment, manufacturing value added and labour cost responses to shocks to China imports. It is worth noting that the IRFs are obtained by setting prior sign restrictions that employment, value added and labour cost respond negatively to china's import shocks. Following Uhlig (2005) sign restriction approach, we set a distribution of the space of impulse vector conditional on the proposed restrictions by generating a random impulse vector and checking whether its fulfil the proposed restrictions. The desired number of draws have been accepted and Figure 1 displays the results of the posterior IRF. The results reported in Figure 1 shows that total employment responds negatively to shocks to import from China. Moreover, Value added in manufacturing sector reacts negatively to positive shocks to textile imports from China.

The decrease in total employment due to positive shocks to imports from China is explained by the inability of textile industry and related industries to compete from cheap import from china, which eventually leads to the laying off of workers in these industries. This finding is supported by a number of studies. For example, Bernard et al. (2007) show that Chinese competition may have depressed output of existing domestic firms and lead to the exit of those who are less efficient and eventually reduce aggregate industry level of employment. Edwards and Jenskins (2013) find that the overall impact of Chinese competition on manufacturing employment in south Africa is

negative, mostly due to the loss of jobs associated with the displacement of local production by imported goods.

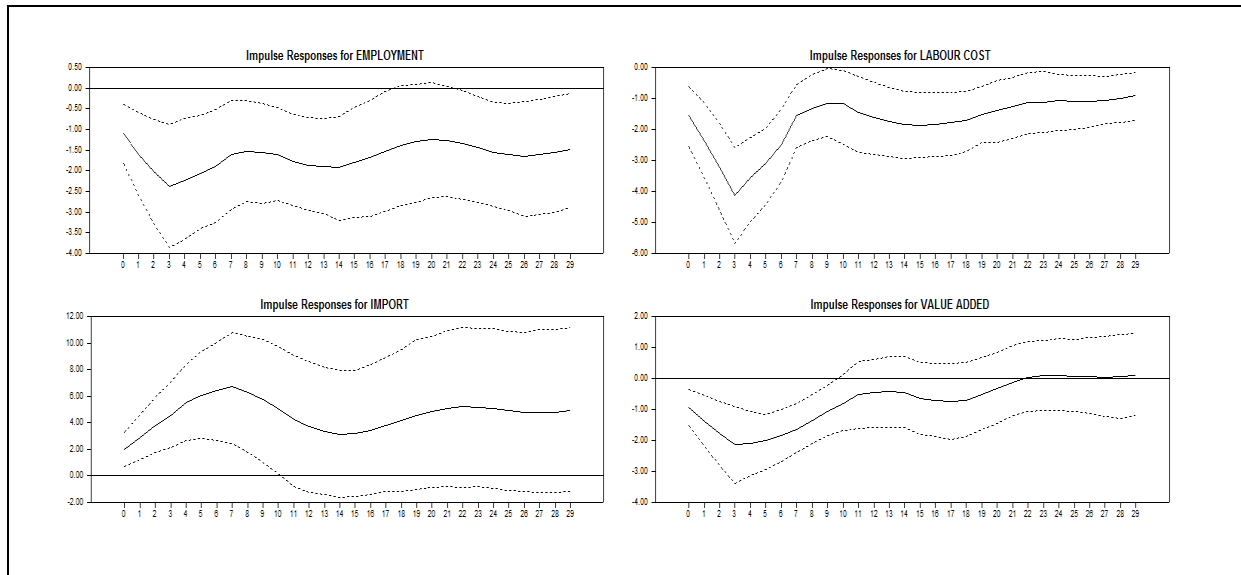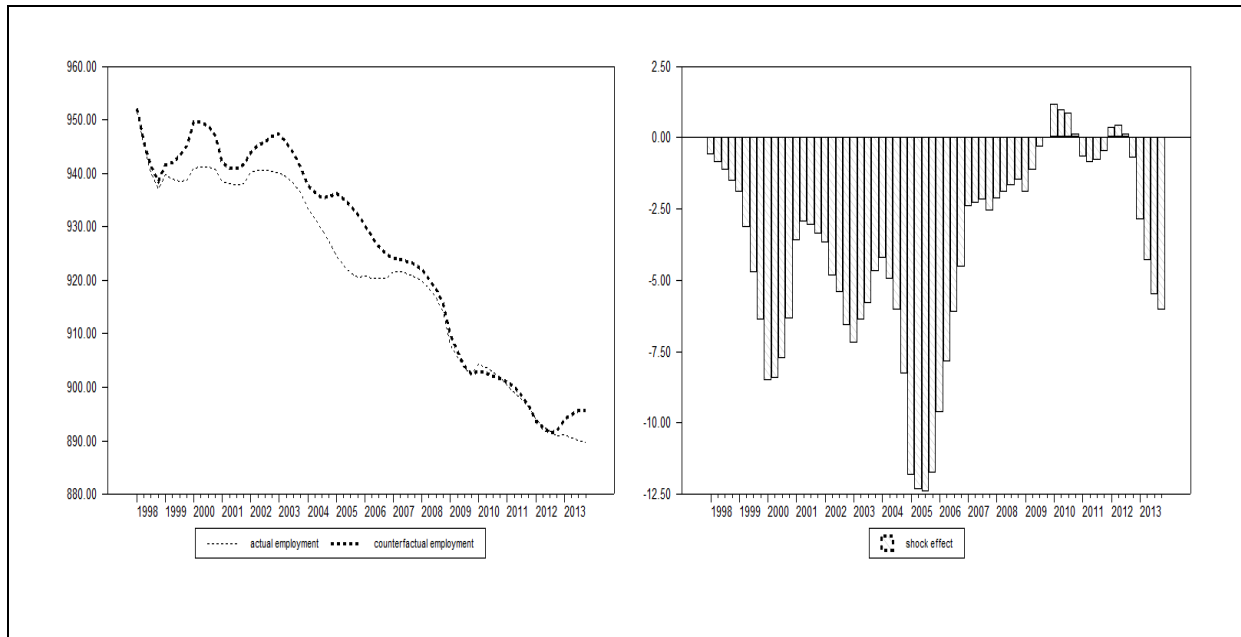**Figure 1. Responses to shocks to textile imports**

