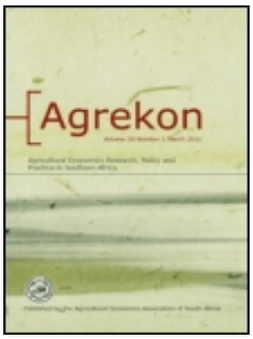

Routledge
Taylor & Francis Group

Agrekon

Agricultural Economics Research, Policy and Practice in Southern Africa

ISSN: 0303-1853 (Print) 2078-0400 (Online) Journal homepage: www.tandfonline.com/journals/ragr20

A historical perspective of the link between economic recessions and agricultural trade performance: The case of South Africa's fruit and wine exports

E.F. Idsardi & P.C. Cloete

To cite this article: E.F. Idsardi & P.C. Cloete (2013) A historical perspective of the link between economic recessions and agricultural trade performance: The case of South Africa's fruit and wine exports, Agrekon, 52:4, 43-65, DOI: 10.1080/03031853.2013.847034

To link to this article: https://doi.org/10.1080/03031853.2013.847034

A HISTORICAL PERSPECTIVE OF THE LINK BETWEEN ECONOMIC RECESSIONS AND AGRICULTURAL TRADE PERFORMANCE: THE CASE OF SOUTH AFRICA'S FRUIT AND WINE EXPORTS

E.F. Idsardi* and P.C. Cloete**

ABSTRACT

The recent global recession, caused by the financial crisis of 2008–2009, resulted in a significant drop in global merchandise trade. However, international trade in agricultural and food products seemed more resilient. This poses the question as to what extent recent and previous economic recessions have had an effect on the trade flows of these specific products. An understanding of this connection will assist the agricultural sector to pro-actively strategize for future economic downturns in their respective export markets. Hence this study uses South Africa's exports of fresh fruits and wine as a case study and applies an import demand model to analyse the relationship between export flows, several demand factors and economic shocks in its traditional export markets over the last 28 years. The results reveal that change in real per capita income is a much more significant determinant of import demand for South Africa's fruit and wine than the incidence of an economic recession. Contrary to general perceptions, economic downturns even positively affected the import demand for wine and apples.

Keywords: recessions, fruit and wine exports, South Africa, import demand model

JEL Classification: Q17, C02

1 INTRODUCTION

The consequences of the global economic crisis have been abundant. In 2009, global trade experienced the sharpest drop in 70 years with a contraction of 12 per cent in volume and 23 per cent in value (WTO, 2010). Trade in iron, steel, manufactures, industrial machinery and automotives especially was severely affected (WTO, 2010).

The global agricultural sector has shown some resilience in this regard and has not been affected so severely when compared with other economic sectors.

* Corresponding author: TRADE Research Niche Area, North-West University. Private Bag x 6001, Potchefstroom 2520, South Africa. Email: ernst.idsardi@nwu.ac.za

** TRADE Research Niche Area, North-West University. Email: flippie.cloete@nwu.ac.za

Agrekon
Vol. 52 (4) 2013 • ISSN Print 0303-1853/Online 2078-0400

DOI: 10.1080/03031853.2013.847034

The rationale behind this is that the demand for agricultural and food products is regarded as relatively income inelastic, thus less vulnerable to global shocks in price and income (OECD-FAO, 2009). Despite this, the impact on global agricultural trade manifested itself in a decline in agricultural trade of 3 per cent in the total volume traded and 13 per cent in total value traded in 2009 (EC, 2010). This decline in trade was experienced after several years of consecutive growth with increases of close to 25 per cent in 2007 and 2008 (EC, 2010). The most important causes of this are considered to be a weaker demand due to the economic slowdown in export markets, appreciation of the US dollar, as well as the depressed prices for agricultural commodities (EC, 2010).

For South Africa, the effects of the recent economic crisis on agricultural and food exports seem to be relatively small compared with the trends in total exports. In 2008, the growth in the value of South Africa's agricultural and food exports was an impressive 48 per cent, and this growth dropped to a mere 1.9 per cent in 2009 and declined to 0.5 per cent in 2010. However, in 2011 South Africa's agricultural and food exports recovered with a total growth of 10.6 per cent (DTI, 2012). From these trends the question arises: To what extent have South Africa's agricultural exports been determined by a recession in its export markets. This link especially is of importance to South Africa's export of fresh produce and wine, which comprises the most important agricultural export products over time. The exports of fruit and wine accounted for 54.2 per cent of South Africa's total agricultural and food exports in 1984 (NBER, 2011) and this share declined to a 31.0 per cent by 2011 (DTI, 2012). The exports of wine and fresh fruits, such as oranges (including mandarins and tangerines), table grapes and apples in particular, have earned valuable foreign currency for many decades and therefore are the focus of this study.

Understanding the historical relationship between export flows and a depressing economic performance (that is, either a slowdown or contraction in gross domestic product (GDP) growth and thus a decline in the overall level of income) on the demand side may provide valuable insights into the South African fruit and wine sector's vulnerability and adaptability to past and current economic shocks. This knowledge may inform policymakers and industry on pro-active strategies to prepare for future economic downturns in export markets.

Previous studies have investigated the determinants of South Africa's trade flows using a gravity model approach (Gebrehiwet *et al.,* 2007; Gouws, 2005; Sichei *et al.*, 2005; Cassim, 2000) or export demand and supply equations (Senhadji and Montenegro, 1999; Edwards and Alves, 2006). All of these studies considered the level of foreign income as a force of attraction of trade flows but none of them has specifically examined the effects of past economic slowdowns and recessions in export markets on South Africa's agricultural trade.

The study therefore attempts for the first time to reveal whether there is a competitive edge with regard to the linkage between South Africa's export flows of fruit and wine, and the economic performance in its respective export markets. This is done against the background of the recent global economic crisis, which thus resulted in a significant drop in total merchandise trade. We first investigate the long-term trends in exports of South Africa's apple, orange, table grape and wine sectors in selected traditional export markets. Second, we apply an export demand model to estimate the effect of economic recessions and slowdowns in the respective export markets on trade in these goods.

