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STUDIA UNIVERSITATIS BABEŞ-BOLYAI OECONOMICA
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THE EFFECT OF THE COVID-19 ON THE AUTOMOTIVE SUPPLY CHAINS

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Abstract. Securing the high level of performance of the supply chains is a difficult task. The harmonization of different interests, the coordination of the raw material supply and information flow, the cooperation of the partners, forging and maintaining a relationship of trust are challenging even in an ideal world in order to meet the customer demands. The recent outbreak of the COVID-19 presents the members of the supply chains with extreme challenges. Because of the epidemic, the value added activities of the supply chains are getting even more importance. It became clear that the different supply chains connect the whole economy in a global and local scale as well. The choice of the inventory and organizational strategy is a key aspect in a crisis like this. The aim of this study is to present the current challenges and their viable solutions in order to check the possibilities to maintain the operation of the supply chains even in this difficult economic and social period using an automotive case study as an example.

JEL classification: E12, E24.

Keywords: COVID -19, pandemic, supply chain, automotive industry, change, fluctuation, case study.

1. Introduction

Supply chains are the results of the cooperation of organizations, where the different members try to achieve a mutually beneficial, synergic relationship in order to achieve a more efficient operational level. There is a significant amount of material, currency, document and information flow in the extended chains. The

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proper quantity and quality of flow is required in order to rationalize or occasionally optimize the processes, reducing the costs or increasing the profits at the supply chain level. The COVID-19, additionally to its devastating social effects, massively influences the local and global economic status, including the short and global supply chains as well. The bullwhip effect of the epidemic on the automotive supply chainsstarted at that time, when infected people were only registered in China. The short term signs could be detected almost immediately, however is it very difficult to foresee the challenges and the economic effects that the cooperating organizations have to overcome.

2. The supply chains

Supply chains are the results of the cooperation between the different organizations with the same goal. This objective can be profit maximization, process improvements, cost reduction etc. The cohesion of the supply chains is based on trust and mutualism.

These chains cross the boarders of the traditional organizational structures, the relationship between the certain members are much deeper, and the economic and strategic partnership enables them to reach a more efficient level of performance (Szegedi-Prezenszki, 2017).

In case of the global supply chains the procurement of resources and raw materials, processing the components and shipping the end-products to the customers are done by the different members of the supply chain, where they play a crucial role, creating value in their area of expertise. The continuous improvement and cost reduction is getting even more important for every single organization (Zhang et al., 2020).

Purchasing has an important role to achieve these goals at a local and global level, especially in this special, pandemic period (Tátrai-Vörösmarty, 2020). Besides profit and efficiency, the ‘green’ aspect of supply chains is getting an increasing amount of attention because of its environmentally friendly, sustainable nature.

Close cooperation between the members is essential at the automotive supply chains because of the long lead times of the products, and only a fraction of the suppliers have the core competencies, infrastructure and capacity to satisfy the customer demands with the proper quality requirements. The balance of power greatly influences the opportunities of the members (customers and suppliers) within the supply chains. Supply chains can be defined as the collaboration of the internal and external organizations, which can exploit the synergic effects of the cooperation in order to satisfy the customers’ needs. The implementation of this collaboration is highly dependent on both the internal and independent external factors. An extreme example for such an external factor is the Coronavirus.

3. The overview and consequences of the COVID-19

In the last few decades, several pandemic outbreaks occurred, which led to the deaths of many people, the most outstanding one is the COVID-19 (Coronavirus), which caused severe social and economic consequences (Guarner, 2020).

The Coronavirus is disease with human-to-human transmission, which can be originated to a fish market (Harapan et al., 2020).

The number of the COVID-19 infections started to skyrocket at the end of January, 2020, from that point onwards more and more patients were registered being infected.

The Chinese New Year had an immense effect on the rapid spread of the virus, because the vast majority of the people celebrated with their families and friends, and as a result the number of infections have increased exponentially (Liu et al., 2019).

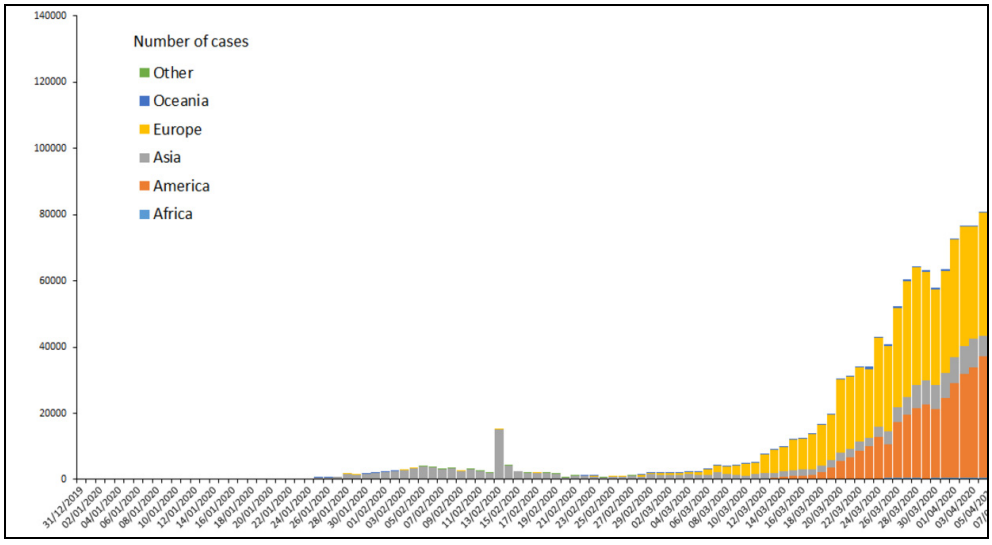

Fig. 1: The global spread of the number of the COVID-19 infections – partial data

Source: https://www.ecdc.europa.eu/en/geographical-distribution-2019-ncov-cases, date of download: 2020.05.31.

At first, the number of infected people only increased in China, but after several weeks, the virus has spread to other countries and continents, it reached Europe and America as well. As this is a highly infectious virus, it can be fatal, numerous protective measures were implemented in order to stop this epidemic.

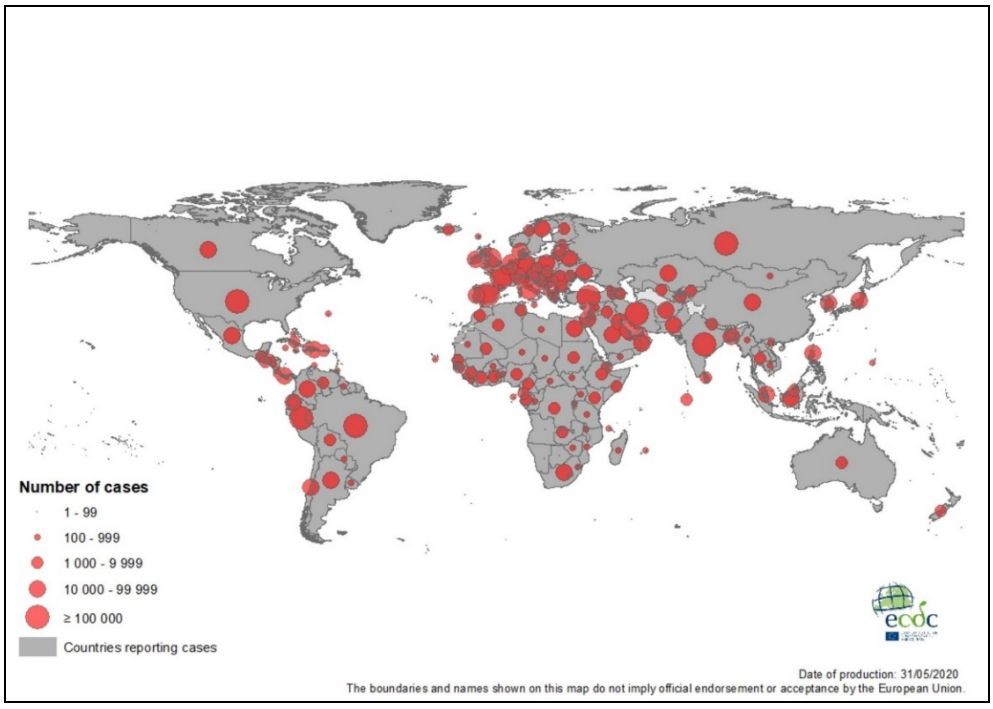

Fig. 2: The geographical distribution of the COVID-19 cases according to the 31.05.2020 data

Source: https://www.ecdc.europa.eu/en/geographical-distribution-2019-ncov-cases, date of download: 31.05.2020.

The limitations of the global logistics services (most of the means of transportations, cancellations of flights), the temporal shut down of production in various factories on behalf of the measures taken by the authorities belonged to these actions. These measures caused massive difficulties in numerous supply chain processes, in some cases even making them impossible to operate. Because of these, the logistic costs were increased, the transport options (sea, train and air freight) were reduced by quite a large margin, and as a result, material shortages, demand reductions and several other unforeseeable consequences were generated at numerous points of the supply chains.

This pandemic influenced the life of the employees as well. Because of the altered economic environment, the decisions of the organizations affected them both directly and indirectly as well. Fear is a decisive factor in this situation, which has an impact on both the individual and organizational performance (Henarath H. D. N. P Opatha, 2020).

Home office was an option at many companies because of the reduced customer demands and to prevent the further spread of the virus. It is important to analyze the personal and organizational performance of the home office option, and the types of jobs, which can be done in this condition (Dingel – Neiman, 2020).

4. The effect of the COVID-19 on the economies and supply chains

The effects on the COVID-19 proved to be a difficult challenge to most of the economic sectors, including the automotive industry as well.

The prevention of the spread of epidemics, which affected a vast number of persons was very critical even in the ancient times and in the early Middle Ages because of different social and economic aspects. Risk mitigation was also crucial in order to prevent further damages (Haldon et al., 2020).

The direct and indirect negative effects of the virus could be seen at the level of countries, industries and organizations. Parallel to the reduction of purchasing intentions and customer demands, material shortages are also getting more and more frequent, and the combination of these effects cause such an economic shock to the different economies and supply chain, which forced them to suspend or shut down their production processes. As a result of these, different levels ofcapacity and labor shredding could be experienced (Kraus et al., 2020).

The effects of the COVID-19 can be compared to a natural disaster, like an earthquake or a volcanic eruption, which strongly influences the processes of the supply chains. The demand fluctuations and material shortages both in short term and long term can cause immense problems (Ivanov, 2020).

Preparing for an epidemic like this is almost impossible, however certain strategies may work, which are flexible enough to proactively respond to the constant changes in an uncertain environment (Kannan et al., 2019).

The recovery of the economies after the virus will be a very difficult challenge because of the extensive damage caused by the epidemic. Certain state interventions will be needed in order to avoid further losses, the growth of unemployment, and the further weakening of the economic sectors. Experts estimate that the economic recovery will need around 9-12 months given the proper support and safety measurements (Mani et al., 2020).

The uncertain duration of the Coronavirus revealed the vulnerabilities of the supply chains, which were not experienced before. The value added activities of the supply chains have been getting more and more crucial recently, and it has become clear, that supply chains connect the economies at a local and global level. The importance of the supply chains can only be seen when they cannot operate properly, or when they have to overcome difficulties, which otherwise wouldnot allow them to play their role effectively. So supply chains can be defined as frameworks, which are the establishments of the efficient and successful economies. These chains are based on mutual trust and cooperation with the common goal of proactively satisfying the customers' needs.

The flexible strategies of the supply chains, which make it possible to smoothly react on the different changes, enable them to have a proactive approach to the demand fluctuations, supply issues and possible quality complaints (Oguzhan – Serpil, 2017).

The close cooperation makes it possible to act together driven by the common interest in order to overcome the difficulties of a bigger economic shock. As a result of the proper quality of communication, collaboration and joint action, the members of the chains can react faster and more effectively to potential risks, and the proactive measurements can mitigate the possible losses.

5. Case study – the effect of the virus on an automotive supplier

In the area of the automotive industry, there are a lot of Chinese components and materials, as many suppliers can only supply the customers from their Chinese factories according to the 9Rs of logistics.

The COVID-19 had severe impacts on not just the automotive area, but on every sectors of the economy. In my cases, the dire consequences will cause further damages to the primary, secondary and tertiary sectors as well (Nicola et al., 2020).

The effects of the initial Chinese safety measurements could be seen very soon. The European customers wanted to start building up their stock levels immediately in order to avoid any material shortages, as initially the epidemic period was expected to end shortly. Many of the substantial suppliers, which outsourced their production to China, and only kept their other functional areas outside of Asia, only calculated with short term issues originally. The long lead time of the automotive components are needed to be taken into consideration, so reacting to the slightest short termdemand fluctuation is a very challenging task.

In order to prevent the further spread of the virus, many international flights have been cancelled, more and more areas have been placed in quarantine, so even though the suppliers had enough stocks to cover the production of the customers, these materials could not be transported due to these limitations.

All the data presented in this section werecollected from the enterprise resource planning system of the chosen organization and from certain organizational reports. These data were prepared and organized by the authors in order to illustrate the cost and transport time changes, the different stock levels in certain periods and the responses to the virus. Table 1 shows the Asian transport changes and the difficulties, that the supplier had to overcome.

Table 1. The Asian international transport changes due to the Coronavirus

	Availability of the mean of transport	**Changes of the transport costs**	**Changes of the transport time**	**Tendency of the usage of the mean of transport**
Road freight	low availability	50 - 300% increase	depends on the infected area	non-preferred
Rail freight	limited availability	20 - 100% increase	50 - 150% increase	preferred
Sea freight	limited availability	0 - 50% increase	0 - 50% increase	less preferred
Air freight	chaotic	100 - 500% increase	100 - 600% increase	strongly preferred

Source: Own construction

As more and more regions were placed in quarantine as a result of the spread of the epidemic, the transportation in those area ceased immediately, and the sea freight, rail freight and air freight options have been gradually decreased. Automotive components could not be picked up from the locked cities, and most of the remaining freight capacities were used for medical equipment, which had the highest priority. Because of these, the air freight prices and transport times increased significantly. Sea freight and rail freight prices have also increased, but not as much as in the case of the air freight (Table 1).

All of the scheduled flights have been booked very soon in short term and long term as well, and the transport companies could not guarantee the original contract prices and transport times.

More and more automotive companies outside of Asia tried to buy as much as possible of the available stock of the suppliers over time in order to prepare for a potentially prolonged crisis period. Because of the bullwhip effectcaused by the Coronavirus, the demand fluctuation and uncertainty had massive effects on the members of the supply chains. The saturated flights caused supply issues at several points of the supply chains even at the first few weeks, the stocks of the suppliers were running out rapidly, they tried to keep up with the increasing demands, but they could only use a fraction of their capacity due to different governmental regulations (Figure 3).

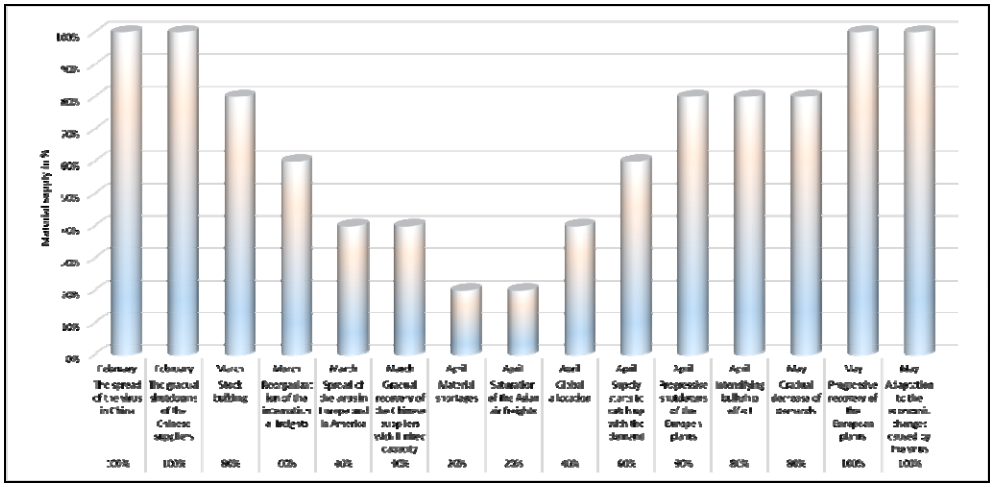

Fig. 3. The change of the material coverage of the analyzed company till May, 2020.

Source: Own construction

In the field of the electronic and mechanic components, which are used in many areas, several supply issues were generated, which could be only solved with close cooperation between the organizations. Multinational companies used global allocations to distribute the available resources to reduce the potential losses as much as possible.

As a result of this “force majeure” situation, most of the costs could not be charged to the other parties, the members of the supply chains had to cover these costs in many cases.

More and more countries started to introduce different safety measures to stop the further spread of the epidemic. While the situation started to look better in China, and the factories could restart their production at almost full capacity, the customer demands were drastically reduced due to the global status, further amplifying the bullwhip effect.