Figure 2 and 3 show the dynamic contribution of shocks to import from china on the value added and employment in South Africa. The results displayed in these figures are obtained from a counterfactual simulations obtained from SVAR analysis with sign restriction. With this type of simulations, this paper is able to assess what would have happened to the dynamic movement of employment and value added in the absence of textile import shocks from China. Figure 2 presents the results of the counterfactual simulation of employment in south Africa.
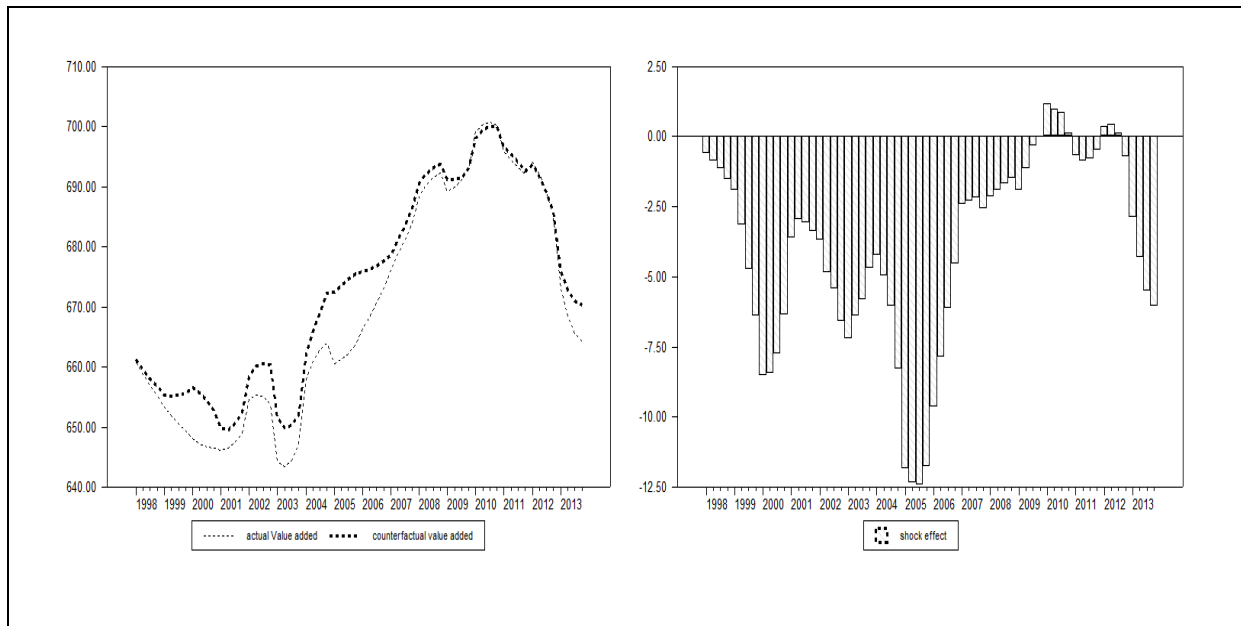
Figure 2 counterfactual simulation of employment and textile import shocks from China

The results depicted in Figure 2 show that without textile import shocks, employment would be higher than it actually was with import shocks from China, especially during the period 1998 t0 2006. The counterfactual analysis shows that the period from 2006 to 2012, characterised mainly by restriction of textile imports from China, show a sharp reduction of the negative effect textile imports has had on employment. Unfortunately, after 2012, the negative effects of textile import on employment in South Africa has become more apparent again. The same trend is observed in Figure 3 where textile imports shocks from China caused the level of value added in the South African manufacturing industry to be below the level it could have been without textile import shocks from China. Once again, restrictive measures have dampened the negative effects textile import from China could have on value added in the manufacturing sector.