The following sections provide an overview of South Africa's long-term exports of fruit and wine, the methodological approach of the study, results and finally conclusions and recommendations.

2 SOUTH AFRICA'S LONG-TERM TRENDS IN THE EXPORTS OF FRUIT AND WINE

2.1 Background

This section provides an overview of the long-term export performance of selected agricultural products in relation to the economic performance of their export markets. The availability of detailed historical international trade data is limited; therefore 1984 was chosen as the base year for the analysis in this study, as disaggregated trade data by volumes are available only from that year onwards. Trade by volume allows for a better long-term comparison in export performance because trade by values is reflected in US dollars and is thus distorted by exchange rate fluctuations. Import statistics were used to quantify the trade flows as these are considered to be more accurate (NBER, 2005). Furthermore, export partners were selected based on their long-term and uninterrupted trade relationship with South Africa in the last 28 years with respect to imports of table grapes, oranges, apples and wine.

Table 1 provides an overview of the trade and economic performance of selected traditional export markets for each product in the period 1984 to 2011. From the table it is evident that South Africa's traditional export base is rather broad with at least two markets per commodity absorbing a large share of exports. Most of these markets currently still play an important role in South Africa's exports of these fruits as well as wine. The relative price of South African imports compared with its main competitors in the different export markets, as presented in the fourth column, provides a good indication of South Africa's price position. Hence the price position for apples and wine is more favourable than for table grapes and oranges. Furthermore, the table shows that overall economic growth

rates in the traditional export markets were moderate in the last 28 years, and that all markets experienced several economic recessions and slowdowns since 1984. The Netherlands only experienced one recession in the last 28 years, while Japan was confronted with five.

Table 1: Economic and trade performance of South Africa's traditional export markets for selected fresh fruit and wine

Product[1]	Main export markets for the period 1984-2011	Total share in SA's exports per product: 1984 -2011 (%)	Relative border price for imports from SA: 1984-2011	Average annual economic growth: 1984-2011 (%)	Number of recessions[2]: 1984-2011	Number of econ. slowdowns[3]: 1984 -2011
Table grapes (SITC 0575)	UK Germany	22 16	1.08 1.39	2.4 1.9	3 3	14 15
Oranges (SITC 0571)[4]	UK Saudi Arabia Netherlands	14 11 11	1.05 0.97 1.16	2.4 2.8 2.5	3 4 1	14 15 14
Apples (SITC 0574)	UK Germany France Netherlands	35 11 5 5	0.91 1.03 0.89 0.89	2.4 1.9 1.9 2.5	3 3 3 1	14 15 13 14
Wine (SITC 1121)	UK	33	0.56	2.4	3	14
	Netherlands	12	0.76	2.5	1	14
	Germany	13	1.42	1.9	3	15
	Japan	1	0.42	1.9	5	13

Notes: [1] The corresponding four-digit trade classification of the Standard International Trade Classification (SITC) nomenclature for each product is provided in brackets.
[2] A recession is defined as a contraction in a country's GDP compared to the previous year.
[3] An economic slowdown is defined as a smaller growth in a country's GDP compared with the previous year.
[4] Includes mandarins and tangerines.

Sources: Own calculations based on data from IMF (2012), NBER (2005), UN Comtrade (2012), IMF (2012).

2.2 A historical policy perspective

To assist with the interpretation of the trends in exports, a brief political perspective is provided regarding South Africa's exports of agricultural and food products over the last 28 years.

The international sanctions imposed by many countries in the mid- and late 1980s against the apartheid regime did not result in reduced levels overall of South African exports to the markets under investigation. Total export volumes rose by 26 per cent between 1985 and 1990, although the terms of trade suffered (Waldmeier, 1997). The export flows of wine, table grapes, apples and oranges, specifically considered in this study, were not directly affected by these sanctions because only the USA and Canada enforced import bans on agricultural products from South Africa in the 1980s, with the exception of ostrich feathers (Kaempfer, 1989). Hence the total exports of wine, table grapes, apples and oranges increased by 147, 12, 39 and 40 per cent, respectively, from 1985 to 1990 (NBER, 2011).

After the first democratic elections in 1994, the agricultural sector was subject to various political reforms that led to deregulation of the agricultural markets as well as trade reforms. This created both internal and external pressures and spurred the agricultural sector to become more competitive and find new global markets (OECD, 2006). This in turn led to considerably increased diversification and volumes of agricultural products exported by South Africa over the last 15 years (OECD, 2006).

2.3 The exports of table grapes

South Africa contributed 5.7 per cent to global trade in table grapes in the period between 1984 and 2010[3]. The country's total volume of table grape exports grew by an annual average of 7.1 per cent in the period from 1984 to 2010. This was well above the global average of 5.5 per cent for the same period. In 2008, however, South Africa's exports of table grapes declined by 8.9 per cent. Exports recovered with growth rates of 12.5 per cent in 2009 and 1.9 percent in 2010 but dropped again by 11.6 per cent in 2011.

The trends in table grape exports to South Africa's main export markets, the UK and Germany, for the period 1984 to 2011 is presented in Figure A1 in Annexure I. The exports of table grapes to the UK and Germany increased with average annual growth rates of 4.1 and 4.5 per cent, respectively, in the period between 1984 and 2011. Over time, other importers such as the Netherlands, Russia, Hong Kong, the United Arab Emirates and Malaysia became important export destinations for South African table grapes.

3 Latest year with most comprehensive data availability for global trade.

Figure A1 clearly indicates the various economic recessions experienced by the two importers, that is, a decline in GDP in relation to the trends in exports. However, the graph shows that a decline in exports does not implicitly coincide with the occurrence of an economic recession in the export market. Table A1 in Annexure II provides a comprehensive historical overview of the recurrent recessions over the last 28 years in the UK and Germany, and the respective trend in the exports of table grapes to those markets. In four of the six recessions, South Africa experienced a decline in exports. However, the table shows that the exports of table grapes to Germany seem more resilient. South Africa's relative border price for table grapes increased in half of the respective recessions (see the last column of Table A1). Hence South African table grapes became relatively more expensive and seem to be more price-elastic than its main competitors in those instances.