Because of the uncertainty, a standstill period has begun. As a result of the massive demand fluctuations, the members of the supply chains started to be reactive,they waited for each other’s move. This stagnant situation was the perfect time to evaluate their position, opportunities and strategies.

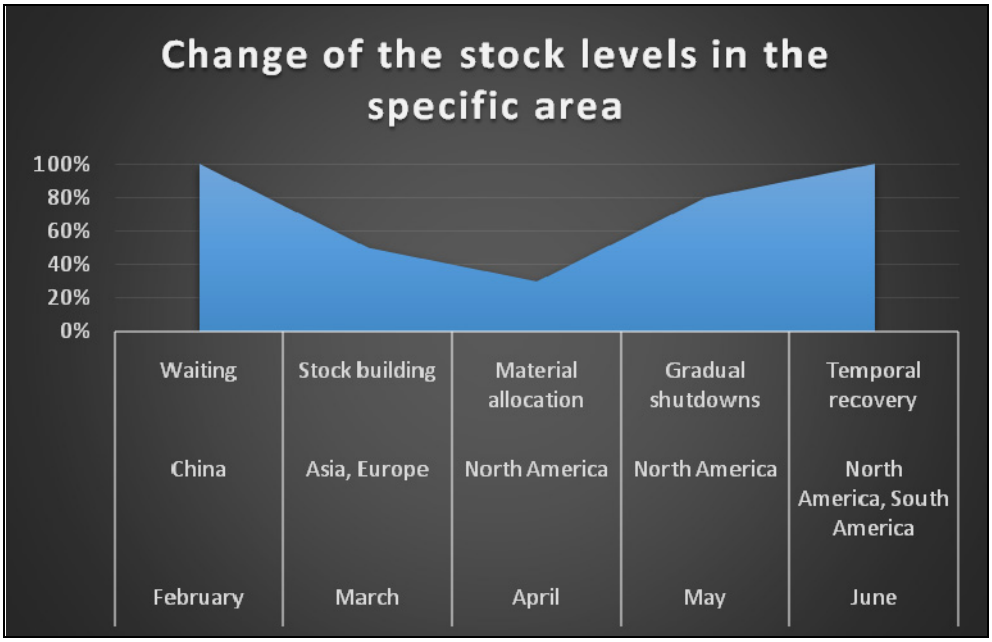

Fig. 4: The fluctuation of the level of stocks of the chosen company during the epidemic

Source: Own construction

When the COVID-19 has been already present in almost every single country, the reduction of demand could be experiences in most of the markets.

The management of uncertainty and risks were handled by the countries in their own way. The closure of the borders, establishment of a state of emergency and curfews or exceptional restrictions – all of these actions had an impact on the economies, and on the supply chains as well (Sharif et al., 2020).

What can be expected in the future? It is very difficult to predict the outcome of this period, although based on the current situation, the following can

be foreseen: in the area of HR: work force reductions; stagnation or reduction of salaries, the reconsideration of career management (Szondi, 2020) and manager responsibilities (Berke-Tóth, 2020); in the area of SCM: reorganization of the supply chains, reconsideration of the projects and their goals (Varga-Csiszárik, 2019), the closure of different companies, the realignment of the balance of power and the economy, new trends and strategies for similar situations like this.

Table 2. The relationship between the spread of the epidemic and the organizational reactions

Time	Centers of infection	Organizational reaction	Stock level
February	China	Waiting	100%
March	Asia, Europe	Stock building	50%
April	North America	Material allocation	30%
May	North America	Gradual shutdowns	80%
June	North America, South America	Temporal recovery	100%

Source: Own construction

6. Conclusion

The automotive supplier, which was chosen for this research, as a member of a supply chain, had to and have to face numerous challenges. With a flexible and suitable organizational strategy, it could quickly adapt to the changes. Building up enough safety stocks and closely cooperating with the partners were crucial to sustain its operations

As to the future, it is necessary to revise the status of the suppliers and customers, the flexibility of the long term organizational strategy based on the economic opportunities. Precautions shall be taken to choose the proper stock levels in order to reach the inventory targets and to be able to react to any bigger changes. Based on the previous experiences, preparing for such big economic shocks is impossible, however the mitigation of risks and damages can be feasible using the rights strategies. The changes in the balance of power and the economic realignment after the epidemic can open up new business opportunities in the area of the automotive industry. As a result of this, the global supply chainscan become evenmore important.

There is certain pattern, which can be observed during other smaller scale crises as well, which was also the case at the chosen automotive supplier. The indecision of the suppliers and customers, a general standstill period, and a high level of demand fluctuation can be experienced at the beginning of these unsettled times in many sectors of the economy.

This case study can serve as best practice to be followed by other organizations, which faced similar issues during this uncertain global period. The results of this study can be used as an example during the creation and implementation of certain inventory strategies in order to prepare for an uncertain period in the automotive industry. Proactive planning is crucial to sustain the production processes while keeping the stock level as low as possible so the relevant organizational KPI targets can be achieved. The challenges and difficulties, their solutions, and the different approaches, which were presented can be vital to prevent or to overcome similar issues and problems in the future.

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INVOLUNTARY UNEMPLOYMENT IN A NEOCLASSICAL MODEL

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Abstract. We show the existence of involuntary unemployment without assuming wage rigidity using a neoclassical model of consumption and production. We consider a case of indivisible labor supply and increasing returns to scale under monopolistic competition. We derive involuntary unemployment by considering utility maximization of consumers and profit maximization of firms in an overlapping generations (OLG) model with two or three generations. In a two-periods OLG model it is possible that a reduction of the nominal wage rate reduces unemployment. However, if we consider a three-periods OLG model including a childhood period, a reduction of the nominal wage rate does not necessarily reduce unemployment.

JEL classification: E12, E24.

Keywords: involuntary unemployment, indivisible labor supply, two or three-periods overlapping generations model, monopolistic competition, increasing returns to scale.

1. Introduction

According to Otaki (2009) the definition of involuntary unemployment consists of two elements, the nominal wage rate is set above the nominal reservation wage rate, and the employment level and economic welfare never improve by lowering the nominal wage rate.

Umada (1997) derived an upward-sloping labor demand curve from mark-up principle for firms under increasing returns to scale technology, and argued that such an upward-sloping labor demand curve leads to the existence of involuntary unemployment without wage rigidity. Lavoie (2001) presented a similar analysis. But his model of firms' behavior is ad-hoc. Otaki (2009) has shown the existence of involuntary unemployment using efficient wage bargaining according to McDonald and Solow (1981). The arguments of this paper, however, do not depend on bargaining.

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In this paper we consider utility maximization of consumers and profit maximization of firms in an overlapping generations (OLG) model with two or three generations under monopolistic competition with increasing returns to scale technology according to Otaki (2007), (2009), (2011) and (2015), and show the existence of involuntary unemployment without assuming wage rigidity. We consider indivisible labor supply. As discussed by Otaki (2015) (Theorem 2.3) and Otaki (2012), if labor supply is divisible and it can be infinitesimally small, there exists no unemployment.

About the indivisible labor supply also please see Hansen (1985). He studies the existence of unemployed workers and fluctuations in the rate of unemployment over the business cycle with indivisible labor supply. To treat an indivisible labor supply in a representative agent model he assumes that people choose lotteries rather than hours worked. Each person chooses a probability of working, then a lottery determines whether or not he actually works. There is a contract between firms and individuals that commits the individual to work the predetermined number of hours with the probability which is chosen by an individual. The contract is being traded, so the individual is paid whether he works or not. The firm provides complete unemployment insurance to the workers.

However, we do not consider a representative consumer. We analyze utility maximization of an employed consumer and that of an unemployed consumer separately.

In this paper similarly to Otaki (2007), we derive a fiscal multiplier (or the Keynesian cross) from the maximization behavior of consumers and firms and market clearing conditions. There are several studies from the standpoint of New Keynesian economics on multipliers (Mankiw (1988), Reinhorn (1998), Startz (1989)). However, as Otaki (2007) says, they commonly emphasize the complementarity between consumer incomes and profits, however as proved by Reinhorn (1998), optimal fiscal expenditure is equal to zero. Thus, expansionary fiscal policy is always harmful. We extend the theory using a dynamic OLG model according to Otaki (2007). It allows the government to use seigniorage to finance its expenditure.

In the next section we analyze the relation between indivisibility of labor supply and the existence of involuntary unemployment in a two-periods OLG model. We show that the real wage rate is increasing with respect to the employment, on the other hand the reservation real wage rate for individuals is constant given the expected inflation rate. Thus, when the real wage rate is larger than the reservation real wage rate, there exists no mechanism to reduce the difference between them.

In a two-periods OLG model it is possible that a reduction of the nominal wage rate reduces unemployment. However, if we consider a three-periods OLG model including a childhood period, a reduction of the nominal wage rate does not necessarily reduce unemployment. Please see Section 3. In Appendix we present details of calculations.

2. Indivisible labor supply and involuntary unemployment

We consider a two-periods (young and old) OLG model under monopolistic competition according to Otaki (2007, 2009, 2011 and 2015). There is one factor of production, labor, and there is a continuum of goods indexed by $z \in [0,1]$. Each

good is monopolistically produced by Firm z. Consumers are born at continuous density $[0,1] \times [0,1]$ in each period. They can supply only one unit of labor when they are young (period 1).

2.1. Consumers

We use the following notations.

$c^i(z)$: consumption of good z at period i, $i = 1,2$.
$p^i(z)$: price of good z at period i, $i = 1,2$.
X^i: consumption basket at period i, $i = 1,2$.

$$X^i = \left\{ \int_0^1 c^i(z)^{1-\frac{1}{\eta}} dz \right\}^{\frac{1}{1-\frac{1}{\eta}}}, \qquad i = 1,2, \qquad \eta > 1.$$

β: disutility of labor, $\beta > 0$.
W: nominal wage rate.
Π: profits of firms which are equally distributed to each consumer.
L: employment of each firm and the total employment.
L_f: population of labor or employment at the full-employment state.
$y(L)$: labor productivity, which is increasing with respect to the employment, $y(L) \geq 1$.

δ is the definition function. If a consumer is employed, $\delta = 1$; if he is not employed, $\delta = 0$. The labor productivity is $y(L)$. It is increasing with respect to the employment of a firm. We define the employment elasticity of the labor productivity as follows.

$$\zeta = \frac{y'}{\frac{y(L)}{L}}.$$

We assume $0 < \zeta < 1$. Increasing returns to scale means $\zeta > 0$. η is (the inverse of) the degree of differentiation of the goods. At the limit when $\eta \to +\infty$, the goods are homogeneous. We assume

$$\left(1 - \frac{1}{\eta}\right)(1 + \zeta) < 1$$

so that the profits of firms are positive.

The utility of consumers of one generation over two periods is

$$U(X^1, X^2, \delta, \beta) = u(X^1, X^2) - \delta\beta.$$

We assume that $u(X^1, X^2)$ is homogeneous of degree one (linearly homogeneous). The budget constraint is

$$\int_0^1 p^1(z)c^1(z)dz + \int_0^1 p^2(z)c^2(z)dz = \delta W + \Pi.$$

$p^2(z)$ is the expectation of the price of good z at period 2. The Lagrange function is

$$\mathcal{L} = u(X^1, X^2) - \delta\beta - \lambda\left(\int_0^1 p^1(z)c^1(z)dz + \int_0^1 p^2(z)c^2(z)dz - \delta W - \Pi \right).$$

λ is the Lagrange multiplier. The first order conditions are

$$\frac{\partial u}{\partial X^1}\left(\int_0^1 c^1(z)^{1-\frac{1}{\eta}}dz\right)^{\frac{\frac{1}{\eta}}{1-\frac{1}{\eta}}} c^1(z)^{-\frac{1}{\eta}} = \lambda p^1(z), \tag{1}$$

and

$$\frac{\partial u}{\partial X^2}\left(\int_0^1 c^2(z)^{1-\frac{1}{\eta}}dz\right)^{\frac{\frac{1}{\eta}}{1-\frac{1}{\eta}}} c^2(z)^{-\frac{1}{\eta}} = \lambda p^2(z). \tag{2}$$

They are rewritten as

$$\frac{\partial u}{\partial X^1}X^1\left(\int_0^1 c^1(z)^{1-\frac{1}{\eta}}dz\right)^{-1} c^1(z)^{1-\frac{1}{\eta}} = \lambda p^1(z)c^1(z), \tag{3}$$

$$\frac{\partial u}{\partial X^2}X^2\left(\int_0^1 c^2(z)^{1-\frac{1}{\eta}}dz\right)^{-1} c^2(z)^{1-\frac{1}{\eta}} = \lambda p^2(z)c^2(z). \tag{4}$$

Let

$$P^1 = \left(\int_0^1 p^1(z)^{1-\eta}dz\right)^{\frac{1}{1-\eta}}, P^2 = \left(\int_0^1 p^2(z)^{1-\eta}dz\right)^{\frac{1}{1-\eta}}.$$

They are prices of the consumption baskets in period 1 and period 2. By some calculations we obtain (please see Appendix)

$$u(X^1, X^2) = \lambda\left[\int_0^1 p^1(z)c^1(z)dz + \int_0^1 p^2(z)c^2(z)dz\right] = \lambda(\delta W + \Pi), \tag{5}$$

$$\frac{P^2}{P^1} = \frac{\frac{\partial u}{\partial X^2}}{\frac{\partial u}{\partial X^1}}, \tag{6}$$

$$P^1X^1 + P^2X^2 = \delta W + \Pi. \tag{7}$$

The indirect utility of consumers is written as follows

$$V = \frac{1}{\varphi(P^1, P^2)}(\delta W + \Pi) - \delta\beta. \tag{8}$$

$\varphi(P^1, P^2)$ is a function which is homogeneous of degree one. The reservation nominal wage rate W^R is a solution of the following equation.

$$\frac{1}{\varphi(P^1, P^2)}(W^R + \Pi) - \beta = \frac{1}{\varphi(P^1, P^2)}\Pi.$$

From this

$$W^R = \varphi(P^1, P^2)\beta.$$

The labor supply is indivisible. If $W > W^R$, the total labor supply is L_f. If $W < W^R$, it is zero. If $W = W^R$, employment and unemployment are indifferent for consumers, and there exists no involuntary unemployment even if $L < L_f$.

Indivisibility of labor supply may be due to the fact that there exists minimum standard of living even in the advanced economy (please see Otaki (2015)).

Let $\rho = \frac{P^2}{P^1}$. This is the expected inflation rate (plus one). Since $\varphi(P^1, P^2)$ is homogeneous of degree one, the reservation real wage rate is

$$\omega^R = \frac{W^R}{P^1} = \varphi(1, \rho)\beta.$$

If the value of ρ is given, ω^R is constant.

Otaki (2007) assumes that the wage rate is equal to the reservation wage rate at the equilibrium. However, there exists no mechanism to equalize them. We assume that β and ω^R are not so large.

2.2. Firms

Let

$$\alpha = \frac{P^1X^1}{P^1X^1 + P^2X^2} = \frac{X^1}{X^1 + \rho X^2}, 0 < \alpha < 1.$$

From (3) $\sim$ (7),

$$\alpha(\delta W + \Pi)\left(\int_0^1 c^1(z)^{1-\frac{1}{\eta}}dz\right)^{-1} c^1(z)^{-\frac{1}{\eta}} = p^1(z).$$

Since

$$X^1 = \frac{\alpha(\delta W + \Pi)}{P^1},$$

we have

$$(X^1)^{\frac{1}{\eta}-1} = \left(\int_0^1 c^1(z)^{1-\frac{1}{\eta}}dz\right)^{-1} = \left(\frac{\alpha(\delta W + \Pi)}{P^1}\right)^{\frac{1}{\eta}-1}.$$

Therefore,

$$\alpha(\delta W + \Pi)\left(\frac{\alpha(\delta W + \Pi)}{P^1}\right)^{\frac{1}{\eta}-1} c^1(z)^{-\frac{1}{\eta}} = \left(\frac{\alpha(\delta W + \Pi)}{P^1}\right)^{\frac{1}{\eta}} P^1 c^1(z)^{-\frac{1}{\eta}} = p^1(z).$$

Thus,

$$c^1(z)^{\frac{1}{\eta}} = \left(\frac{\alpha(\delta W + \Pi)}{P^1}\right)^{\frac{1}{\eta}} P^1(p^1(z))^{-1}.$$

Hence,

$$c^1(z) = \frac{\alpha(\delta W + \Pi)}{P^1}\left(\frac{p^1(z)}{P^1}\right)^{-\eta}.$$

This is demand for good z of an individual of younger generation. Similarly, his demand for good z in period 2 is

$$c^2(z) = \frac{(1-\alpha)(\delta W + \Pi)}{P^2}\left(\frac{p^2(z)}{P^2}\right)^{-\eta}.$$

Let M be the total savings of consumers of the older generation carried over from their period 1. It is written as

$$M = (1-\alpha)(\overline{W}\overline{L} + L_f\overline{\Pi}).$$

$\overline{W}$, $\overline{L}$ and $\overline{\Pi}$ are the nominal wage rate, the employment and the profit in the previous period. Then, their demand for good z is

$$\frac{M}{P^1}\left(\frac{p^1(z)}{P^1}\right)^{-\eta}.$$

The government expenditure constitutes the national income as well as consumptions of younger and older generations. The total demand for good z is written as

$$c(z) = \frac{Y}{P^1}\left(\frac{p^1(z)}{P^1}\right)^{-\eta}.$$

Y is the effective demand defined by

$$Y = \alpha(WL + L_f\Pi) + G + M.$$

G is the government expenditure (about this demand function please see Otaki (2007), (2009)). The total employment, the total profits and the total government expenditure are

$$\int_0^1 Ldz = L, \int_0^1 \Pi dz = \Pi, \int_0^1 Gdz = G.$$

We have

$$\frac{\partial c(z)}{\partial p^1(z)} = -\eta\frac{Y}{P^1}\frac{p^1(z)^{-1-\eta}}{(P^1)^{-\eta}} = -\eta\frac{c(z)}{p^1(z)}.$$

From $c(z) = Ly(L)$,

$$\frac{\partial L}{\partial p^1(z)} = \frac{1}{y(L) + Ly'}\frac{\partial c(z)}{\partial p^1(z)}.$$

The profit of Firm z is

$$\pi(z) = p^1(z)c(z) - \frac{W}{y(L)}c(z).$$

P^1 is given for Firm z. $y(L)$ is the productivity of labor, which is increasing with respect to the employment L.