These results show that textile import from China is not necessary beneficial to the employment and value added of the manufacturing sector in South Africa. Moreover, the results show that restrictive measures on textile imports from China has reduced the negative effects import shocks from China has had on the South African manufacturing sector.

Figure 3 counterfactual simulation of manufacturing value added and textile import from China

Conclusion

this paper assessed the dynamic impacts of Chinese textile imports on the employment and value added in South Africa by making use of the structural vector autoregressive (SVAR) methodology with sign restriction. Moreover, based on this methodology, the paper conducts a counterfactual analysis to uncover what would have happened to employment and value added trends in the South African textile industry in the absence of trade with china. The results of the empirical analysis show that total employment responds negatively to shocks to import from China. Moreover, total value added in the manufacturing sector reacts negatively to positive shocks to textile imports from China. The results of the counterfactual analysis show that without textile import shocks, employment in the South African manufacturing sector would have been higher than it actually was with import shocks from China, especially during the period 1998 to 2006. Moreover, the counterfactual analysis shows that the period from 2006 to 2012, characterised mainly by restriction of textile imports from China, is characterised by a sharp reduction of the negative effect textile import has had on employment. Unfortunately, after 2012, the negative effects of textile import from China on employment in South Africa has become more evident again.

References

Adekunle, B. and Gitau, C.M., 2013. Illusion or reality: understanding the trade flow between China and Sub-Saharan Africa. *Journal of African Business*, *14*(2), pp.117-126.

Bernard, A.B., Jensen, J.B., Redding, S.J. and Schott, P.K., 2007. Firms in international trade. *Journal of Economic perspectives*, *21*(3), pp.105-130.

Bräutigam, D. and Zhang, H., 2013. Green dreams: Myth and reality in China's agricultural investment in Africa. *Third World Quarterly*, *34*(9), pp.1676-1696.

Cooley, T.F. and LeRoy, S.F., 1985. Atheoretical macroeconometrics: a critique. *Journal of Monetary Economics*, *16*(3), pp.283-308.

Edwards, L. and Jenkins, R., 2015. The impact of Chinese import penetration on the South African manufacturing sector. *The Journal of Development Studies*, *51*(4), pp.447-463

Elwell, C.K., Labonte, M. and Morrison, W.M., 2006. Is China a threat to the US economy? *Congressional Research Service, RL33604*.

Johansen, S. and Juselius, K., 1990. Maximum likelihood estimation and inference on cointegration—with applications to the demand for money. *Oxford Bulletin of Economics and statistics*, *52*(2), pp.169-210.

Kinfack, E.C. and Bonga-Bonga, L., 2015. *Trade Linkages and Business Cycle Co-movement: An Empirical Analysis of Africa and its Main Trading Partners using Global VAR* (No. 512).

Lütkepohl, H., Saikkonen, P. and Trenkler, C., 2004. Testing for the cointegrating rank of a VAR process with level shift at unknown time. *Econometrica*, *72*(2), pp.647-662.

Morrison, W.M., 2014. China's economic rise: History, trends, challenges, and implications for the United States. *Washington, DC: Congressional Research Service*.

Munemo, J., 2013. Examining imports of capital goods from China as a channel for technology transfer and growth in Sub-Saharan Africa. *Journal of African Business*, *14*(2), pp.106-116.

Park, Y.J. and Alden, C., 2012. Upstairs" and "downstairs" dimensions of China and the Chinese in South Africa. *State of the nation: South Africa, 2013*.

Truett, L.J. and Truett, D.B., 2010. New challenges for the South African textile and apparel industries in the global economy. *Journal of Economic Development*, *35*(4), p.73.

Uhlig, H., 2005. What are the effects of monetary policy on output? Results from an agnostic identification procedure. *Journal of Monetary Economics*, *52*(2), pp.381-419.

Van der Westhuizen, C., 2007. Trade and poverty: A case study of the South African clothing industry. *Studies in Economics and Econometrics*, *31*(2), pp.109-124.

World Bank Group, 2014. *World development indicators 2014*. World Bank Publications.

World Trade Organization, 2014. *World trade report 2014*. World Trade Organization.