2.4 The exports of oranges

South Africa contributed 8.8 per cent to global trade in oranges in the period between 1984 and 2010. Its exports of oranges grew by an average of 22.9 per cent annually and a total increase of 586.6 per cent between 1984 and 2010. This was an excellent performance compared to the average annual increase of 4.0 per cent of exports globally and a total increase of world trade in oranges of 152.0 per cent. The global trade in oranges was not affected negatively during the recent global recession; global exports grew by 7.4 per cent in 2008 and an impressive 17.4 per cent in 2009, but dropped by 6.1 per cent in 2010. In contrast, the quantities of oranges exported by South Africa dropped by 43.7 per cent in 2008 and 12.2 per cent in 2009, increased by 21.9 per cent in 2010 and decreased again with 10.7 per cent in 2011.

The long-term trends in quantities of oranges exported to South Africa's traditional export markets, namely the UK, Saudi Arabia and the Netherlands, are presented in Figure A2 in Annexure I. The figure also indicates the various economic recessions experienced by these importers in relation to the trends in exports. The average annual growth in orange exports to the UK, Saudi Arabia and the Netherlands was 25.9, 27.0 and 67.8 per cent, respectively, in the period between 1984 and 2011. Over time other export destinations for oranges such as Russia, the United Arab Emirates, the USA and Hong Kong have gained importance; this has resulted in a sideways trend of exports to the UK and Saudi Arabia. Exports to the Netherlands, however, have gained momentum only since the late 1990s.

An overview of the economic recessions that occurred in South Africa's main export markets for oranges in the period from 1984 to 2011 is presented in Table A2 in Annexure II. The Netherlands only experienced one recession in

this period where the UK faced three and Saudi Arabia four recessions. Contrary to expectation, not all instances of negative GDP growth in an export market coincided with a decrease of South Africa's exports of oranges to that specific market. A relatively small recession in Saudi Arabia in 1999 was associated with a relatively large drop in imports of South African oranges. Any possible causality between the economic performance of an export partner and imports from South Africa is analysed further in the next section. South Africa's relative border price for oranges decreased in four of the seven recession periods (see the last column in Table A2). This implies that the South African oranges became relatively less expensive than those of its main competitors during those recessions.

2.5 The exports of apples

South Africa's share in global trade in apples was 5.2 per cent in the period between 1984 and 2010. The country's exports of apples increased by a moderate 2.7 per cent average annual rate between 1984 and 2010. This was well below the global average of 5.0 per cent. The total increase in global trade of apples between 1984 and 2010 was 244 per cent; South Africa recorded a total increase of only 31 per cent in apple exports in that period. Global trade in apples was only moderately affected during the recent global economic crises. The trade in apples increased by 1.9 per cent globally in 2008 but decreased by 3.1 per cent in 2009 and recovered in 2010 with growth of 6.6 per cent. A similar trend was recorded by South Africa: a 4.7 per cent increase in 2008 followed by a significant drop in exports of 11.1 per cent in 2009. In 2010 and 2011, exports recovered with increases of 6.9 and 9.0 per cent, respectively.

The long-term trends in apple exports to South Africa's traditional export partners, namely the UK, France, the Netherlands and Germany, for the period 1984 to 2011, are illustrated in Figure A3 in Annexure I. The figure furthermore indicates the various economic recessions experienced by these importers in relation to the trends in exports. The UK was and is by far the most important export market for apples. Exports to this country as well as to France grew steadily with an annual average of 2.4 and 11.7 per cent, respectively, over the last 28 years. Exports to the Netherlands showed a more volatile pattern with an average annual increase of 221.3 per cent in that same period. In contrast, exports of apples to Germany declined at a rate of 2.5 per cent per annum. Apart from these four traditional markets, other export destinations such as Malaysia, the United Arab Emirates progressively grew in size.

An overview of economic recessions in South Africa's traditional export markets for apples is presented in Table A3 in Annexure II. In five of the ten recessions a decline in the exports of apples to the respective markets was recorded. South Africa's relative border price for apples decreased in six of the

nine recession periods (see last column in Table A3). This implies that South African apples became relatively less expensive during those recessions. This may be explained by a drop in price due to a decrease in foreign import demand. However, an econometric analysis of the relationship between South African apple exports and the economic performance of the export market is provided in the next section.

2.6 The exports of wine

South Africa's share in global trade in wine was 3.7 per cent in the period between 1984 and 2011. This share increased from 0.1 per cent in 1984 to 5.0 per cent by 2011.The country's exports of wine grew by a remarkable 7 208 per cent between 1984 and 2011. Global trade in wine increased by only 50.2 per cent in total in that same period; South Africa therefore performed well in comparison. During the recent global economic crisis, the global trade in wine increased only slightly with 0.4 per cent in 2008, but dropped by 4.8, 13.2 and 5.6 per cent in 2009, 2010 and 2011, respectively. South African wine exports declined by 13.5, 0.7, 8.7 and 4.7 per cent in 2008, 2009, 2010 and 2011, respectively. Hence it seems that global and South African trade in wine was negatively affected by the latest economic crisis.

The long-term trend in South Africa's exports of wine to its traditional export markets, namely the UK, the Netherlands, Germany, and Japan, is depicted in Figure A4 in Annexure I. The figure furthermore indicates the various economic recessions experienced by these importers in relation to the trends in South Africa's exports. The UK was by far the most important export destination for South African wines in the last 28 years. From the data presented in the figure it is evident that wine exports were relatively low in the 1980s and the beginning of the 1990s, but increased considerably from the mid-90s. South Africa's exports of wine to the UK, the Netherlands, Germany and Japan increased with an annual average of 17.0, 26.1, 21.2 and 35.8 per cent, respectively. Apart from these four traditional export markets, South African wines are increasingly being exported to Sweden, Denmark and the USA.