The employment elasticity of the labor productivity is

$$\zeta = \frac{y'}{\frac{y(L)}{L}}.$$

The condition for profit maximization with respect to $p^1(z)$ is

$$c(z) + \left[p^1(z) - \frac{y(L) - c(z)y'\frac{1}{y(L)+Ly'}}{y(L)^2}W\right]\frac{\partial c(z)}{\partial p^1(z)}$$

$$= c(z) + \left[p^1(z) - \frac{1 - Ly' \frac{1}{y(L)+Ly'}}{y(L)} W\right] \frac{\partial c(z)}{\partial p^1(z)}$$

$$= c(z) + \left[p^1(z) - \frac{W}{y(L) + Ly'}\right] \frac{\partial c(z)}{\partial p^1(z)} = 0.$$

From this

$$p^1(z) = \frac{W}{y(L) + Ly'} - \frac{c(z)}{\frac{\partial c(z)}{\partial p^1(z)}} = \frac{W}{(1+\zeta)y(L)} + \frac{1}{\eta} p^1(z).$$

Therefore, we obtain

$$p^1(z) = \frac{W}{\left(1 - \frac{1}{\eta}\right)(1+\zeta)y(L)}.$$

With increasing returns to scale, since $\zeta > 0$, $p^1(z)$ is lower than that in a case without increasing returns to scale given the value of W.

2.3. Involuntary unemployment

Since the model is symmetric, the prices of all goods are equal. Then,

$$P^1 = p^1(z).$$

Hence

$$P^1 = \frac{W}{\left(1-\frac{1}{\eta}\right)(1+\zeta)y(L)}. \tag{9}$$

The real wage rate is

$$\omega = \frac{W}{P^1} = \left(1 - \frac{1}{\eta}\right)(1+\zeta)y(L).$$

If ζ is constant, this is increasing with respect to L.
The aggregate supply of the goods is equal to

$$WL + L_f \Pi = P^1 L y(L).$$

The aggregate demand is

$$\alpha(WL + L_f \Pi) + G + M = \alpha P^1 L y(L) + G + M.$$

Since they are equal,

$$P^1 L y(L) = \alpha P^1 L y(L) + G + M, \tag{10}$$

or

$$P^1 L y(L) = \frac{G+M}{1-\alpha}. \tag{11}$$

In real terms

$$L y(L) = \frac{1}{1-\alpha}(g + m), \tag{12}$$

where

$$g = \frac{G}{P^1}, \qquad m = \frac{M}{P^1}.$$

$\frac{1}{1-\alpha}$ is a multiplier. (12) means that the employment L is determined by $g + m$. It can not be larger than L_f. However, it may be strictly smaller than L_f $(L < L_f)$. Then, there exists *involuntary umemployment*. Since the real wage rate $\omega = \left(1 - \frac{1}{\eta}\right)(1 + \zeta)y(L)$ is increasing with respect to L, and the reservation real wage rate ω^R is constant, if $\omega > \omega^R$ there exists no mechanism to reduce the difference between them without increasing unemployment.

Figure 1 depicts the relation between the real wage rate and the employment, where L is obtained by

$$L = \frac{1}{(1-\alpha)y(L)}(g + m).$$

E is the equilibrium point.

If we consider the following budget constraint for the government with a lump-sum tax T on the younger generation consumers,

$$G = T,$$

the aggregate demand is

$$\alpha(WL + L_f\Pi - G) + G + M = \alpha(P^1 L_y - G) + G + M.$$

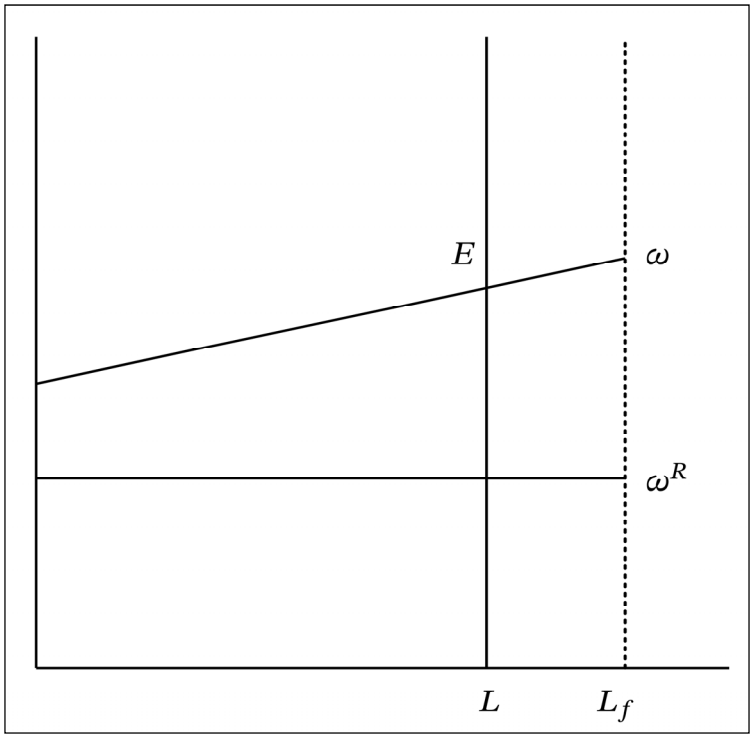

Figure 1: Relation between ω and L

Then, we get

$$L = \frac{1}{(1-\alpha)y}[(1-\alpha)g + m]. \tag{13}$$

This equation means that the balanced budget multiplier is 1.

2.4. Summary of discussions

The real wage rate is determined by a parameter of product differentiation, the labor productivity and its elasticity with respect to the employment. The real aggregate demand and the employment level are determined by the value of $g + m$. It does not depend on the real wage rate. The employment may be smaller than the population of labor, then there exists involuntary unemployment. As mentioned in Introduction Otaki (2009) has shown the existence of involuntary unemployment using efficient wage bargaining according to McDonald and Solow (1981). The arguments of this paper, however, do not depend on bargaining.

From (12) we derive a fiscal multiplier by the government expenditure without tax. It is larger than one. Also, we showed that the balanced budget multiplier is one. These results are obtained using OLG model. It is like the results in Otaki (2007) and is contrast to the results in Mankiw (1988), Startz (1989) and Reinhorn (1998).

The real wage rate is increasing with respect to the employment and the reservation real wage rate is constant. Then, if the real wage rate is larger than the reservation real wage rate, there exists no mechanism to reduce the difference between them without increasing unemployment.

The firms maximize their profits given the demand fuunctions of their goods. Thus, they are happy. Employed consumers determine their consumptions to maximize their utility, and so they are happy. Unemployed consumers are leaved as the only unhappy party.They are willing to work at less than the prevailing real wage, but firms are not hiring because they already maximize their profits[1].

2.5. On a reduction of the nominal wage rate

A reduction of the nominal wage rate induces a proportionate reduction of the prices even when there exists involuntary unemployment (please see (9)) and the employment and the outputs do not change[2]. It does not rescue involuntary unemployment. In Proposition 2.1 of Otaki (2016), it is stated as follows: "Suppose that the nominal wage sags. Then, as far as its indirect effects on the aggregate demand are negligible, this only results in causing a proportionate reduction of the price level. In other words, a reduction of the nominal wage never rescues workers who are involuntarily unemployed."

There may exist *indirect effects* on the aggregate demand of a reduction of the nominal wage rate. If the prices of the goods fall, the real value of the consumption of the older generation may increase, then unemployment may be reduced. This effect is similar to the so-called real balance effect (or Pigou effect). However, if we

[1] These descriptions are like those in p.142 of Harvey (2016).

[2] By increasing returns to scale, if the employment and the output increase (decrease), the reduction rate of the prices is larger (smaller) than the reduction rate of the nominal wage rate.

consider a three-periods OLG model including a childhood period, a reduction of the nominal wage rate does not necessarily reduce unemployment, and may increase unemployment. Please see Section 3.

In the model of this section no mechanism determines the nominal wage rate. When the nominal value of $G + M$ increases, the nominal aggregate demand and supply increase. If the nominal wage rate rises (for example, by monetary or fiscal policy), the prices also rise. When the rate of an increase in the nominal wage rate is smaller than the rate of an increase in $G + M$, the real aggregate supply and the employment increase. Partition of the effects by an increase in $G + M$ into a rise in the nominal wage rate (and the prices) and an increase in the employment may be determined by bargaining between labor and firm.

2.6. Full-employment case

If $L = L_f$, full-employment is realized. Then, (12) is written as

$$L_f y(L_f) = \frac{1}{1-\alpha}(g + m). \tag{14}$$

Since L_f is constant, this is an identity not an equation. On the other hand, (12) is an equation not an identity. (14) should be written as

$$\frac{1}{1-\alpha}(g + m) \equiv L_f y(L_f).$$

From this we have

$$P^1 = \frac{1}{(1-\alpha)L_f y(L_f)}(G + M),$$

where

$$g = \frac{G}{P^1}, \qquad m = \frac{M}{P^1}.$$

Therefore, the price level P^1 is determined by $G + M$, which is the sum of nominal values of government expenditure and consumption of the older generation. Also the nominal wage rate is determined by

$$W = \left(1 - \frac{1}{\eta}\right)(1 + \zeta) y(L_f) P^1.$$

2.7. Steady state

Consider a steady state with $\rho = 1$. Let T be the tax revenue for the government expenditure, G, then (10) is written as

$$\alpha(P^1 L y(L) - T) + G + M = P^1 L y(L).$$

The savings of the consumers of the younger generation is

$$(1-\alpha)(P^1 L y(L) - T) = G - T + M.$$

Since at the steady state this is equal to M, which is the consumption of the older generation, we need $G = T$.Thus, we require the balanced budget for the steady state.

2.8. Money demand and supply at the steady state

The demand for money is the sum of
1. savings of the younger generation,
2. tax payment,

The supply of money is the sum of
1. consumption of the older generation,
2. government expenditure,

At the steady state where the price of the good is constant, we have

savings of the younger generation=consumption of the older generation,
tax payment=government expenditure.

Therefore, the demand for money is equal to the supply of money.

3.Three-periods overlapping generations (OLG) model

3.1. Analyses of involuntary unemployment

We add a childhood period (period 0) to a OLG model with two periods, younger period (period 1, working period) and older period (period 2, retired period). In a childhood period people consume the goods by borrowing money from their parents generation (the younger generation) and repay the debts in the next period. Savings of the younger generation may be insufficient for the consumption of the childhood generation. Thus, we assume that the childhood generation consumers can borrow student loan (or scholarship which needs to be paid back) from the government. They must repay the student loan in their period 1 (when they belong to the younger generation). Therefore, in period 1 the consumers of the younger generation have to save money for their consumptions in period 2 (when they belong to the older generation) and repay their debts and student loan. Since the consumers make their consumption plans at the beginning of period 1 (working period), their consumptions in the childhood period are constant. We consider the following utility function of a consumer who is employed

$$u(X^1, X^2, D) - \delta\beta,$$

where

$$D = \left\{ \int_0^1 \hat{c}(z)^{1-\frac{1}{\eta}} dz \right\}^{\frac{1}{1-\frac{1}{\eta}}}.$$

$\hat{c}(z)$ is consumption of good z in the childhood period. It is constant. Thus, D is constant.

If a consumer is not employed in his period 1, he can not repay his debt. Therefore, we assume that unemployed consumers receive unemployment benefits from the government. They are covered by taxes on employed consumers of the younger generation. Let R be the unemployment benefit, Θ be the tax for the

unemployment benefit. Then, the budget constraint for an employed consumer is

$$\int_0^1 p^1(z)c^1(z)dz + \int_0^1 p^2(z)c^2(z)dz = W - D - \Theta + \Pi.$$

$D + \Theta$ is the sum his own debt repayment and the tax for repayment of the debt of unemployed consumers. Since Θ satisfies

$$D(L_f - L) = L\Theta,$$

we have

$$D + \Theta = \frac{L_f D}{L}.$$

The value of the right-hand side of this equation is given for an employed consumer. The budget constraint of an unemployed consumer is

$$\int_0^1 p^1(z)c^1(z)dz + \int_0^1 p^2(z)c^2(z)dz = R - D + \Pi = \Pi.$$

R is not used for consumption of an unemployed consumer in period 1. If the government aids consumptions of unemployed consumers, it is another policy.

Analyses of consumptions in the younger generation and the older generation are similar to those in the previous case (two-periods OLG model). Let

$$\alpha = \frac{P^1X^1}{P^1X^1 + P^2X^2}.$$

Denote the savings of the older generation by M. Then, the effective demand is

$$Y = \alpha[(W - D - \Theta)L + L_f\Pi] + L_fD' + G + M. \quad (15)$$

D' is the consumption in the childhood period of consumers of the next generation. It is constant. The difference between the two-periods OLG model and the three-periods OLG model exists in the effective demand.

Profit maximization of firms implies

$$P^1 = \frac{W}{\left(1 - \frac{1}{\eta}\right)(1 + \zeta)y(L)}.$$

Using the above effective demand and this condition we can analyze involuntary unemployment. Let us compare (15) with the effective demand in a two-periods OLG model,

$$Y = \alpha(WL + L_f\Pi) + G + M.$$

The difference between them is

$$L_fD' - \alpha(D + \Theta)L.$$

In the case of three-periods OLG model (10), (11) and (12) are written as

$$P^1Ly(L) = \alpha P^1Ly(L) - \alpha(D + \Theta)L + L_fD' + G + M \quad (16)$$

$$= \alpha P^1Ly(L) - \alpha L_fD + L_fD' + G + M,$$

$$P^1 Ly(L) = \frac{L_f D' + G + M - \alpha L_f D}{1 - \alpha},$$

and

$$Ly(L) = \frac{L_f d' + g + m - \alpha L_f d}{1 - \alpha},$$

where

$$g = \frac{G}{P^1}, m = \frac{M}{P^1}, d' = \frac{D'}{P^1}, d = \frac{D}{P^1}.$$

If the value of L obtained from this equation is smaller than L_f, there exists involuntary unemployment.

3.2. Steady state

Consider a steady state with $\rho = 1$. Let T be the tax revenue for the government expenditure, G, then (16) is written as

$$\alpha(P^1 Ly(L) - T - L_f D) + L_f D' + G + M = P^1 Ly(L).$$

G does not include student loan. Since at the steady state where $\rho = 1$ we have $D = D'$, the savings of the consumers of the younger generation is

$$(1 - \alpha)(P^1 Ly(L) - T - L_f D) = G - T + L_f D' - L_f D + M = G - T + M.$$

this is equal to M, which is the consumption of the older generation, at the steady state, we need $G = T$.

3.3. Money demand and supply at the steady state

The demand for money is the sum of
1. savings of the younger generation,
2. tax payment,
3. repayment of student loan,
4. repayment of other debt.

The supply of money is the sum of
1. lending of the younger generation,
2. consumption of the older generation,
3. government expenditure,
4. supply of student loan

At the steady state where the price of the good is constant, we have

savings of the younger generation=consumption of the older generation,
repayment of debt other than student loan=lending of the younger generation,
repayment of student loan=supply of student loan,
tax payment=government expenditure.

Therefore, the demand for money is equal to the supply of money. The taxes for repayment of the debts of unemployed consumers are included in the

repayment of student loan and the repayment of debts other than student loan, not "the tax revenue".

3.4. On a reduction of the nominal wage rate

If the nominal wage rate reduces, the prices of the goods reduce. Without any special policy even if the prices of the goods reduce, we can consider that the real values of the government expenditure, g, and the consumption in the childhood period of the next generation, d', are maintained. On the other hand, the nominal values of the consumption of the older generation, M, the debt (including the student loan) of the younger generation, D, and the tax for repayment of the debt, Θ, are maintained even if the prices of the good reduce. Therefore, a reduction of the nominal wage rate increases or decreases the effective demand and employment whether

$$M - \alpha(D + \Theta)L = M - \alpha L_f D$$

is positive or negative. Thus, there may exist posive and negative real balance effects.

Since at the steady state

$$M = (1 - \alpha)(P^1 Ly - T - L_f D),$$

we obtain

$$M - \alpha L_f D = (1 - \alpha)(P^1 Ly - T) - L_f D. \tag{17}$$

Whether this is positive or negative is not clear. It depends on whether savings for the retirement stage is larger, or consumption in the childhood stage is large. In the former case (17) is likely to be positive, and in the latter case it is likely to be negative. The relation between L and L_f, that is, whether the situation is close to full employment or not, or L is large or not affects the sign of (17). In the former case it is likely to be positive, and in the latter case it is likely to be negative. Also if α, which is the marginal propensity to consume of the younger generation, is large, (17) is likely to be negative. Thus, a reduction of the nominal wage rate does not necessarily reduces involuntary unemployment. If the existence of involuntary unemployment induces a reduction of the nominal wage rate and $M - \alpha L_f D < 0$, involuntary unemployment increases and the state goes away from the full-employment state. The discussion in this section is from the different perspectives of the real balance effect for which the argument was fought by Pigou (1943) and Kalecki (1944).

4. Concluding Remarks

In this paper we have examined the existence of involuntary umemployment under indivisibility of labor supply using a monopolistic competition model with increasing returns to scale. Mainly, we have shown the following results.

1). We have derived involuntary unemployment from indivisibility of labor supply. We think that although the labor supply must not be infinitely divisible, it need not be infinitely indivisible.

2). We have shown that a fiscal multiplier by the government expenditure without tax is larger than one and the balanced budget multiplier is one.

How the so-called the first postulate (relation between the price and the marginal cost based on profit maximization) and the second postulate (relation between the real wage rate and labor supply) of classical economics by Keynes are treated in this paper? Since we determine the prices of the goods according to profit maximization behavior of firms, we accept the monopolistic competition version of the first postulate. Because consumers determine consumptions and labor supply (one or zero) to maximize their utility, we accept the second postulate for employed consumers. Unemployed consumers determine their consumptions given their unemployment situation. Thus, they also choose their optimal behaviors. However, their utility is apparently lower than that when they are employed. They want to be employed. Therefore, for unemployed consumers we do not accept the second postulate.

In a model of consumption and labor supply it is usually assumed that there exists only one consumer, or situations of all consumers are the same. Then, involuntary unemployment means that working hours of consumers are shorter than those they require. But, unemployment essentially means that a consumer is not employed by any firm. Therefore, unemployed consumers should be treated in distinction from employed consumers.

The limit of this paper is that there exists no capiital and investment of firms, and the good is produced by only by labor. The analysis of involuntary unemployment in the case where the good is produced by labor and capital is a theme of future research. In the future research we also want to consider the effects of fiscal policies in a state with involuntary unemployment.

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Appendix: Derivations of (5), (6), (7) and (8)

From (3) and (4)

$$\frac{\partial u}{\partial X^1}X^1\left(\int_0^1 c^1(z)^{1-\frac{1}{\eta}}dz\right)^{-1}\int_0^1 c^1(z)^{1-\frac{1}{\eta}}dz=\frac{\partial u}{\partial X^1}X^1=\lambda\int_0^1 p^1(z)c^1(z)dz,$$

$$\frac{\partial u}{\partial X^2}X^2\left(\int_0^1 c^2(z)^{1-\frac{1}{\eta}}dz\right)^{-1}\int_0^1 c^2(z)^{1-\frac{1}{\eta}}dz=\frac{\partial u}{\partial X^2}X^2=\lambda\int_0^1 p^2(z)c^2(z)dz.$$

Since $u(X^1,X^2)$ is homogeneous of degree one,

$$u(X^1,X^2)=\frac{\partial u}{\partial X^1}X^1+\frac{\partial u}{\partial X^2}X^2.$$

Thus, we obtain

$$\frac{\int_0^1 p^1(z)c^1(z)dz}{\int_0^1 p^2(z)c^2(z)dz}=\frac{\frac{\partial u}{\partial X^1}X^1}{\frac{\partial u}{\partial X^2}X^2},$$

and

$$u(X^1, X^2) = \lambda\left[\int_0^1 p^1(z)c^1(z)dz + \int_0^1 p^2(z)c^2(z)dz\right] = \lambda(\delta W + \Pi).$$

From (1) and (2), we have

$$\left(\frac{\partial u}{\partial X^1}\right)^{1-\eta}\left(\int_0^1 c^1(z)^{1-\frac{1}{\eta}}dz\right)^{-1} c^1(z)^{1-\frac{1}{\eta}} = \lambda^{1-\eta}p^1(z)^{1-\eta},$$

and

$$\left(\frac{\partial u}{\partial X^2}\right)^{1-\eta}\left(\int_0^1 c^2(z)^{1-\frac{1}{\eta}}dz\right)^{-1} c^2(z)^{1-\frac{1}{\eta}} = \lambda^{1-\eta}p^2(z)^{1-\eta}.$$

They mean

$$\left(\frac{\partial u}{\partial X^1}\right)^{1-\eta}\left(\int_0^1 c^1(z)^{1-\frac{1}{\eta}}dz\right)^{-1}\int_0^1 c^1(z)^{1-\frac{1}{\eta}}dz = \lambda^{1-\eta}\int_0^1 p^1(z)^{1-\eta}dz,$$

and

$$\left(\frac{\partial u}{\partial X^2}\right)^{1-\eta}\left(\int_0^1 c^2(z)^{1-\frac{1}{\eta}}dz\right)^{-1}\int_0^1 c^2(z)^{1-\frac{1}{\eta}}dz = \lambda^{1-\eta}\int_0^1 p^2(z)^{1-\eta}dz.$$

Then, we obtain

$$\frac{\partial u}{\partial X^1} = \lambda\left(\int_0^1 p^1(z)^{1-\eta}dz\right)^{\frac{1}{1-\eta}} = \lambda P^1,$$

and

$$\frac{\partial u}{\partial X^2} = \lambda\left(\int_0^1 p^2(z)^{1-\eta}dz\right)^{\frac{1}{1-\eta}} = \lambda P^2.$$

From them we get

$$u(X^1, X^2) = \lambda(P^1X^1 + P^2X^2),$$

$$\frac{P^2}{P^1} = \frac{\frac{\partial u}{\partial X^2}}{\frac{\partial u}{\partial X^1}}, \tag{6}$$

and

$$P^1X^1 + P^2X^2 = \delta W + \Pi. \tag{7}$$

Since $u(X^1, X^2)$ is homogeneous of degree one, λ is a function of P^1 and P^2, and $\frac{1}{\lambda}$ is homogeneous of degree one because proportional increases in P^1 and P^2 reduce X^1 and X^2 at the same rate given $\delta W + \Pi$. We obtain the following indirect utility function.

$$V = \frac{1}{\varphi(P^1, P^2)}(\delta W + \Pi) - \delta\beta. \tag{8}$$

$\varphi(P^1, P^2)$ is a function which is homogenous of degree one.

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MONEY SUPPLY, INFLATION AND ECONOMIC GROWTH: CO-INTEGRATION AND CAUSALITY ANALYSIS

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Abstract. The aim of this paper is to examine the relationship between money supply, inflation rate, and economic growth in the context of Algeria, using various econometric procedures as co-integration without and with structural breaks in addition to three different ways of causality test for the period 1970-2018, the results confirm the long-run relationship between the variables with more than three structural breaks, but with the absence of the effects of money supply and inflation rate on economic growth both in short run and long run terms, on the other hand, the causality results confirmed the existence of hidden causalities among the variables running from the cumulative components not from the natural series, and all the results support the Monetarist view of inflation though the absence of any effect of money supply on economic growth.

JEL classification: C22, E31, E51, F43;

Keywords: Money supply; Inflation; Co-integration; Hidden causality.

1. Introduction

Money supply and inflation rates are one of the most important key determinants of the economic growth, according to Phibian (2010) these two factors can be create employment opportunities and high GDP per capita which leads to poverty reduction (Phibian, 2010) and this what really needs in the Algerian context in last five years, for this reason, several studies have tried to examine the relationship between economic growth, money supply and inflation rate as Kaldor (1959), Moosa (1982), Bessler (1984), Balakrishanan (1991), Moser (1995), Levine (1997), Odedokun (1997), Lucas (2001), Teriba (2005) and many others, according to these studies we can distinguish between two different opinions, the Keynesian opinion which think that money does not matter against the Monetarist opinion which suggest that money does matter, back to Davidson and Weintraub (1973), the Monetarists believes that money supply leads to inflation by raising the general price level in a small manner, this what can stimulate the economy growth but with conditions, whereas, if this rise

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goes behind the limits this will affect negatively the economic growth (Davidson and Weintraub, 1973), on the other extreme, Ball and Romer (1990) showed that the Keynesians suggest that according to the demand in the economy the income can change due the money stock especially for the small flexibility of the prices, so, in their opinion the economy can be controlled by the demand (Ball and Romer, 1990).

On the other hand, Barro (1977, 1978), Mishkin (1982) and Frydman and Rappoport (1987) made a distinction between the expected and unexpected changes in the money supply, in other words, is there a symmetric effect from money supply to economic growth with same relationship between positive and negative changes and shocks with economic growth or there is an asymmetric relationship between the two variables with hidden co-integration and hidden causality.

The relatively fragile Algerian economy especially in last five years according to the deteriorate in oil prices since 2014 is due a high levels of inflation rates and weak monetary policy especially the money supply, but even so, the impact of money supply on the economic growth predominately the GDP per capita has received a very poor attention in the literature of Algerian economy, after the collapse of oil prices in 2014, the Algerian economy entered into a major crisis, for example, the total of government revenues has tumbled from 60 billion dollars in 2014 to 27.5 billion in 2016, and the foreign exchange reserves fell from 193 billion dollars in 2013 to 105 billion in 2017 and then to 50 billion in 2019, this what caused the current account deficit by 27 billion dollars in 2015, 21 billion in 2017 and 15 billion in 2018, and this what promoted the Algerian Central Bank to issue 6555 billion dinars equivalent to 544 million dollars to stimulate the economy and bridge the budget deficit in 2017 and 2018, all of this changes was reflected in the social life with the increase of unemployment rate from 9% in 2013 to 12% in 2017 and the poverty rates from 9.2% in 2013 to 11% in 2018 because the austerity policy that the government has pursued since 2016 by decreasing the government spending and the suspension of many investment projects in addition to the high tax rates.

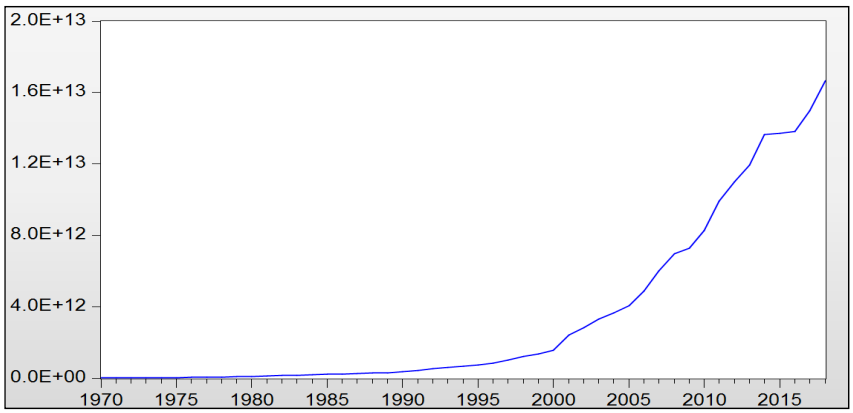

Fig. 1: Money supply in Algeria 1970-2018 in national currency

Source: Authors computation using World Bank databes 2019.

The paper makes a contribution to existing literature at first by filling the gap of scarcity and the absence of studies in the context of Algeria where there is no papers in this important relationship especially with modern econometric study, secondly, this paper tries to shed light on the asymmetric shocks (positive and negative shocks and variations) between the three variables unlike the previous studies where they carry out only on the symmetric shocks (the variation on the series), in addition, the paper aims to examine even the structural breaks and its effects in the long run relationship.

Testing the co-integration and causality relationships between money supply, inflation rate and economic growth in the context of Algeria for the period 1970-2018 is the subject of this paper, using various econometric procedures as co-integration with structural breaks based on Gregory Hansen, Hatemi-J and Maki tests, in addition to three different tests of causality (symmetric causality using Hacker Hatemi-J (2010) test, asymmetric causality using Hatemi-J test (2012) and non-linear causality using Dicks Panchenko (2006) test).

This paper is organized as follows, section one is for the introduction where the problematic was raised and the objectives were clarified, section two throws light at the relevant literature, section three describes the data set and explains the econometric tests, section four presents the empirical results and section five concludes the paper with policy recommendations.

2. Literature review

Over the last decades, the studies that care out of the relationship between the money supply, inflation rate and economic growth especially in developing countries under the Monetarists and Keynesians conflict have been very widespread, back to 1963, Friedman suggested that the money supply led to high inflation but just in the long run term nor the short run term this what stimulates the economic growth in the long run term, and this what was confirmed by MeCandless and Weber (1995) where they examined the correlations between the two variables, and the correlation coefficient was between 0.92 and 0.96, the same results was obtained by Tobin (1970), Barro (1978) and many others, on the other hand, Kormendi and Meguire (1984) found the opposite, where they though that there is no evidence of this relationship not just in short run term but also in the long run term, this what makes an important to Cover's study (1992) who distinguish between the positive and negative fluctuations of money supply and he found that only the positive changes can impact the output but by a very small manner, Hussain and Bilquees (1991) found a unidirectional causal relationship running from monetary base to GNP and a bidirectional causality running from money supply and GNP.

Table 1: Some studies for the relationship between money supply, Inflation and Growth

Study	Period and sample	Methodology	Results
Tabi and Ondoa (2011)	Cameroun 1960-2007	VAR model	Increase in money supply increases growth.
Indalmanie (2011)	Jamaica 1961-2006	Causality analysis	Bidirectional causal relationship between money and growth.

Study	Period and sample	Methodology	Results
Ahmed and Suliman (2011)	Sudan 1960-2005	Granger causality analysis	Unidirectional causal relationship running from growth to money and inflation.
Sulku (2011)	Turkey 1987:Q3-2006:Q3	Fisher and Seater (1993) ARIMA framework	The long-run money neutrality hypothesis holds in Turkey.
Al-Fawwaz and Al-Sawai'e (2012)	Jordan 1976-2009	Johansen co-integration analysis	No relationship between money and growth neither in short-run nor long run terms.
Muhammadpour et al. (2012)	Malaysia 1991-2011	Co-integration and VEC Model	Long-run influence from M1, M2 and M3 (money supply) to growth.
Wang (2012)	China 1998-2007	Co-integration and causality analysis	No relationship between the variables in the long-run term.
Paun and Topan (2013)	Romania 1st January 1997-31 December 2010	VAR Model	Unidirectional causality from money to inflation.
Sturgill (2014)	OECD countries 1979-1997	Panel data analysis	Causal relationship running from money to growth.
Nguyen (2015)	9 Asian countries 1985-2012	Pooled Men Group and GMM estimations	Positive impact from money to inflation.
Gatawa et al. (2017)	Nigeria 1973-2013	VAR model and Granger causality	No causal relationship from money and inflation to growth.
Hussain and Haque (2017)	Bangladesh 1972-2014	Co-integration and VEC Model	Monetarist view with important effect from money to growth in the long-run term.
Korkmaz (2017)	Mediterranean countries 2008-2014	Panel co-integration analysis	No causal relationship from money and inflation to growth.
Dingela and Kobai (2017)	South Africa 1980-2016	ARDL Model	Statistically positive relationship between money and growth in both short-run and long run.
Mansoor et al. (2018)	Pakistan 1980-2016	ARDL Model	Monetarist view.
Sang (2019)	Vietnam 2009-2018	VAR Model	Positive impact at a high significant level on growth by money supply.
Solina (2019)	Philippines 1986-2017	Johansen co-integration analysis	Significant relationship between money supply, inflation rate and economic output (GDP)

Study	Period and sample	Methodology	Results
Sean (2019)	Cambodia October 2009- April 2018	Bayesian VAR model	Money supply induces 0.13% to inflation.
Abdullah et al. (2020)	Kuwait 1979-2015	Multiple linear regression analysis	Changes in GDP is responsible for changes in CPI.
Obaid et al. (2020)	6 Asian countries 1993-2017	Panel data analysis	Money supply Granger cause inflation rate.