A detailed overview of the various recessions in South Africa's traditional export markets for wine is provided in Table A4 in Annexure II. South Africa experienced a decrease in wine exports in only three of the twelve recessions. South Africa's relative border price for wine exports showed a negative trend in six of the twelve recessions (see last column in Table A4). Especially during the latest recessions, South African wine became relatively less expensive compared with its main competitors.

3 APPROACH

3.1 Import demand model

As mentioned, the main aim of this study is to describe the ex-post effects of an importing country's economic performance on the demand for imports of selected fresh fruit and wine from South Africa. This relationship is investigated by the application of an econometric estimation. One of the most successful and widespread methods used for estimating the determinants of trade at a disaggregate level and for a relatively small sample of countries is import demand and export supply equations (see Khan, 1974; Warner and Kreinin, 1983; Goldstein and Khan, 1985; Bahmani-Oskooee, 1986; Bahmani-Oskooee and Niroomand, 1998; Aydin *et al*., 2004). The import demand of fresh fruit is subject to several natural and erratic exogenous factors and South Africa is a price-taker in the international market. Therefore, since this study is only interested in the relationship between demand-side factors and export flows, it will estimate an import demand model.

Under this approach the import demand for South African wine and fruit depends upon the relative price of the product and the real income in the importing country. This basic demand function is derived according to economic theory of a general utility function. Other variables that influence the demand for imports and which capture economic performance, trade regime, and exchange rates are also included in our import demand model.

An import demand equation for each of the four products was specified as follows:

$$(log)SAExp_{pti} = \alpha + \beta_1(log)Inc_{ti} + \beta_2\,(log)RelP_{pti} + \beta_3(log)TradReg_{pti} + \beta_4 ER_{ti} + \beta_5 DUMpta_{ti} + \beta_6 DUMrec_{ti} + \beta_7 DUMsd_{ti} + \epsilon$$

Equation (1)

Where *SAExp* is the quantity exported of product *p* by South Africa in year *t*, to country *i*; *Inc* is the income reflected by per capita gross domestic product based on purchasing-power parity in year *t* of importing country *i* in international dollars; *RelP* is the border price of imports from South Africa relative to its main competitors for product *p*, in year *t,* for importing country *i*; *TradReg* is the trade regime faced by South Africa expressed in weighted average import tariff for product *p* in year *t*; *ERpt* is the exchange rate between South Africa and the currency of the importing country *i* in year *t, DUMpta* is a dummy variable for the existence of a preferential trade agreement between South Africa and importing country *i* in year *t*; *DUMrec* is a dummy variable for the occurrence of a recession in country *i* in year *t*; DUMsd is a dummy variable for the occurrence of an

economic slowdown in country *i* in year *t*; and ε is an error term.

The regression is estimated in a log linear form to determine the elasticity between export flows and the import demand variables. The analysis uses a panel data framework, with cross-sections reflected by the different countries and time series data from 1984 to 2011. The F-test is applied to determine the *poolability* of the individual datasets (that is, whether the data is heterogeneous or homogeneous). This test concludes that the time series dataset of each country is not *poolable* and that country-specific individual effects should be considered in the specification of the regression models. Egger (2002) and Martinesz-Zarzoso and Nowak-Lehmann (2003) argue that the Fixed Effect (FE) should be included in the regression model for the analysis of trade flows between an ex-ante preselected group of countries. As this is the case in this study, the FE is specified for the cross-sections to allow for country-fixed effects. Since all the variables are time variant, each of the four import demand models can be estimated in one stage.

The four models were estimated using the Panel Estimated Generalised Least Squares (EGLS) method. This approach will correct for cross-section heteroscedasticity and serial correlation in panel data estimations. Since $T>2N$[4] the cross-section parameters are estimated with greater reliability than the period parameters, thus cross-section SUR[5] weights were used for the EGLS estimation (Reed and Haichun, 2011). Furthermore, in order to assure robust coefficient covariance of the cross-equations the White cross-section method was used. The variables were tested for non-stationarity using the Levin, Lin and Chu Unit Root test for panel data. The data series were transformed in the first difference if unit root was detected.

The existence of autocorrelation in the four equations was tested with the Durbin-Watson statistic. If autocorrelation was detected it was corrected by transforming the variables using information on the degree of autocorrelation (ρ) to estimate a quasi-difference equation (see Gujarati, 2003; Wooldridge, 2000).

3.2 Data

The four import demand models were estimated using balanced panel data from 1984 to 2011. Table 2 provides an overview of the variables used in Equation 1.

4 T = number of time periods N= the number of cross-sections (i.e. importing countries).

5 SUR = Seemingly Unrelated Regressions.

Table 2: Variables and data used in the import demand model

Variable	Explanation	Hypothesised sign	Data source
SAExp	Dependent variable. South African exported volumes of apples, oranges, table grapes or wine specified at the 4-digit level of the SITC classification as reported by the importing country.		NBER (1984 -2000), UN Comtrade (2000 – 2011)
Inc	The per capita GDP based on Purchasing Power Parity (PPP) of the importing country is a proxy for the real level of consumer income. An increase in consumer income is expected to lead to a relatively smaller increase in the demand for fruit and wine products	+	IMF
RelP	The relative border price calculated by Psa/ Pc, where Psa is the unit value of imports from South Africa and Pc the weighted unit value of imports from its main competitors (due to the seasonal marketing window for fresh fruits only competitors from the Southern-Hemisphere were considered). If the relative border price >1 South African exports are more expensive than those of its competitors. Hence a higher relative price is expected to result in a decrease in import demand.	-	NBER, UN Comtrade
ER	The Exchange Rate measures the impact of currency appreciation on export supply. A stronger local currency will result in higher prices for South African exports and subsequently a lower import demand.	-	South African Reserve Bank
TradReg	The Trade Regime of the trading partner is reflected by the weighted average import duty faced by South Africa. A higher tariff will lead to an increase in price of South African exports and subsequently to a lower import demand.	-	TRAINS
DUMpta	A Preferential Trade Agreement between South Africa and its trading partner stipulates concessions on bilateral market access (i.e. both tariff and non-tariff barriers). This dummy variable will hold the value of "1" if a preferential trade agreement has come into effect and a value of "0" if no trade agreement is in place[1]. It is expected that increased market access will result in a higher import demand.	+	