It's clear from the table above the absence of studies in the case of Algeria and Arabic countries, so in this paper, we shall try to fill this gap using various econometric methods and techniques, on the other extreme, one of the most important results from the literature review is the asymmetric relationship between the three variables (money supply, inflation rate and economic growth) for this reason we use in this paper the asymmetric causality analysis to distinguish between the positive and negative fluctuations and shocks to get more accurate results for the causality named the hidden causality, in addition to the using of the modern co-integration analysis in the presence of structural breaks to avoid any spurious results according the structural changes.

3. Data and Methodology

Back to Westerlund and Edgerton (2006) the existence of structural breaks in non-stationary series can provide biased results using the conventional co-integration tests as Engle-Granger test, Johansen test or Bound test under ARDL model (Shaeri, 2018, p.689), for this reason and to avoid the spurious regression we use different tests of co-integration with regime shifts as follows.

3.1. Gregory-Hansen (1996) test

The Gregory Hansen (1996) procedure can solve this issue (biased results) by accounting for structural breaks in the co-integration equation as follows (Gregory and Hansen, 1996):

1. The level shift model (C):

$$y_t = \mu_0 + \mu_1 \varphi_{t,\tau} + \mu_2 x_t + \varepsilon_t \quad (01)$$

Where $\varphi_{t,\tau}$ is a dummy variable such that $\varphi_{t,\tau}$ = 1 if t >nτ or 0 if r⩽nτ, and $\tau \in (0,1)$ denotes the relative timing of the break point, the effect of the regime shift in this case in on the intercept μ_0 (before the break) and μ_1 is the change in intercept (at the break time).

2. The level shift with trend model (C/T):
   In this model the break still on the intercept but with the existence of a trend (t) in the series

$$y_t = \mu_0 + \mu_1 \varphi_{t,\tau} + \mu_2 t + \mu_3 x_t + \varepsilon_t \quad (02)$$

3. Regime shift with changes in the intercept and the slope (C/S):
   For this model the structural break is on both intercept and slope coefficient where μ2 is the co-integration slope coefficient before the break where μ3 is the coefficient of co-integration slope at the time of the break.

$$y_t = \mu_0 + \mu_1\varphi_{t,\tau} + \mu_2 x_t + \mu_3 x_t\varphi_{t,\tau} + \varepsilon_t \quad (03)$$

4. Regime shift with changes in intercept, slope and trend (C/S/T):
   In this case the structural break affects all the components (intercept, slope and the trend).

$$y_t = \mu_0 + \mu_1\varphi_{t,\tau} + \mu_2 t + \mu_3 t\varphi_{t,\tau} + \mu_4 x_t + \mu_5 x_t\varphi_{t,\tau} + \varepsilon_t \quad (04)$$

   And for each equation, we perform the unit roots tests on the residuals series using three tests ADF, Z_α and Z_t.

3.2. Hatemi-J (2008) test

As pointed by Hatemi-J (2008) the traditional co-integration tests are based on the assumption that the co-integrating vector remained the same during the period of study (Hatemi, 2008), but the presence of economic crises, technological shocks, policy and regime changes can cause big changes in this co-integrating vectors in the long run term, for this reason Hatemi (2008) propose the following procedure based on Gregory-Hansen (1996) test to examine the co-integration relationship in the presence of two different structural breaks:

To account for the effect of two structural breaks on the intercept and the slopes, we have the following equation:

$$y_t = \alpha_0 + \alpha_1 D_{1t} + \alpha_2 D_{2t} + \beta_0' x_t + \beta_1' D_{1t} x_t + \beta_2' D_{2t} x_t + \mu_t \quad (05)$$

Where D_{1t} and D_{2t} are dummy variables defined as:

$$D_{1t} = \begin{cases} 0 & if\ t \le [n\tau_1] \\ 1 & if\ t > [n\tau_1] \end{cases}$$

And

$$D_{2t} = \begin{cases} 0 & if\ t \le [n\tau_2] \\ 1 & if\ t > [n\tau_2] \end{cases}$$

With the unknown parameter $\tau_1 \in (0,1)$ and $\tau_2 \in (0,1)$ signifying the relative timing of the regime change point and the bracket denotes the integer part.

3.3. Maki (2012) test

When the number of breaks are more than three, the tests of Gregory Hansen (1996) and Hatemi-J (2008) would perform poorly (Maki, 2012), for this reason, Maki suggested four equations to test the co-integration relationship under maximum of five structural breaks as follows:

$$y_t = \mu + \sum_{i=1}^{k} \mu_i D_{i,t} + \beta' x_t + \varepsilon_t \quad (06)$$

$$y_t = \mu + \sum_{i=1}^{k} \mu_i D_{i,t} + \beta' x_t + \sum_{i=1}^{k} \beta_i' x_t D_{i,t} + \varepsilon_t \quad (07)$$

$$y_t = \mu + \sum_{i=1}^{k} \mu_i D_{i,t} + \gamma_t + \beta' x_t + \sum_{i=1}^{k} \beta_i' x_t D_{i,t} + \varepsilon_t \quad (08)$$

$$y_t = \mu + \sum_{i=1}^{k} \mu_i D_{i,t} + \gamma_t + \sum_{i=1}^{k} \gamma_t t D_{i,t} + \beta' x_t + \sum_{i=1}^{k} \beta_i' x_t D_{i,t} + \varepsilon_t \quad (09)$$

Where equation (06) is the model with level shifts, eq. (07) called the regime shifts model, eq. (08) is model (07) with a trend and eq. (09) constitutes structural breaks of levels, trends and regressors; $D_{1,t}$ takes a value 1 if $t>T_{B1}$ (i=1,…,k) and 0 otherwise, where k is the maximum number of breaks and T_{B1} denotes the time period of the break.

3.4. Asymmetric causality (Hatemi-J (2012) test)

The term causality is one of the most important terms in economics and econometrics with the co-integration concept, the first appearances of the causality term was in 1969 according to Cleve Granger work, in simple words, a causal relationship running from variable X to other variable Y means that we can use the actual values of variable X to predict the futures values of the variable Y, there is a massive literature since Granger (1969) on causality analysis like Sims (1972) and Geweke (1983) and many others both in time domain analysis or frequency domain analysis like Breitung-Caldelon (2006) procedure, but the problem with this traditional causality tests as said by Hatemi-J (2011) is the assumption that the impact of positive shock is the same as the impact of a negative shock with no separation between them under the symmetric causality, and this might be a too restrictive assumption because in many cases there is no symmetric relationship between the variables like the response of people to the positive and negative shocks in the financial markets, Granger and Yoon (2002) tried to transform the variables into cumulative positive and negative changes to test co-integration relationship which named the hidden co-integration, and this what open the door to the hidden causality between the variables and the cumulative positive and negative changes under the hidden causality (Granger and Yoon, 2002).

Assuming that we are tried to test the causal relationship between two integrated variables Y and X defined as the following random walk processes:

$$y_t = y_{t-1} + \varepsilon_{1t} = y_0 + \sum_{i=1}^{t} \varepsilon_{1t} \quad (10)$$

$$x_t = x_{t-1} + \varepsilon_{2t} = x_0 + \sum_{i=1}^{t} \varepsilon_{2t} \quad (11)$$

Where y_0 and x_0 are the initial values, and the variables ε_{1t} and ε_{2t} signify white noise disturbance terms, and the cumulative positive and negative components (shocks) are defined as $\varepsilon_{1t}^{+} = max\ (\varepsilon_{1t}, 0)$ and $\varepsilon_{2t}^{+} = max(\varepsilon_{2t}, 0)$ for positives shocks or $\varepsilon_{1t}^{-} = min(\varepsilon_{1t}, 0)$ and $\varepsilon_{1t}^{+} = min(\varepsilon_{1t}, 0)$ for negative shocks, therefore $\varepsilon_{1t} = \varepsilon_{1t}^{+} + \varepsilon_{1t}^{-}$ and $\varepsilon_{2t} = \varepsilon_{2t}^{+} + \varepsilon_{2t}^{-}$, therefore the random walk processes will be as follows:

$$y_t = y_{t-1} + \varepsilon_{1t} = y_0 + \sum_{i=1}^{t} \varepsilon_{1t}^{+} + \sum_{i=1}^{t} \varepsilon_{1t}^{-} \quad (12)$$

$$x_t = x_{t-1} + \varepsilon_{2t} = x_0 + \sum_{i=1}^{t} \varepsilon_{2t}^{+} + \sum_{i=1}^{t} \varepsilon_{2t}^{-} \quad (13)$$

And we can write the positive and negative shocks of each variable as $y_t^+ = \sum_{i=1}^{t} \varepsilon_{1t}^+$ and $y_t^- = \sum_{i=1}^{t} \varepsilon_{1t}^-$ for Y variable and $x_t^+ = \sum_{i=1}^{t} \varepsilon_{2t}^+$ and $x_t^- = \sum_{i=1}^{t} \varepsilon_{2t}^-$ for X variable, and then process is ready to test the causal relationship between these components under VAR model or any other form of its transformations.

The series employed in this study are annual observations covering the period 1970-2018 of Gross Domestic Product per capita (GDP per capita) as a proxy of economic growth, the Broad money supply (M2) as a proxy for money supply and the consumer price index (CPI) as a proxy of inflation rate, and all the variables were derived from the World Bank's database September 2019.

4. Results of studys

4.1. Unit root tests

As usual the first step in time series analysis is the unit root test to get the order of integration for each variable, for this purpose, we use the modern test of NG-Perron (2001) without structural breaks to test the stationary processes of the series, in addition to both Zivot-Andrews (1992) to test the possibility of the existence of one structural break in the series and Lumsdaine-Papell (2003) test to examine the existence of two structural breaks to avoid any spurious regression according the co-integration relationship or the structural changes, and it's clear from the results inspired from table 2 that all the variables are I(1) variables which means that they are not stationary at their levels but stationary at the first differences for GN-Perron test, and by passing to unit root tests with structural breaks we assume that in 5% significance level all the variables doesn't have any structural breaks for both the two tests.

Table 2: Unit root tests results

Variables	NG-Perron test				
	MZa	MZt	MSB	MPT	
GDP	-4.898	-1.560	0.318	18.580	
M2	-4.938	-1.525	0.308	18.209	
CPI	-8.339	-2.036	0.244	10.945	
D(GDP)	-23.308***	-3.410	0.146	3.931	
D(M2)	-22.836***	-3.375	0.147	4.012	
D(CPI)	-23.213***	-3.403	0.146	3.946	
	Zivot-Andrewe test				
	t-statistic	Break	1% c-value	5%c-value	10%c-value
GDP	-2.610	1988	-5.57	-5.08	-4.82
M2	-4.521	1990	-5.57	-5.08	-4.82
CPI	-4.624	1996	-5.57	-5.08	-4.82

	Lumsdaine-Papell test					
	t-statistic	1st break	2nd break	1% c-v	5% c-v	10% c-v
GDP	-3.118	1991	2010	-7.190	-6.750	-6.840
M2	-6.261	1987	1995	-7.190	-6.750	-6.840
CPI	-5.604	1977	1996	-7.190	-6.750	-6.840
*** denotes the significance at 1%, 5% and 10% significance level; D denotes the first differences.						

Source: Our data processing in Eviews 10, Stata 16 and Rats 9.2 programs.

4.2. Co-integration tests results

After determining all variables are I(1) series, we shall continue with the co-integration analysis to detect the long run relationship between the three variables with two different types of co-integration test, Johansen-Juselius (1994) test without structural breaks and three co-integration tests with structural breaks (Gregory-Hansen (1996) test for one structural break , Hatemi-J (2008) test for two structural breaks and Maki (2012) test for more than two structural breaks), and the results are reported in table 3 and 4.

Table 3: Johansen co-integration test results

Johansen and Juselius (1994) test results (trace test)				
Hypothesized No. of CE(s)		Trace test	Critical value 5%	Probability
r = 0	r = 1	28.675	29.797	0.066
r ≤ 1	r = 2	11.286	15.494	0.194
r ≤ 2	r = 3	1.937	3.841	0.163
Johansen and Juselius (1994) test results (max-eigenvalue test)				
r = 0	r = 1	17.388	21.131	0.154
r ≤ 1	r = 2	9.348	14.264	0.258
r ≤ 2	r = 3	1.937	3.841	0.163

Source: Our data processing in Eviews 10 program.

The results from the table above clarified that the null hypothesis of no co-integration relationship cannot be rejected in 5% significance level for the two tests (trace test and max-eigenvalue test), whereas, there is no evidence of any co-integrating vector between the series which means there is no long run relationship between the three variables, this result corresponds to the results of Al-Fawwaz and Al-Sawaoi'e (2012) in Jordan, but is only relevant with the co-integration test without structural breaks, and to avoid any spurious results we must deal with the co-integration tests with structural breaks.

The next step in this study is to test the co-integration relationship with structural breaks to avoid any spurious results from co-integration test without structural breaks, Gregory-Hansen with its four equations and Hatemi-J in addition to Maki test are employed to deal with 1 to 5 structural breaks, and the results are reported in table 4.

Table 4: Co-integration with structural breaks tests results

Gregory-Hansen test					
Equations	Tests	t-statistic	Break	1% c-value	5% c-value
Equation (C)	ADF	-3.93	1992	-5.44	-4.92
	Zt	-3.94	1994	-5.44	-4.92
	Za	-22.91	1994	-57.01	-46.98
Equation (C/T)	ADF	-3.79	2005	-5.80	-5.29
	Zt	-3.67	2005	-5.80	-5.29
	Za	-21.40	2005	-64.77	-48.94
Equation (C/S)	ADF	-2.80	2005	-5.97	-5.50
	Zt	-3.85	1996	-5.97	-5.50
	Za	-22.52	1966	-68.21	-58.33
Equation (C/S/T)	ADF	-4.16	2010	-6.45	-5.72
	Zt	-4.32	2005	-6.45	-5.72
	Za	-24.04	2005	-79.65	-63.10
Hatemi-J test					
Tests	t-statistic	1st break	2nd break	1% c-value	5% c-value
Modified ADF	-10.692**	1978	2004	-6.928	-6.458
Modified Zt	-10.638**	1978	2004	-6.928	-6.458
Modified Za	-70.952	1978	2005	-99.458	-83.644
Maki test					
N of breaks	Equations	t-statistic	Breaks		5% c-value
3 breaks	Equation 6	-10.3**	1982-1992-2002		-5.392
	Equation 7	-9.36**	1984-2002-2007		-5.961
	Equation 8	-9.61**	1976-1991-1997		-6.516
	Equation 9	-9.58**	1991-1997-2008		-7.145
4breaks	Equation 6	-10.3**	1982-1992-2000-2012		-5.550
	Equation 7	-9.36**	1994-2002-2007-2013		-5.831
	Equation 8	-9.61**	1976-1984-1991-1997		-6.872
	Equation 9	-9.58**	1991-1997-2008-2014		-7.636
5 breaks	Equation 6	-10.3**	1976-1982-1992-2000-2012		-5.760
	Equation 7	-9.36**	1988-1994-2002-2007-2013		-5.993
	Equation 8	-9.61**	1976-1984-1991-1997-2014		-7.288
	Equation 9	-9.58**	1991-1997-2003-2008-2014		-8.129
** denote the significance at 1 and 5% significance level.					

Source: Our data processing in Stata 16 and Gauss 16 programs.

The results obtained from the table shows that there is no co-integration relationship between the variables with one structural break under Gregory-Hansen test for the three tests and four all the equations at 10% significance level, but in Hatemi-J test with two structural breaks, two of the three tests accept the null hypotheses in 5% significance level which means the existence the long run

relationship between the variables with two structural breaks, and the same result is obtained from Maki test in all the equations and for 3, 4 and 5 structural breaks, subsequently, we conclude that there is a long run relationship among money supply, inflation rate and economic growth in Algeria over the period 1970-2018 with at least two structural breaks.

4.3. Short run estimation results

As declared by Engle and Granger (1987) the best solution to estimate the short run effects in case of co-integrated variables is the Error Correction Model (ECM), according to the results in table 5, the estimated coefficient of error term (ECT) is negative and significant at 5% significance level (-0.49), therefore, the results states that the ECM corrects its previous period's level of disequilibrium by 49% each year (after two years the model back to its equilibrium stat after any shock), according the parameters of both inflation and money supply in the ECM, it's clear that there is no effect from both the variables on economic growth in 5% significance level, this result confirm the previous studies which suggests that there is no relationship between the three variables in the short run terms.

Table 5: Short run estimation results

Parameters	Coefficients	Student statistic	Probability
ECT	-0.491**	-4.690	0.000
D(GDP)	0.068	0.436	0.850
D(M2)	4.673	0.354	0.872
D(CPI)	-1.857	-0.173	0.932
Constant	79.532	1.297	0.625
** denote significance at 1% and 5% levels; D denote the first difference; ECT denote the error correction term.			

Source: Our data processing in Eviews 10 program.