DUMrec	An economic recession in an export market is expected to have a negative impact on income, and subsequently demand for consumables, including imported products. This dummy variable will hold the value of "1" in a year of economic recession and a value of "0" otherwise.	–	IMF
DUMsd	An economic slowdown in an export market is expected to have a negative impact on income and subsequently demand for consumables, including imported products (the impact of a slowdown is expected to be less severe than of a recession). This dummy variable will hold the value of "1" in a year of economic slowdown and a value of "0" elsewise.	–	IMF

Sources: Own calculations based on data from IMF (2012), NBER (2005), UN Comtrade (2012), IMF (2012).

4 RESULTS OF THE IMPORT DEMAND MODELS

The results of the EGLS estimations of the import demand models for table grapes, oranges, apples and wine are depicted in Table 3. The overall goodness of fit of the four models, reflected by the R square, ranges from poor to good. The import demand model for wine is especially accurately specified since it explains more than 74 per cent of the variation in South Africa's export volumes of this product to its traditional export markets in the period from 1984 to 2011.

The explanatory variables with significant coefficients are depicted in bold face. It is evident that the coefficient of the dummy variable for economic recession is statistically significant in two of the import demand models, namely for wine and oranges. Furthermore, the coefficient of the dummy variable for economic slowdown is found to be statistically significant in the estimation of apple exports.

The results of the import demand model for table grapes show that none of the coefficients of the explanatory variable in the estimation was statistical significant. Hence the level of income, the relative price, the exchange rate, the trade regime, trade policy and economic shocks do not have a statistically significant impact on table grape exports. Thus, a change in South African exports of table grapes to its traditional export markets is determined by exogenous factors that are not captured by the specified import demand model.

The R square of the import demand model for orange exports of 0.517 indicates more predictive power than the model for table grapes. The coefficients for income, trade regime and recession were found to be statistically significant and the signs of the coefficients are all in accordance with theoretical expectations.

Relatively speaking, the level of consumer income has the strongest impact on changes in import demand for oranges to South Africa's traditional export markets. Furthermore, oranges are the only product for which changes in the trade regime (import duties) have a significant impact on import demand. This is possibly related to the fact that oranges face the highest average tariff regime in its traditional export markets of all of the four products.

The specification of the import demand model for South Africa's apple exports is also adequate. Import demand for apples is also significantly determined by income as well as by economic slowdown in the export market. Contrary to the theoretical expectation, the sign of the coefficient is positive. Although the coefficient is relatively small, this implies a positive effect of an economic slowdown on apple exports, possibly explained by substituting high-value fruits for apples during those specific periods.

The import demand model for wine explains 74 per cent of the variation in South Africa's exports to its traditional export markets. The results show that the coefficients for income, the relative price, and economic recession are all statically significant. The variable for the level of consumer income has the largest coefficient; thus the largest impact on import demand for South African wine in its traditional markets. Since wine is a value added and luxury good, it expectedly has a higher income elasticity of demand than the other products. The sign of the dummy variable coefficient for economic recession is negative, which is in contrast with the hypothesis. This may be due to the fact that the demand for high-value wines is substituted with relatively less expensive wine from South Africa during those specific periods.

Table 3: Estimation results of the Import demand Models

Dependent variable:	SAExp							
	Table Grapes^		Oranges		Apples^		Wine^	
	Coeff.	Sign	Coeff.	Sign	Coeff.	Sign	Coeff.	Sign
C	0.291	ns	-3.814	ns	1.003	ns	-8.763	***
Inc	0.859	ns	1.455	***	0.807	*	4.365	***
RelP	-0.199	ns			-0.126	ns	-0.788	***
d(RelP)			0.186	ns				
ER	0.257	ns	0.142	ns	-0.285	ns	-0.183	ns
d(ER)								

TradReg	0.0269	ns			0.014	ns	-0.062	ns
d(TradReg)			-0.056	***				
DUMpta	-0.062	ns	0.115	ns	-0.089	ns	-0.016	ns
DUMrec	0.002	ns	-0.335	*	0.079	ns	0.203	***
DUMsd	-0.027	ns	0.026	ns	0.077	*	-0.035	ns
R2	0.182		0.517		0.562		0.745	
Periods included	27		27		27		27	
Cross-sections	2		3		4		4	

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%, ns no significance at 10% level
^ corrected for autocorrelation by estimation of a quasi-difference equation

Sources: Own calculations based on data from IMF (2012), NBER (2005), UN Comtrade (2012), IMF (2012).

5 CONCLUSIONS

Compared with global standards, South Africa's export performance for wine, apples, oranges and table grapes was impressive over the last 28 years. It maintained a steady growth in its traditional export markets while boosting production to diversify export flows to new markets. Especially concerning wine and apples, the country seems to have a price advantage over its main competitors. The export performance during the latest global economic crisis of the last four years differed per product, but was generally volatile. South Africa's total exports of especially wine and oranges seem to be negatively affected by the recent global economic crisis. Looking specifically at the export flows to the traditional markets, the picture looks somewhat different. An economic recession (a negative growth in GDP) in one of these markets did not implicitly concur with a decrease in exports to those markets or *vice versa* (also see tables in Annexure II).

Therefore this study investigated the historical relationship between South Africa's fruit and wine exports and economic shocks (economic recessions and slowdowns) in export markets from 1984 to 2011. Information on this relationship provides valuable insights on the vulnerability or adaptability of these agricultural sub-sectors to economic shocks in export markets. This will enable industry roleplayers to pro-actively strategize for future economic downturns in their export markets.