4.4. Long run estimation results

After the short run estimation, we analyses the co-integration estimators to get the long run coefficients using the Fully Modified Ordinary Least Squares estimation (FMOLS), according to Maki co-integration test, we estimate two models with five structural breaks, the regime shift with trend model and the level shift with trend model.

Table 6: Long run estimation results (the regime shift with trend model)

Parameters	Coefficients	Student statistic	Probability
M2	6.499	0.597	0.554
CPI	15.866	0.860	0.396
D1	-2813.264	-1.965	0.058
D2	1406.914	1.336	0.191
D3	-7579.158*	-2.131	0.041
D4	14552.44**	3.378	0.002

Parameters	Coefficients	Student statistic	Probability
D5	-2804.620	-0.316	0.754
CPI*D1	-31.158	-0.994	0.328
CPI*D2	41.226	0.621	0.538
CPI*D3	-689.960**	-2.827	0.008
CPI*D4	685.557**	2.785	0.009
CPI*D5	-538.369**	-4.364	0.000
M2*D1	39.149	1.740	0.092
M2*D2	-58.446*	-2.661	0.012
M2*D3	177.960*	2.524	0.017
M2*D4	-247.533**	-3.177	0.003
M2*D5	61.604	0.549	0.587
Constant	-152.302	-0.238	0.812
Trend	126.598**	6.759	0.000
** denote significance at 1% and 5% levels. D_i denotes the dummy variables for each structural break.			

Source: Our data processing in Eviews 10 program.

Table 7: Long run estimation results (the level shift with trend model)

Parameters	Coefficients	Student statistic	Probability
M2	6.499	0.597	0.554
CPI	15.866	0.860	0.396
D1	-2813.264	-1.965	0.058
D2	1406.914	1.336	0.191
D3	-7579.158*	-2.131	0.041
D4	14552.44**	3.378	0.002
D5	-2804.620	-0.316	0.754
Constant	-152.302	-0.238	0.812
Trend	126.598**	6.759	0.000
** denote significance at 1% and 5% levels. D_i denotes the dummy variables for each structural break.			

Source: Our data processing in Eviews 10 program.

According to both of the two models, the effect of money supply and inflation rate on economic growth still insignificant at 5% significance level, which means that there is no long run effect from money supply and inflation rate on economic growth, and all the efforts from the Algerian Bank is still very limited to impulse the economic growth, especially the latest unconventional financing in 2015 and 2016 from the insignificant dummy variable M2*D5, this results confirm the Komendi and Meguire (1984) results as is the Keynesian view.

4.5. Causality analysis results

The last step in this study is the test of causal relationship between the three variables, and as mentioned before we use three different tests, the Hacker-

Hatemi-J (2010) test for symmetric linear causality, Dicks Panchenko (2006) test for symmetric non-linear causality and the asymmetric causality proposed by Hatemi-J (2012), and the results are reported in table 8.

Table 8: Causality analysis results

Direction of causality	Statistic	Critical values with 10000 repetitions		
		1%	5%	10%
Symmetric linear causality				
M2 to GDP	0.426	10.466	6.456	4.975
CPI to GDP	1.850	12.651	7.167	5.282
GDP to M2	2.529	10.200	6.390	4.917
GDP to CPI	0.924	12.872	7.109	5.126
CPI to M2	0.386	11.122	6.804	5.031
M2 to CPI	1.358	10.559	6.555	4.937
Symmetric non-linear causality				
Direction of causality	t-statistic		P-value	
M2 to GDP	0.759		0.223	
CPI to GDP	1.109		0.133	
GDP to M2	1.102		0.135	
GDP to CPI	1.367		0.085	
CPI to M2	0.660		0.254	
M2 to CPI	0.675		0.249	
Asymmetric causality (Hidden causality)				
GDP^{+} to M2	0.349	9.109	4.551	3.150
GDP^{-} to M2	6.838	12.546	7.337	5.389
INF^{+} to M2	2.951	9.896	6.408	4.878
INF^{-} to M2	1610.918***	9.809	6.318	4.868
$M2^{+}$ to GDP	0.501	10.719	6.497	4.977
$M2^{-}$ to GDP	16672.017***	10.247	6.427	4.824
INF^{+} to GDP	9.984	9.410	6.182	4.856
INF^{-} to GDP	729369.596***	10.029	6.369	4.804
GDP^{+} to INF	40.371***	15.657	7.267	4.809
GDP^{-} to INF	42.781***	15.319	7.015	4.776
$M2^{+}$ to INF	59.161***	10.481	6.464	4.863
$M2^{-}$ to INF	64.658***	10.419	6.220	4.711
*** denote significance at 1%, 5% and 10% levels.				

Source: Our data processing in Gauss 16 and Panchenko for non-linear causality programs.

Based on table 8, the null hypothesis in both linear and non-linear causalities is that the first variable do not Granger-cause the second variable cannot be rejected at any critical values, this implies there is no symmetrical causality (linear nor non-linear) between the original series of the three variables, this result is the same of Getawa et al (2017) and Korkmaz (2017) studies with no causal relationship between the three variables, especially when we know that the first study was on a similar economy for the Algerian economy (the Nigerian

economy both are oil exporter countries), and the second study focused on the Mediterranean countries where Algeria is one of theme, on the other hand, there is a hidden causalities (asymmetric causalities) running from negative shocks of Money supply to growth and inflation rate, negative shocks of inflation to money supply and economic growth and from both negative and positive shocks of growth to inflation rate, these results confirm the Cover (1992) who distinguish between the positive and negative shocks, according to these results, the money supply in Algeria have a hidden causality running from just its negative shocks to economic growth which means that the Algerian economy doesn't react to the rising in the money supply as the decreasing of it according to the inflation rate which react to both positive and negative changes in money supply.

5. Conclusion

This study analyze the co-integration and causal relationships between money supply, inflation rate and economic growth in Algeria by using data covering the period 1970-2018, the investigation of the three variables for the long-run relationship is determined by both the co-integration without structural breaks (Johansen-Juselius (1994) test) and the co-integration with structural breaks (Gregory-Hansen (1996) test, Hatmi-J (2008) test and Maki (2012) test), and the causal relationships are obtained from Hacker-Hatemi-J (2010) test and Dicks-Panchenko (2006) for the symmetric causality both linear and non-linear respectively, in addition to the Hatemi-J (2012) procedure for the asymmetric causality following the Cover (1994) work to distinguish between the positive and negative shocks in order to detect the hidden causality, the co-integration approach confirmed the absence of co-integration relationship in the absence of structural breaks in contrast of the presence of the breaks when we found a strong evidence of co-integration relationship especially with more than 3 breaks, which means the existence of long-run relationship between the variables when the economic growth served as the dependent variable, on the same extreme, both the short run and long run estimations revealed a non-effect from the money supply and inflation rate on economic growth, on the other hand, the causality results confirmed the previous results, whereas, there is no evidence of symmetric causal relationship between all the variables neither linear relationship nor non-linear, this result under Cover (1994) believe doesn't mean the total absence of the causalities, but there is a possibility of the existence of hidden causalities running from only the cumulative components not the naturel series, this what was confirmed by Hatemi-J (2012) test, when we had causal relationships running from negative shocks of money supply to economic growth and from both negative and positive shocks of money supply to inflation rate in addition to both positive and negative shocks of economic growth to inflation rate.

Our results confirmed the Monetarist view of inflation because the hidden causalities running from both money supply and economic growth to inflation rate, this what consist the applying of the Taylor rule in Algerian economy to allow the money supply to increase the economic growth especially the positive changes which still very limited to impulse the outputs, but with a steady rate to avoid any shocks from inflation rates, in addition to this, the monetary policy based on money

supply must be pursued if the economy is to produce tradable goods to eliminate the inflation shocks, and this may occurred by encourage the investments both domestic and FDI, since in an inflationary environment the money supply can increase when the nominal expenditures increases, and based in our results, it's clear that the inflation rates must be accommodated by the expansion in the money supply, and this is necessary with the non-effect of money supply in economic growth neither in short run nor long run terms.

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ATTITUDES, KNOWLEDGE, AND PRACTICES OF CUSTOMS ADMINISTRATORS ON TRADE FACILITATION

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Abstract. In light of renewed interests to boost African trade through continental integration, the authors identified trade facilitation as an integral component of complimenting the integration processes. This is especially relevant in the southern region where the majority of borders are characterised by complex and duplicated processes due to the lack of 'one-stop border posts'. This study explores the attitudes, knowledge and practices of customs administrators on trade facilitation in Zimbabwe. Based on questionnaires, face-to-face interviews, and secondary data collected from the Zimbabwe Revenue Authority (ZIMRA), the results indicated that 'trade facilitation' was not included in strategic policies of ZIMRA. In terms of risk factors, low staff remuneration was identified as the major issue. Many cross-border authorities at the border (overstaffed) and outdated infrastructure were major constraints in the flow of cargo and people. The study recommends that ZIMRA should provide training on the 'single window system' in order to improve on coordinated border management. Secondly, ZIMRA should review staff remuneration frequently and synchronise it with regional standards. Thirdly, there should be alignment and coordination of the trade-related issues within various government ministries. Fourthly, customs authorities should establish stand-alone trade facilitation units at ports of entry.

JEL classification: F13, F15, F23, F42;

Keywords: trade facilitation; economic integration; customs logistics; AfCFTA; Zimbabwe Revenue Authority (ZIMRA)

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1. Introduction

The renewed interests in reviving intra-African trade, which have manifested in the recently signed African Continental Free Trade Area (AfCFTA) agreement, require the minimisation of delays at border control points of African countries (Pasara and Dunga, 2019). Delays at border control points have been the bane of the efficient movement of goods in sub-Saharan African countries, with Zimbabwe being no exception to this rule. The delays have been attributed to bureaucracy on the part of customs officials as well as inadequate infrastructure and technical challenges at these ports of entry and exit. However, even when major upgrades are completed to the IT systems, the delays persist (Tavengerwei, 2018). Developing border control points in order to improve the flow of cargo and people is often a costly exercise. For example, upgrading and modernising of the Beitbridge border into a one-stop border post will cost Zimbabwe approximately $241 million. The Zimbabwe government asserts that the project to transform the Beitbridge border post is part of the North-South Corridor and it has been prioritised in the SADC Programme for Infrastructure Development of Africa (PIDA) Acceleration Programme for Regional Corridor Development (Muleya, 2018). Other means that have prescribed to improve trade facilitation are the adoption of the one-stop border post (OSBP) system and the adoption of the 'single window system'. Single windows have the advantage that they allow traders to electronically interface, submit or distribute their customs documents (such as permits, invoices, declarations and certificates of origin) in an accelerated manner (Morini *et al*., 2017).

Globally, there have been emerging trends to customs administration in international supply chains (Dan and Carlotta, 2019). In 2005, the Framework of Standards to Secure and Facilitate Global Trade (SAFE) was adopted by World Customs Organisation members. The major objectives of the SAFE framework are to prevent situations such as terrorism and human trafficking, safeguard revenue collection as well as to promote trade facilitation. With the framework came a modern approach to the end-to-end supply chain management of goods moving across borders. This framework was updated again in 2018 and important additions were on Authorized Economic Operators (AEO), Coordinated Border Management, Trade Continuity and Resumption, Customs to Other Government and Inter-Government Agencies, and Pre-loading Advance Cargo Information (ACI) for air cargo (World Customs Organisation, 2018).

As supply chains become more and more globalised due to renewed interests in economic integration, they rely more and more on effective trade facilitation practices by customs administrations (Stank *et al.,* 2012; Tavengerwei, 2018; Zhu *et al*., 2018)). The 2018 Logistics Performance Index (LPI) by the World Bank indicated that Zimbabwe's overall ranking was 152 out of 160 countries. South Africa has an LPI ranking of 33, Cote d'Ivoire 50, Rwanda 57 and Malawi and Zambia are at 97 and 111, respectively. Zimbabwe's ranking in customs efficiency was 146 out of 160 countries. The LPI is a benchmarking tool that measures the national performance of 160 countries in the area of trade logistics. In order to provide a single aggregate measure of performance in logistics, the LPI is a survey including logistics operators to determine the logistics 'friendliness' of a country. Other components include efficiency of customs border and clearance; the quality of trade and transport infrastructure; the ease of arranging competitively priced

shipments; the competence and quality of logistics services; the ability to track and trace consignments; and the frequency within which shipments reach consignees within scheduled or expected times (World Bank, 2018). The efficiency of customs or the lack thereof has an impact on logistics performance.

Zimbabwe and Zambia were the first countries in Africa to implement the OSBP. There have been several proposals that the OSPB at, for example, Chirundu border between Zimbabwe and Zambia should be implemented at other borders, although its benefits to trade facilitation have been mainly anecdotal as road transporters and passengers still complain of delays in movement at that border. In fact, according to Tavengerwei (2018), major border posts in Africa's busiest corridors face congestion troubles regardless of whether they are a one-stop border post or a conventional border post. Nevertheless, the governments of South Africa and Zimbabwe have a framework agreement to convert Beitbridge border into a one-stop border post because of the perennial challenge of congestion that is experienced at that border post (Mafurutu, 2015). The borders have become a bottleneck and stumbling block for the efficient movement of goods and people. The delays significantly increase supply chain costs or disrupt the supply chains altogether (International Trade Centre, 2018). The goal of any logistics system is to ensure the right product reaches the right customer at the right price, time and place in the right quantity and condition (Jonsson and Holmström, 2016). While outlining the theory of constraints, Goldratt and Cox (2004) contend that in order to achieve a goal, bottlenecks should be identified because a problem anywhere in the supply chain is ultimately a problem for the entire supply chain.

The task of managing Zimbabwe's ports of entry is the responsibility of the Zimbabwe Revenue Authority (ZIMRA), which has a mandate to collect revenue and enforce controls on behalf of other government departments (Mafurutu, 2015). The latter role serves to safeguard national security, protect the Zimbabwean population from harmful and substandard products, while protecting the integrity of the flora and fauna of the country as well as preserving Zimbabwe's cultural heritage and moral values (Murevererwi, 2015). The role of customs in the supply chain also involves ensuring trade facilitation, which means ensuring that there are little or no administrative delays at the port of entry (Barratt and Baratt, 2011). When delays arise, it may result in a plethora of challenges, which include retaliation by other trading countries as well as additional logistics costs such as demurrage, storage and detention charges that are eventually passed on to the consumer (Hoekman and Shepherd, 2015; Sakyi *et al*., 2017). Additional logistics costs also lead to foreign currency leakages for the country as demurrage and detention charges are paid to foreign-owned transporters such as hauliers, airlines and shipping lines (Moísé and Sorescu, 2013). In severe cases, poor trade facilitation results in total loss of trade as it is diverted elsewhere such as when vehicles use alternative transit routes or businesses relocate their operations or otherwise reconfigure their supply chains. Poor trade facilitation practices are an impediment to trade-led development and consequently economic progression. As supply chains become more and more global, trade facilitation has increased in significance and importance as it is universally considered as an international public good (Minor and Tsigas, 2008; Stank *et al*., 2012; Zhu *et al*., 2018).

Similarly, the World Bank, *Doing Business Report* (Trading across borders) (2019), positions Zimbabwe at an overall ranking of 157 out 190 countries. The *Doing Business Report* gives a quantitative measurement of business regulations in 190 countries. The Trading Across Borders Report, which is part of the set of sub-indices that are compiled to produce the Ease of Doing Business Index, measures the time and cost (with the exclusion of the customs and/or excise tariff) that arise from processes and procedures in the importation or exportation of goods. The Trading Across Borders Report measures documentary compliance, border compliance and domestic transport. Zimbabwe's global ranking on the *Ease of Doing Business* Index is 155 (Doing Business, 2019). Albeit, it is not enough that Zimbabwe is ahead of 32 other countries in the Trading Across Borders ranking because the countries that occupy the bottom 15 places are either prone to or affected by natural disasters, war or other forms of civil strife.

Delays at Zimbabwe's ports of entry are an impediment to the free flow of goods into and out of the country. Poor trade facilitation practices at these ports of entry are well documented; however, little is known as to the cause of these poor trade facilitation practices that are a major supply chain bottle neck. Although there are extensive studies on trade facilitation, customs risk management and coordinated border management, few of those studies have been conducted in Sub-Saharan Africa, let alone Zimbabwe. Scholars such as Mafurutu (2015) and Mureverwi (2015) have written on customs risk management and trade facilitation in Zimbabwe, respectively, yet little is known on the knowledge, attitudes and practices of the customs administration with regard to trade facilitation in Zimbabwe. This exploratory study seeks to bridge this knowledge gap in customs administration and operations within Zimbabwe by applying holistic, systematic risk management methodologies to the operations of Zimbabwe's customs administration with respect to its information technology, legislation, procedures, human resources and organisational arrangements in order to understand its trade facilitation practices.