From the outcomes of the four models it can be concluded that the occurrence of an economic recession in South Africa's traditional export markets does historically only have a statistically significant impact on the import demand for

oranges and wine. The impact is negative for orange exports but it is remarkable that the impact is positive for wine exports. Hence, the overall extent to which economic recessions have a negative effect on South Africa's export of fruit and wine seems marginal.

The effect of an economic slowdown in the export market was only found to be statistically significant for the import demand for apples. This study is limited to the extent that it specifically looked at the economic performance of South Africa's traditional export markets and did not consider recessions in its "new" export markets or economic crises at a global level. Since the latest widespread global recession occurred in 1974–1975, a comparable statistical analysis is not feasible due to data limitations.

The level of consumer income seems to be the best predictor for import demand as its coefficient was found to be statistically significant in three of the four import demand models. The results only partially underpin the theoretical principles of income elasticity of food demand. Since food products are generally regarded as a necessity good, an increase in income will theoretically result in a relatively smaller increase in demand. The coefficient for apples is lower than one and thus in line with theoretical expectations. However, the coefficients for oranges and wine are larger than one, implying that an increase in income will result in a relatively larger increase in import demand. These results thus suggest that South African wine and oranges can be regarded as "luxury goods" in its traditional export markets.

The import demand models furthermore included a variable for the relative border price of South African exports compared with its main competitors for fruits and wine products. Although, as mentioned earlier, South Africa has a price advantage for especially wine and apples, the coefficient for the relative border price was only statistically significant for the import demand for wine. This implies that South Africa competes on price (value for money) internationally.

Other demand side factors included in the import demand model included variables for trade regime, trade agreement and exchange rate. It was found that only the trade regimes (import duties) for oranges have a negative impact on South Africa's exports demand of the selected fruit and wine. Hence preferential trade agreements and monetary policy seem not to be the appropriate institutional tools for stimulating import demand for wine, grapes, apples and oranges in South Africa's traditional markets

The results of this study provide us with some recommendations for the South African fruit and wine sector with regards to economic shocks in export markets. Firstly, for planning purposes, we rather focus on projected changes in the real level of consumer income than on contractions in GDP. The first factor was found to be significantly impacting import demand but is not implicitly

related with the latter. For instance, in the period between 1984 and 2011, the UK recorded four annual economic recessions and 14 economic slowdowns but only one year with a negative growth in real consumer income. Secondly, maintaining the current position with regards to relative border price is only of importance to wine products. Although a competitive cost focus is important for South African fruit exports, fluctuations in relative prices are permissible. Thirdly, institutional support in the form of monetary policy and trade agreements did not enhance import demand to the traditional export markets. Hence the sector has focused on internal competitive attributes and should continue to do so. Fourthly, we need to re-investigate the demand-side dynamics of South African table grape exports as this is not adequately captured by the estimated demand equation.

REFERENCES

Aydin, M.F., Çiplak, U. & Yücel, M.E. 2004. Export supply and import demand models for the Turkish economy. Research Department Working Paper 04/09, Central Bank of the Republic of Turkey, Ankara.

Bahmani-Oskooee, M. 1986. Determinants of international trade flows: The case of developing countries. *Journal of Development Economics* 20:107–123.

Bahmani-Oskooee, M. & Niroomand, F. 1998. Long-run price elasticities and the Marshall-Lerner condition revisited. *Economics Letters* 61(1):101–109

Cassim, R. 2000. The determinants of intra-regional trade in southern Africa with specific reference to South Africa and the rest of the region. Paper prepared for the Second Research-in-Progress Workshop, Development Policy Research Unit, September 2000, South Africa.

DTI (Department of Trade and Industry). 2012. South African trade statistics database. Available at: http://apps.thedti.gov.za/econdb/raportt/defaultrap.asp (Accessed in April 2012).

EC. 2010. *EU agricultural trade: back on track?* Monitoring Agri-trade Policy, No. 01-10, June 2010. Brussels: European Commission (EC).

Edwards, L. & Alves, P. 2006. South Africa's export performance: Determinants of export supply. *South African Journal of Economics* 74(3):473–500.

Egger, P. 2000. A note on the proper econometric specification of the gravity equation. *Economics Letters* 66:25–31.

Gebrehiwet, Y., Ngqangweni, S. & Kirsten J.F. 2007. Quantifying the trade effect of sanitary and phytosanitary regulations of OECD countries on South African food exports. *Agrekon* 46(1):1–17.

Goldstein, M. & Kahn, M.S. 1985. Income and price effects in foreign trade. In: *Handbook of International Economics*, R.W. Jones and P.B. Kenen (eds.). Amsterdam: Elsevier Science Publishers.

Gouws, A.R. (2005). *The determinants of South African exports: Critical policy implications.* Ph.D. Thesis, Faculty of Economic and Management Sciences, University of Pretoria, South Africa

Gujarati, D. 2003. *Basic econometrics*. New York: McGraw-Hill.

IMF. 2011. World economic outlook database. International Monetary Fund, Available from:

http://www.imf.org/external/ns/cs.aspx?id=28 (Accessed in July 2012).

Kaempfer, W.H. & Lowenberg A.D. 1989. Sanctioning South Africa: The politics behind the policies. *Cato Journal* 8(3):713–727.

Khan, M.S. 1974. Import and export demand in developing countries. *IMF Staff Papers* 21:37 –693.

Martinez-Zarzoso, I. & Nowak-Lehmann, F. 2003. Augmented gravity model: an empirical application to Mercosur-European Union trade flows. *Journal of Applied Economics* 6(2):291–316.

NBER. 2005.. World trade flows: 1962–2000. National Bureau of Economic Research. Available from: http://cid.econ.ucdavis.edu/ (Accessed in July 2012).

OECD. 2006. *Agricultural policy reform in South Africa.* Policy Brief April 2006. Paris: Organisation for Economic Cooperation and Development (OECD).