The study aims to establish the knowledge, attitudes, and practices of customs officials with regard to their role in trade facilitation; secondly, to identify the risk management factors aiding or impeding on trade facilitation in customs administration; and thirdly, to establish the legislative, administrative and technological requirements for improvement of trade facilitation in customs administration. The study is significant because, Zimbabwe, being a landlocked country, relies on its ports of entry to connect it to regional and international markets and products. Moreover, other countries also rely on Zimbabwe as a transit route linking Southern Africa to North and East Africa. The main contribution of the paper is that it revealed the perspective of the officials who are involved in the process of trade facilitation. Majority of studies place their emphasis on the perspective of clients. Officials provide an inside and somehow different view on the same subject as they are aware of some issues which the general populace may not. These include legislative aspects and even internal structures and systems. These become critical in providing balanced policy recommendations.

2. Literature review

Edward Lorenz's butterfly effect of 1960 postulated that weather conditions such as hurricanes could emanate from minute atmospheric changes just like a

butterfly flapping its wings across the globe[1]. Over the years, the theory was borrowed from its traditional meteorological and mathematical fields and applied to other fields to demonstrate that a series of small events can lead to significant multiplier effects. Similarly, this theory is applicable to trade facilitation because the minute differences in the way cargo is handled and processed at borders are causing a big divide among stakeholders as well as across the supply chain system. Without an agreement on the way forward on trade facilitation, progress will be stalled despite significant efforts to integrate Africa into a single economic community (Tavengerwa, 2018; Pasara and Dunga, 2019). This is because the existing regional economic communities, SADC in this case, are already operating under free trade instruments and yet no significant differences in the speeding up process of moving cargo are being felt by traders (Sakyi *et al*., 2015; Johns *et al*., 2018). This is true irrespective of whether there are two separate processing points such as the Beitbridge (South Africa and Zimbabwe) border post or there is a one-stop border post such as the Chirundu border post (Zambia and Zimbabwe). The implication of this, therefore, is that it is not only improvements in both hard and soft infrastructure as reflected by the one-stop border post and advanced IT systems that are needed to accelerate trade facilitation, but also improved attitudes of personnel involved in the process of facilitating trade.

Tavengerwei (2018) argued that burdensome customs administration in developing countries range from administrative processes, lack of transparency that translates into difficulties to anticipate the amount of payable duty, cumbersome customs procedures, applicable rules on duties and taxes, challenges associated with preparing for the relevant documentation to inefficient physical control of goods at borders discouraged most SMMEs in participating in cross-border trade. SMMEs are the most significant players in cross-border trade as reflected by the most recent survey conducted by the International Trade Centre (ITC) on 2 262 firms. The study indicated that 82% of them are MSMEs. The challenges in trade facilitation were acknowledged by the former WTO Director General Pascal Lamy who said, in sub-Saharan Africa, almost double the number of documents for customs procedures are required; and goods take about 32 days for exports and 38 days for imports to clear".[2] This can, in turn, affect other issues such as consumer rights to return goods as indicated by ITC statistics, which show that only 10% of transactions involve return sales, cancellation and refund requests (Tavengerwei, 2018).

Other challenges include corruption related to customs procedures. This can emanate from lack of transparency to small packages that can easily go missing (Hoekman and Shepherd, 2015). These issues are rarely mentioned in theoretical postulations as argued by Jonsson and Holmström (2016), who highlighted that the supply chain planning theory is of little practical relevance. For instance, in the case of the former, before the introduction of the Trade Portal in Malawi, the Malawi Bureau of Standards did not publish mandatory customs fees and duties, which made it difficult for traders to plan. Similar traits on lack of transparency are still common across border centres in Africa. In Zimbabwe, the situation is exacerbated

[1] Kevin Dooley, "The Butterfly Effect of the "Butterfly Effect"", (13) Nonlinear Dynamics Psychology and Life Sciences (2009) 3, 1-3

[2] Former Director General Pascal Lamy, 'Speech at the World Customs Organisation in Brussels' (World Trade Organisation, 24 June 2011) https://www.wto.org/english/news_e/sppl_e/sppl_e.htm

by the fact that the country has been changing its base currency and customs rates several times since the introduction of the 'bond notes'[3] in late 2015. However, the SADC region is not affected by security issues as with other African regions such as the Bakassi border (Nigeria and Cameroon), which is under constant threat from pirates and Boko Haram, which results, in some instances, in the military accepting bribes in exchange for security provision when cargo is crossing the border (Kaipia *et al.,* 2017; Zhu *et al.,* 2018; Dan and Carlotta, 2019).

The conceptual framework of this study centres on customs risk management (CRM), its evolution and adaptation to the specific needs of the department of customs in a revenue authority that operates in a dynamic international trading environment along with the concomitant desire to ensure trade facilitation (TF) in global supply chains. Customs reform is a central aspect of trade facilitation: Modernising customs practices supports improving enforcement of regulatory compliance and increasing revenue collection while facilitating trade (COMCEC Coordination Office, 2018). The external and internal contexts within which the CRM and trade facilitation activities are managed are a fundamental consideration. Emphasis is placed on the goals, objectives, strategies, scope and parameters of TF and CRM, while external factors, such as the legal, economic and cultural environment, as well as, internal factors such as the customs administration's structures, objectives, strategies and capabilities (Barratt and Barratt, 2011, de Campos *et al.,* 2016; Odebiyi and Alege, 2019). In terms of theoretical postulations, the seminal work of Smith (1776) on absolute advantage and Ricardian (1817) comparative advantage theory underpins the international free trade theory. They provide the rationale and motivation for nations to engage in international trade. As nations shift from autarky or mercantilist policy and gradually adopt free trade practices, trade costs are lowered and trade flows increase, which result in individual and national improvements in the welfare of the trading countries (Armington, 1969). While these theories did not explicitly allude to trade facilitation as a tool for opening up international trade, it can be inferred that it is indeed one of the tools since it not only lowers trade costs, but also increases flow of trade, both of which are practices of opened trade.

The second theoretical framework is the theory of constraints (Goldratt and Cox, 2004). It provides a methodology for identifying factors limiting the smooth flow of cargo across borders. In practice, these constraints range from hard infrastructure such as transport-related infrastructure including railways, roads as well as warehouses with refrigeration and air conditioning facilities. Soft infrastructure includes ICT infrastructure such as cable and satellite technology (Stank *et al.,* 2012; Tavengerwei, 2018). Developing countries such as Zimbabwe are characterised by generic problems of a lack of ICT infrastructure that can facilitate trade. These usually manifest in the form of failures in power generation and expensive wireless broadband systems (Sakyi *et al*., 2017). At a regional level, statistics indicate that 48 of the SSA economies have a combined power generating capacity equivalent to that of Spain, which has a significantly smaller population.[4] In general, lack of power disrupts the full functionality of trade facilitation (ITC, 2018).

[3] A form of a fiduciary note whose value was backed by the AFREXIMBANK. However, majority of stakeholders did not have confidence in it, leading to its sharp plummeting in value.
[4] Vivian Forster and Cecilia Briceno-Garmendia, 'Africa's infrastructure, A Time for Transformation', The International Bank for Reconstruction and Development/The World bank (2010) 6.

Intertwined with the above-mentioned constraints is the gravity model of trade by Tinbergen (1962). The gravity trade model borrows from Newton's theory of gravity and it posits that comparative economic size draws countries to trade with one another, whereas increased distances diminish the attractiveness to trade with each other. In this model, 'distance' is measured by trade costs and the greater the trade costs, the more economically 'distant' the countries are (John *et al*., 2018). The model is flexible to incorporate and can be included as 'distance' variables, but also other country idiosyncratic variables or constraints such as whether or not the country is landlocked, a member of a free trade area, and cultural differences among other factors. These salient features and cultural differences can then translate into several challenges between cross-border traders and customs officials thereby stalling the process of trade facilitation (Hoekman and Shepherd, 2015; Tavengerwei, 2018, Pasara, 2020).

Improved trade facilitation would technically reduce 'economic distance', thereby reducing trade costs and increasing the level of bilateral trade. Finally, this paper also considers Armington's (1969) trade theory, which holds the view that non-trade costs play a significant role in international trade. More specifically, Armington's theory employs the concept of elasticity of substitution and assumes imperfect substitution between demand for imports and domestic supply and asserted that products are differentiated by place of origin (Pasara and Dunga, 2019). What this implies is that, since products are not perfect substitutes, complex border processes will make the imported product more inelastic thereby adding significantly to the cost associated with importing it. Other factors that reduce the level of elasticity include non-trade costs such as overseas shipments, total logistics costs, which account for between 30 and 50% of the landed cost of goods. Therefore, the theory by Armington accounts for shipping costs, tariffs and the attendant customs documentation and formalities involved in processing.

This section provides a short summary of empirical results from international studies. Using econometric analysis in a multi-country study, which included 15 high income countries, 39 upper middle income countries, 32 lower middle income countries and 21 low income countries, results by Moísé and Sorescu (2013) indicate that enhancing trade facilitation positively impacts the flow of trade. The most significant measures were information availability, automated processes, simplification and harmonisation of documents, impartiality and good governance, streamlining of border processes, and risk management. The authors further highlighted that the most important factor for low income economies was harmonisation and document simplification. Similar results were also observed for the Sub-Saharan African economies. The factor that had the strongest impact on lower-middle and upper income countries (Caribbean and Latin America, Central Asia, Eastern Europe) was streamlining procedures. They concluded that the impact of trade facilitation is important in specifications of developing economies when they are both importing and exporting. The results confirm that improving the trade facilitation environment in developing economies significantly impacts on export performance. Therefore, improving efficiency of exporting procedures and addressing bottlenecks are important.

Taking into account overall trade, harmonising and simplifying documents and use of automated processes have the greatest impact on low income countries. The latter reduces trade costs by 2.3% and the former by 3%. The effect of harmonising documents on lower-middle income economies was 2.7%, while that of streamlining procedures by employing automation was 2.2%. Costs for upper-

middle income economies will reduce by 2.8% due to streamlining of procedures, while using automated processes and risk management will lower costs by another 2.4%. A combined regression is likely to lower overheads by 13.2% for upper middle, 15.5% for lower middle income, 14.5% for lower income economies. Consequently, combined effects are greater than individual measures due to multiplier effects, which confirms the significance of undertaking comprehensive measures in trade facilitation reforms as opposed to isolated measures.

Milner, Morrissey and Zgovu (2008) investigated trade facilitation in developing countries and observed that trade reforms are significantly beneficial. More specifically, improvement of customs clearance procedures, automation, reducing excessive document requirements, improving cooperation between customs and other agencies and modernisation. The authors suggested regional integration arrangements as an inclusive solution. Integration arrangements must include increased efficiency in revenue collection, reducing trade costs and promotion of regional cooperation. Minor and Tsigas (2008) highlighted that although there was an overall growth in trade to GDP ratio from 5.5% in 1950 to 19.4% in 2005, diversification of trade has not been experienced at the same pace. Moreover, the share of least developed countries (LDCs) on growth of trade has lagged behind other higher income groups. Exports of LDCs remain dominated by low valued goods especially from the primary sector. Despite tariffs reducing in LDCs over the past few decades due to regional integration, analysts also identified poor trade facilitation facilities (more time to move goods across borders) as another trade barrier (Djankov *et al.,* 2006; OECD, 2003). They concluded that a delay of one day increases costs by 1%. Other studies also confirmed that 'indirect costs' from time delays have greater impacts on volume of trade than 'direct costs' do (OECD, 2003). This relationship is popularly known as the 'iceberg effect', where direct costs are just an iceberg tip compared to indirect costs (Hertel, Walmsley and Ikatura 2001).

Hummels (2001) demonstrated that the value of time delays significantly varies among US merchandise imports. For instance, expediting delivery has minimal effects on commodities such as minerals and non-perishable agricultural products such as grain implying they have low time values. Contrastingly, manufactured products have high time values due to higher depreciation rates in terms of their market value. Results indicated that a one-day delay in apparel products equals 0.8% ad-valorem tax. Consequently, the extent of delays substantially affects the type of products traded in each economy.

Minor and Tsigas (2008) employed a computable general equilibrium (CGE) model on four income groups of countries: high income, middle income, all low income and low-income sub-Saharan African (SSA) economies, and explored reduction in trading time using simulations. They found that economies realise the largest wealth if they decrease trading time, while other nations do not, that is, in *ceteris paribus* mode. Likewise, benefits reduce as other countries follow similar patterns. The results confirm the supply chain theory, which conjectures that "the benefits of fast delivery times for the fastest deliverer increase as the variance between him and next fastest deliverer grows." In SSA, results also indicated that a reduction in time delays stimulates greater share of exports of value-added products and increases in intra-trade at the regional level. Using firm-level analysis for a large group of European countries on small to medium firms with employees ranging between 10 and 249, Hagsten and Kotnik (2017) observed that export intensity is strongly

linked with advanced ICT capabilities (both within the firm, exporting agencies and customs authorities) compared to the pure decision to export. Beverrelli, Neumueller and Teh (2015) estimated the effects of facilitating trade on diversification of exports by measuring twofold broad margins, i.e. number of export destination served by merchandise and number of exported merchandises by destination. Results indicated a positive influence of TF on trade margins.

Ismail and Mahyideen (2015) quantified both soft and hard infrastructure and posited that it plays a strategic role in facilitating Asian trade, especially in its recently liberalised environment. More specifically, results showed that when transport infrastructure improves (ports, air transport, road density network, railways, and logistics) there will be improved trade flows. ICT infrastructure (mobile phones, telephone lines, internet users and secure servers, broadband access) also has positive effects on importers and exporters. The paper concludes by noting that emphasis has been historically given to the impact of hard infrastructure, but there must also be thorough examinations on soft infrastructure. In a study covering 189 countries, including 44 Sub-Saharan economies, Shephered (2017) examined the relationship between trade facilitation, infrastructure and value chain participation by applying a network analysis method to derive measures of value chain connectivity. The author found a significant link between the stated measures and summary indicators of performance on trade facilitation and infrastructure development. In addition, the study also observed that both the performance of the country and its neighbours matters. Therefore, policies on infrastructure and trade facilitation must be addressed at a regional dimension, especially in SSA economies, that they can connect to global value chains.

3. Methodology

3.1. Research design

The research philosophy of this study is anchored around the three research paradigms of ontology, epistemology and axiology, taking from the postulation by Hudson and Ozane (1998) that reality is both multiple and relative. Thus, in order to capture several subjective elements relating to trade facilitation, the researchers adopted a qualitative approach. Furthermore, as stated by Willis, Mukta and Rema (2007), interpretivists tend to favour qualitative methods, and assert that qualitative approaches produce reports with a great deal of detail that are essential for interpretivists to comprehend their context. A qualitative study provides a way for exploring and understanding the meaning individuals or groups assign to a social or human problem (Creswell, 1998). Therefore, in supply chain management research, if a scholar seeks to understand the knowledge, attitude and practices of those involved in or affected by trade facilitation, qualitative methods are likely to be the best-suited strategy.

3.2. Sample and data collection

The population for this study comprised ZIMRA customs officials. This study adopted the recommendations by Creswell (1998) of five to 25 participants for phenomenological studies.

The study employed purposive sampling to select key informants for interviews and questionnaires. Snowball (friend of a friend) sampling was used to identify other key informants. A structured questionnaire was administered to selected customs officials. The data obtained was both quantitative and quantitative in nature, using interview guides and the interviews were conducted with selected officials who were drawn from the Zimbabwe Revenue Authority. Interviews were held with selected participants to capture their knowledge, practices and attitudes towards trade facilitation and related processes in customs regulatory control. The researchers scheduled the meetings during periods that were convenient to the selected participants and the interviews were conducted in environments that were permissive and non-threatening to the participants.

Discussions lasted approximately one hour and followed a semi-structured topic guide to ensure coverage of specific aspects in line with the objectives of the study. This method allowed for open-ended sharing of information from the participants with regard to their trade facilitation in supply chain management knowledge and experience. Secondary information was also collected using content analysis guided by the study objectives. Some of the information collected under this method included relevant policies and legislation in customs administration, trade facilitation, and logistics.

Data was collected from ZIMRA staff operating at the ports of Beitbridge border as well as the customs division at the Harare Head Office. In total, 12 face-to-face interviews were arranged through confirmed appointments with targeted interviewees. Out of the 12 interviews that were organised, only nine were conducted as per prior arrangements, while three were cancelled and arrangements for re-appointments were not possible. A total of 60 survey questionnaires were distributed at Beitbridge border post and Harare Head Office. Of these 60 distributed survey questionnaires, 50 responses were returned. As shown below, this gave an overall response rate of 81.94%. From the total number of participants, 6.8% occupied the position of senior manager, 13.6% identified themselves as managers, while 22.1% were revenue supervisors and the remaining 51% were revenue officers who serve on the front-line. A total of 61% of the respondents indicated they had two to five years working experience at Beit Bridge, while 32% were in the range of more than five years working experience. The working experience of the remaining 7% were those with less than two years working experience, who were located at in Head Office.