OECD-FAO. 2009. *Agricultural outlook 2009–2018*. Joint publication of the Organisation for Economic Cooperation and Development (OECD) and the Food and Agriculture Organisation of the United Nations (FAO). Paris: OECD Publishing.

Reed, W.R. & Haichun, Y. 2011. Which panel data estimator should i use? *Applied Economics* 43(8):985–1000.

Senhadji, A.S. & Montenegro, C.E. 1999. Time series analysis of export demand equations: A cross-country analysis. *IMF Staff Papers* 46(3):259–273.

Sichei, M., Erero J.L. & Gebreselassie, T. 2005. An augmented gravity model of South Africa's export of transport equipment and machineries. Paper presented for the TIPS annual forum 2005 on Trade and Uneven Development, 30 November– 1 December, Glenburg Lodge, Gauteng, South Africa.

UN Comtrade. 2011. Commodity trade statistics database of the UN. Available from: http:// comtrade.un.org (Accessed in April 2012).

Waldmeier, P. 1997. *Anatomy of a miracle: The end of apartheid*. New York: W.W. Norton.

WTO. 2010. *World trade 2009, prospects for 2010*. Press release 598, 26 March 2010. Geneva: World Trade Organisation.

Warner, D. & Kreinin, M.E. 1983. Determinants of international trade flows. *The Review of Economics and Statistics* 65:96–104.

Wooldridge, J.M. 2000. *Introductory econometrics: A modern approach*. Boston: South-Western College Publishing.

ANNEXURE I

South Africa's long-term exports of table grapes, oranges, apples and wine

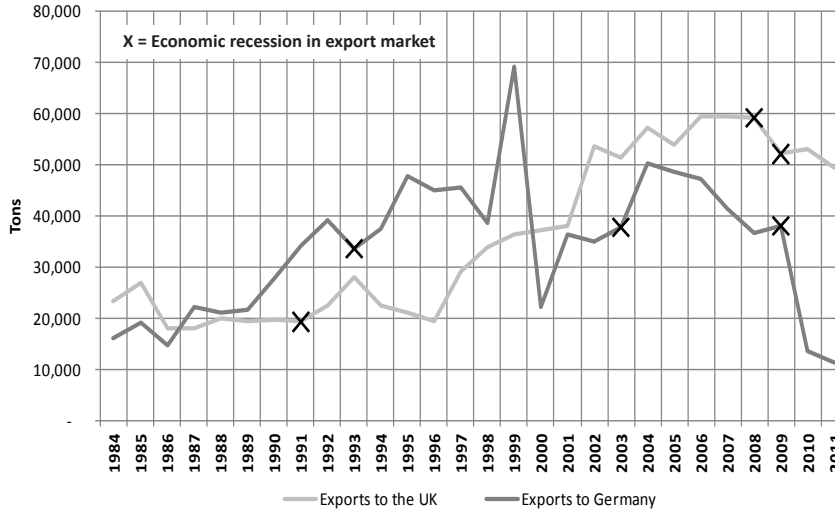

Figure A1: Trends in South Africa's table grape exports to its traditional export markets in relation to their respective economic recessions (1984–2011)

Source: NBER (2005), UN Comtrade (2012), IMF (2012).

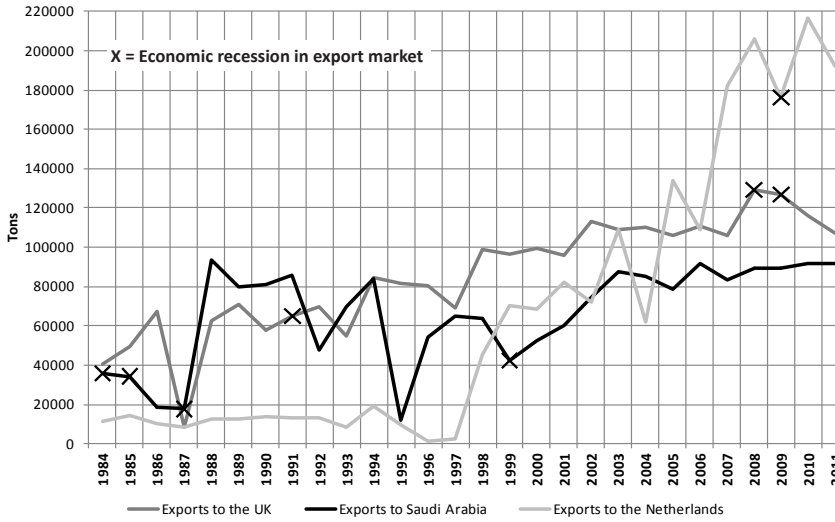

Figure A2: Trends in South Africa's orange exports to its traditional export markets in relation to their respective economic recessions (1984–2011)

Source: NBER (2005), UN Comtrade (2012), IMF (2012).

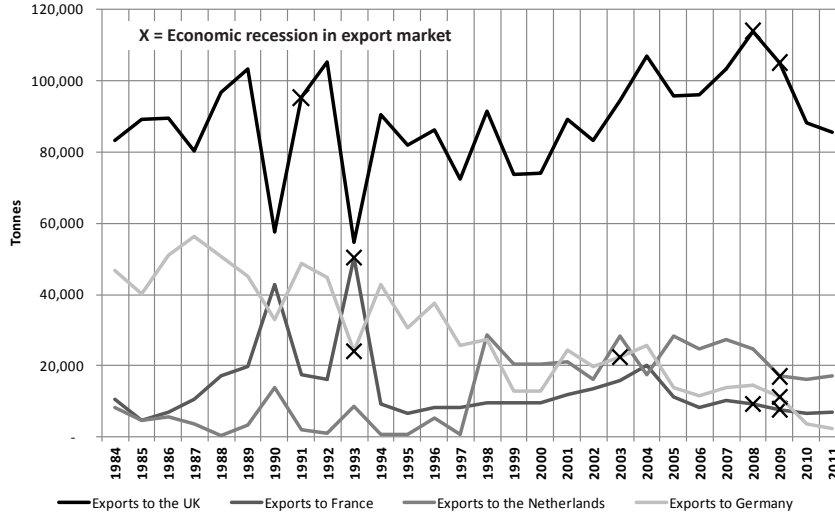

Figure A3: Trends in South Africa's apple exports to its traditional export markets in relation to their respective economic recessions (1984–2011)

Source: NBER (2005), UN Comtrade (2012), IMF (2012).

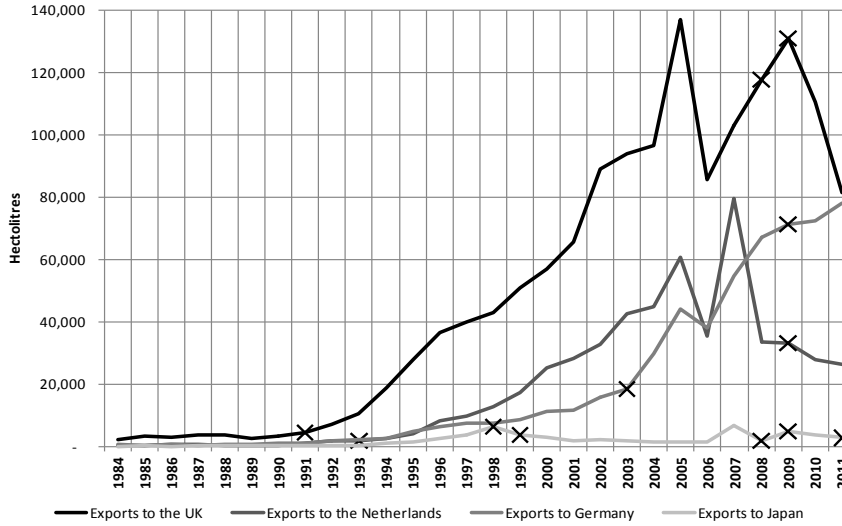

Figure A4: Trends in South Africa's wine exports to its traditional export markets in relation to their respective economic recessions (1984–2011)

Source: NBER (2005), UN Comtrade (2012), IMF (2012).

ANNEXURE II

Trends in economic- and trade performance of South Arica's traditional export partners

Table A1: Economic and trade trends of South Africa's traditional export partners for table grapes

Recession	Contraction of GDP (% change)	Trend in quantities of table grapes exported by SA to the respective export market (% change)	Trend in relative border price for imports from SA (% change)
United Kingdom - 1991	- 1.4	- 1.7	0.7
Germany – 1993	- 0.8	- 14.2	20.1
Germany – 2003	- 0.2	8.5	20.6
United Kingdom - 2008	- 0.1	- 0.7	-2.4
Germany - 2009	- 5.3	4.1	10.0
United Kingdom – 2009	- 4.4	- 11.9	0.1

Source: Own calculations based on IMF (2012), NBER (2005) and UN Comtrade data (2012).

Table A2: Economic and trade trends of South Africa's traditional export partners for oranges

Recession	Contraction of GDP (% change)	Trend in quantities of oranges exported by SA to the respective market (% change)	Trend in relative border price for imports from SA (% change)
Saudi Arabia – 1984	-3.1	NA	NA
Saudi Arabia - 1985	- 4.3	- 4.7	21.9
Saudi Arabia – 1987	- 4.0	- 5.2	-2.2
United Kingdom - 1991	- 1.4	12.5	0.8
Saudi Arabia – 1999	- 0.7	- 33.6	77.7
United Kingdom – 2008	- 0.1	21.7	-31.6

Netherlands – 2009	- 3.9	- 14.5	-15.2
United Kingdom – 2009	- 4.9	- 1.8	-7.3

Source: Own calculations based on IMF(2012), NBER (2005) and UN Comtrade data (2012).

Table A3: Economic and trade trends of South Africa's traditional export partners for apples

Recession	Contraction of GDP (% change)	Trend in quantities of apples exported by SA to the respective market (% change)	Trend in relative border price for imports from SA (% change)
United Kingdom - 1991	- 1.4	65.4	75.5
France – 1993	- 0.8	209.7	-23.9
Germany - 1993	- 0.8	- 45.9	-41.1
Germany – 2003	- 0.2	13.6	-14.2
France - 2008	-0.2	-9.0	-3.7
United Kingdom – 2008	- 0.1	10.2	-10.6
France – 2009	- 2.5	- 16.5	11.3
The Netherlands – 2009	- 3.9	- 31.4	12.3
Germany – 2009	- 4.7	- 23.5	-1.7
United Kingdom – 2009	- 4.9	- 7.8	7.0

Source: Own calculations based on IMF(2012), NBER (2005) and UN Comtrade data (2012).

Table A4: Economic and trade trends of South Africa's traditional export partners for wine

Recessions	Contraction of GDP (% change)	Trend in quantities of wine exported by SA to the respective market (% change)	Trend in relative border price for imports from SA (% change)
UK – 1991	- 1.4	36.1	18.7
Germany – 1993	- 0.8	20.4	13.8
Japan – 1998	- 2.0	77.4	12.2
Japan – 1999	- 0.1	- 41.5	-46.3
Germany - 2003	- 0.2	17.5	14.1
UK - 2008	- 0.1	14.1	-11.7
Japan – 2008	- 1.2	- 70.8	157.4
UK - 2009	- 4.9	11.2	12.9
Germany - 2009	- 4.7	6.2	-5.5
The Netherlands – 2009	- 3.9	- 1.3	-26.2
Japan – 2009	- 6.3	146.1	-15.1
Japan – 2011	-0.7	-20.8	-10.5

Source: Own calculations based on IMF (2012), NBER (2005) and UN Comtrade data (2012).

1 Wine: EU-SA Wine & Spirit Agreement in affect since 2002.
Fruit: EU-SA Trade and Development Cooperation Agreement in effect since