3.3. Data analysis

The study used SPSS and NVivo software applications for analysis of quantitative and qualitative data, respectively. Thematic and content analyses were used to code qualitative data. Multiple qualitative data sources allowed for data verification, triangulation and complementarity to provide extent and descriptions of issues identified in the study. Efforts were made to establish association between/ among variables using Pearson correlation and cross-tabulation analysis. Graphs, frequency tables, cross-tabulations and selected statistical tests were used to present quantitative study findings, while thematic analyses with the aid of frequency tables and quotable quotes were applied for the presentation of qualitative study findings.

Quality and validity of the process was ensured by sending questionnaires for quality control with other experienced researchers and supervisors. Secondly, interviews and FGDs were scheduled in advance to ensure quality attendance and

discussions on data collection. Finally, feedback was sent to respondents through emails after the transcription process was completed.

Several processes were used to ensure objectivity and moral integrity is attained. Firstly, structured questionnaires were send for quality control to the ethical clearance committee and the supervisors of the ZIMRA offices before an ethical clearance certificate was issued. Secondly, participants were notified that participation is voluntary and their personal information would remain anonymous.

4. Research findings

4.1. Training and policy in trade facilitation

The dispersed nature of customs operations often necessitates that more experienced staff are sent to outstations while those with less experience are nurtured and trained at main office. Results indicate that an overwhelming majority of the participants had received specialised training in trade facilitation. A total of 96% stated that that they had received some form of basic trade facilitation training offered internally by ZIMRA as part of the modules for elementary levels I and II of the traineeship programme offered at the training school. Others referred to training in the form of hands-on sectional review meetings.

Approximately 26.5% of the respondents indicated that they had received training on trade facilitation less than six months ago while 25% indicated that it was more than six months but less than twelve months. Majority of the respondents, about 35% of the respondents highlighted that they were last trained more than a year ago but less than two years. Around 8.5% indicated that they received training more than two years ago while only 5% indicated that they never received training on trade facilitation.

Although some participants received training on more than one aspect of trade facilitation, the majority received training in the areas of authorised economic operator, customs risk management and coordinated border management. These training aspects are in line with best practice standards as set out by WCO SAFE framework of standards and the 2013 Bali WTO ministerial agreement.

Table 1: Trade facilitation training received

Authorised economic operator	Customs risk management	Coordinated border management	Customs valuation	Never
14 (28%)	12 (24%)	18 (36%)	4 8(%)	2 (4%)

Source: Authors computations based on survey data.

In addition to the statistics indicated in Figure 1 and Table 1. which show the level of training received by the respondents, participants also indicated their interests in further training. More specifically, 16 respondents indicated a desire for training on customs rulings, 24 on import controls, nine on regional trade agreements (RTAs), 28 on single window and only four on customs valuation. Further analysis

of these responses reveals that respondents had not been trained on nor were they keen to be equipped with 'soft' dimensions related to intangible aspects, which include governance and impartiality, involvement, cooperation, transparency and the business environment, which are key to efficient and effective trade facilitation. The interviews also revealed that the main themes that would improve either at organisational or individual level are confidence, efficiency and image. Through training, the participants stated that they could perform tasks faster with fewer errors. One participant, for example, commented:

> "If you don't know what you are doing then it doesn't matter how much time you are allocated to do it. It simply won't get done."

In terms of image of an organisation, this theme brought out the essential point that as an ISO 9001:2009 certified organisation, offering a service to the public, the organisation ought to have a good image in the public eye. It is widely acknowledged that customs officers have not always maintained this image. The perceptions of the public of these officers often are seen as creating trade facilitation bottle necks in order to solicit bribes by offering to expedite cargo movement (IMF, 2003; Morini *et al*., 2017; Tavengerwei, 2018). With regular training, the participants felt they would be more equipped to improve the corporate image of the customs authority and inspire confidence in their customers and the general public. When prompted to respond to the question of whether the organisation's strategic plan makes reference to trade facilitation management, an overwhelming majority (88.1%) of the respondents responded that they were not sure, while 10.2% of the research participants indicated that they were confident that ZIMRA's strategic plan included trade facilitation management, as indicated in Figure 2. Only 1.7% of the respondents stated that customs authority's strategic plan does not make reference to trade facilitation management. From the responses, senior management are aware that the strategic plan contains a trade facilitation management framework; however, as one goes down the organisation, this awareness is not shared, indicating differences between senior, middle level management and shop floor workers.

In subsequent questions, respondents were asked to respond on the availability of a trade facilitation policy documents, and an overwhelming majority (91.5%) stated that they were 'not sure', while 8.5% indicated that such a document did not exist in the organisation. The researcher's desktop review failed to establish the existence of trade facilitation participation document for the organisation. Nonetheless, whether such a document is in place or not will not be of much consequence to the customs authority as a significant majority are either not sure if it is available or are convinced that it does not exist. Similarly, approximately 88.14% of the respondents were not sure if a strategic document existed, while an additional 1.69% asserted that it did not; only 10.17 highlighted that they were aware of the strategic document. The study also attempted to gain insight into the attitude of the organisation towards trade facilitation by establishing if resources were being allocated by the management. In their responses, 74.6% said high-level management were moderately involved in the actual implementation and enforcement of TF on the ground, while 15.3% felt that high-level management were 'somewhat' involved, while only 1.7% felt 'strongly' about high-level management's involvement, while 5.1% and 3.4% were convinced that high-level management were somewhat detached and not involved at all, respectively. The results indicate

that prioritisation of TF with regard to allocation of resources such as time and finances is perceived as a secondary function in the organisation. This sentiment, together with the ignorance on a TF policy document revealed that the organisation's strategic thrust and execution did not fully prioritise trade facilitation. As a customs authority, emphasis still lay on revenue collection and enforcement of controls.

4.2 Risk factors in customs administration and treatment measures

Participants were asked to rank the main focus of risk management in their daily work. The results are presented in Table 2. A relatively small percentage considered its use to be in revenue collection and the protection of domestic industries as well as revenue collection and protection of society.

Table 2: Main applications of customs risk management

Application	Frequency	Percentage
Revenue collection & local protection of local domestic industries	1	1.7
Revenue collection & trade facilitation	9	15.3
Revenue collection & enforcement of controls	44	74.6
Revenue collection & national security	3	5.1
Revenue collection & protection of society	2	3.4

Source: Authors computations based on survey data.

The participants were asked if they are aware of any risk management reviews and updates done so as to keep up with the changing environment in trade facilitation and were subsequently questioned about the frequency of these changes. On the questionnaire, five participants chose not to respond to this question. However, out of those who responded, a significant percentage of 81.5% indicated they were aware of some form of risk review or update that had been done to keep up with changes in trade facilitation, while 19.5% of them were not aware of any such reviews or updates. Of those who responded in the affirmative, when further prompted to respond to the frequency of those changes, 90.9% stated that these changes took place on a monthly basis. 6.8% considered these changes to take place after a month. Only 2.3% considered these changes to be taking place on a weekly basis. During the interviews, participants were asked to offer any risk management-related suggestions to be incorporated by ZIMRA in its procedures for increased efficiency and effectiveness in trade facilitation.

Table 3: Number of mentions risk management

	Number of mentions			Total mentions
Risk management suggestions to increase efficiency in trade facilitation	T26	T28	T29	
Use of technology	1		2	3
Remuneration of staff		2		2
Single window		1	1	2

Source: Authors computations based on survey data.

Quoted below are some of the responses with regard to risk management.

> 'In this day and age, you can't rely on manual checks, using technology can greatly improve risk management' (T26)
> 'If staff are not well paid, they become the first and greatest risk. If they have good salaries, I believe that is where risk management starts' (T28) 'when you talk about risk management, it's all about processes and procedures. These have to be streamlined. Single windows make life easy' (T29)

Although various scholars have posited technology and the 'single window system' as tools for risk management and trade facilitation, the interviews revealed that the issue of staff compensation and remuneration was also an important consideration when discussing risk management for the purposes of improving efficiency and effectiveness in trade facilitation. Moreover, the respondents also revealed that ZIMRA does not have a standalone trade facilitation unit at the border that specialises in coordinating, implementing and managing trade facilitation issues. In general, risk management requires a holistic approach from individual to institutional approaches. As indicated in Table 4, the majority of respondents asserted that the use of ICT has been partially used to maximise revenue collection and trade facilitation. The distribution of responses indicates that the majority of responses indicate that to a certain extent, most of the respondents perceived ICT to have been used effectively to enhance revenue collection and trade facilitation.

Table 4: Proportion of responses to use of ICT in TF and revenue collection

Response	Frequency	Percentage
Very highly	1	1.8
Highly	10	17.5
Medium	41	71.9
Rarely	3	5.3
Not at all	2	3.5
Total	57	100

Source: Authors computations based on survey data.

To gain an understanding of how middle and senior-level managers appraised their workforce, the researchers probed further by how they would rank their staff's confidence level in the ordinary daily use of current ICT systems in clearing cargo at their respective stations. The majority of managers considered their staff to be confident in their ordinary daily use of the current ICT system used to clear cargo, which is ASYCUDA world. However, only 20.3% considered their staff to be highly confident, with 77.9% perceiving them to be just moderately confident. 1.7% stated that the staff lacked the required confidence. Further analysis was then conducted to determine which station felt the most confident in their staff's ICT ability. Results show that management at Beitbridge regard their staff as having superior confidence in the ICT system used for clearance of goods. Beitbridge staff are directly involved in the clearance of cargo at the port of entry. Staff at the Harare office are involved in other administrative functions such as rebates, compliance and administration. In terms of level of reliability in ICT systems, which ranked from

'Very reliable' to 'Not reliable at all', the study aimed at understanding from the trading and logistics community issues such as whether the internet systems and connectivity were not dependable. One senior manager responded, 'By and large, our systems are reliable and robust, of course there are failures here and there which can lead to a lot of challenges. One failure does not mean something is not reliable.' (T28).

Table 5 indicates other causes of delays that were identified by respondents as the main ones.

Table 5: Administrative and legislative causes for delays

Administrative and legislative causes for delays	Number of mentions
Too many cross border regulatory authorities	19
Infrastructure constraints	11
Opening and closing times of border offices	8
Slow payment methods	7
Power supply interruption	5

Authors computations based on survey data.

Generally, the results reflect that most of the respondents perceived the systems to be reliable, with one participant stating that the systems were very reliable. Most intermittent system failures were always resolved within a reasonable period. However, challenges were mainly emanating from other structural issues highlighted in the table above. These were largely legislative and administrative.

5. Discussion

The results presented above generally confirm earlier arguments raised by Mafurutu (2015) and Murevererwi (2015) who argued that Zimbabwe's trade facilitation processes (or rather challenges) were affected by internal structures. These constraints will have, as Lorenz (1960) earlier argued, butterfly effects which will then constrain cross border facilitation system.

The results also confirm arguments raised earlier by Tavengerwei (2018) who argued that developing nations are characterised by burdensome customs administration which is usually reflected by complex administrative processes and lack of transparency. The latter usually leads to corruption (Hoekman and Shephered, 2015). In addition, the results also confirm the arguments postulated in the theory of constraints (Goldratt and Cox, 2004) whose methodology revealed that a combination of hard (railways, roads, warehouses, refrigeration services) and soft infrastructure (ICT, cable and satellite technology) are necessary for efficient trade facilitation (Stank *el al*. 2012). On the other hand, the effects of salient features such as cultural differences and infrastructural constraints as emphasised by Tavengerwei (2018) were also highlighted by the respondents as significant influencers of trade facilitation.

This paper adds some valuable literature to trade in Africa especially in light of the recently signed African Continental Free Trade Agreement (AfCFTA).

Whist the AfCFTA places more emphasis on tariff reduction, this paper reveals some salient aspects of trade which should be addressed to accelerate the intra-African trade. More importantly, the results can be used as a baseline and recommendations can be replicated by other revenue authorities across Africa. Trade facilitation is just as important as tariff reduction and several other aspects of trade. As such, due attention should be given. Secondly, the paper provides a rather rare perspective on the attitudes and perspectives of officials with regards to trade facilitation. These responses cannot be easily extrapolated using, for instance, time series data. As such, it becomes challenges to provide balanced analysis on trade promotion without such information.

6. Conclusions

This study aimed to analyse the significance of trade facilitation in Africa in light of the economic integration efforts such as the signing of the AfCFTA. A case study of the attitude, knowledge and practice of the customs administrators of the Zimbabwe Revenue Authority (ZIMRA) was considered due to its strategic geolocation between South Africa and several southern African countries. The study revealed that a significant majority of the respondents had received some form of specialised or work-related training in trade facilitation and that most of this training had taken place in the last two years. However, there is a need to align the strategic plans and policies of the customs authority to trade facilitation measures and increase awareness to all stakeholders.

Although low compensation and remuneration were identified as risk factors, respondents seem to generally concur that the risk reviews and updates are being sufficiently carried out at ZIMRA. To mitigate risk, the study recommends ZIMRA to continuously review their compensation package and benchmark it to regional standards. The revenue authority can also engage in meetings to keep their staff motivated. To mitigate risk, there is a need for an independent trade facilitation unit across stations. Since most respondents indicated a greater level of confidence in the use of ICT and other soft infrastructure systems, improvements in these areas could smoothen the trade facilitation and revenue collection processes thereby minimising constraints that bottleneck the flow of merchandise. Moreover, there is a need to enhance single window operations and training that will streamline border operations as multiple regulatory authorities present multiple bureaucracies and time wastage at borders. There is also a need for a coordinated approach on trade issues within government. Alignment of line ministries related to trade and trade facilitation such as the Ministry of Finance, which is ZIMRA's parent ministry, the Ministry of Industry and Commerce as well as the Ministry of Foreign Affairs and International Trade, including also the Ministry of Transport and Infrastructure Development. At the regional level, countries should enhance their coordinated border activities through regular meetings, real-time data and information sharing as well as assisting each other in controls and revenue collection.

The main contribution of the paper is that it managed to get an understanding of the attitudes, knowledge and practices of key personnel who are involved in the process of trade facilitation process. The Beitbridge border post is arguably the busiest and among the very few ones which operate 24 hours in the Sub-Saharan African region which makes it a very strategic point of reference.

Thus, identifying factors influencing trade facilitation processes through staff responses gives the readers an inside and rather different perspective from the perspective, had for instance, clients been interviewed. In addition, ZIMRA officials also gave access to the researchers additional legislative and administrative information which brings to light some salient yet key aspects of trade facilitation.

The main limitation of the study is that one country and organisation (Zimbabwe and ZIMRA, respectively) were considered, more so that the country itself is currently facing internal economic and political challenges that bring certain idiosyncrasies that may not be applicable to other economies in the region. Future studies can take into account cross-country factors to have a more representative regional outlook. Secondly, the nature of the data collected does not allow for other deeper econometric methodologies to be applied. Thus, studies which incorporate this kind of are encouraged in future.

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CONSUMER PERCEPTIONS OF CRITICAL SUCCESS FACTORS FOR SMALL LOCAL CONSUMER BRANDS

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Abstract. Local or regional fast-moving consumer (FMCG) brands sold mostly in delimited geographic areas are a growing trend. This study aims to understand consumer attitudes towards such products and to identify factors critical to their success. The paper is a comparative study between developed (Germany) and emerging (South Africa) nations to identify differences between the preference criteria for FMCG. The methodology involved an online cross section survey in the two countries. Respondents from both countries preferred local brands and believe they are better quality and more supportive of, and connected to, local communities. South Africans feel this more strongly, show greater commitment, and are prepared to pay more than Germans. 'Beliefs' regarding quality, value for money, and trust in local brands are critical.

JEL classification: M 30, M31, M13, L26

Keywords: emerging country; developed country; entrepreneurship; belief; commitment; image

1. Introduction

Small, Medium and Micro Enterprises (SME) are responsible for adding socio-economic value to an economy by reducing unemployment through the creation of employment opportunities, and by alleviating poverty through both the

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generation and dissemination of wealth (Masutha and Rogerson, 2014; Koens and Thomas, 2015). In South Africa (SA), SMEs make up approximately 90% of all businesses (Mouloungui, 2012), and contribute between 30% and 57% to the national Gross Domestic Product, while also providing employment opportunities to between 61% and 80% of the national workforce (Naidoo and Urban, 2010; Fatoki and Odeyemi, 2010; Ngary et al., 2014; Swart, 2011). Research has shown that better marketing and access to markets is essential for SME success (Raap and Mason, 2016; Heijden and Vink, 2013; Ortman and King, 2010).

The interest in region centric consumer behaviour emphasizes the importance of a brand's/product's place of origin (Eshuis et al., 2014; Vuignier, 2017). Despite the growing interest in regional or local products, researchers have not specifically investigated fast moving consumer goods (FMCGs)produced or sold by SMEs. A trend in small businesses is the development of local or regional products that are mostly sold in smaller, delimited geographic areas. However, such SMEs sometimes also sell such products via the Internet which can give them a wider geographic reach than the local population. Among South African SMEs, growth in ecommerce has been observed from 2015, as more and more SMEs have adopted online business practices (Mkhosi, 2016). Although indirectly competing with national brands, SMEs are significantly different, appealing to a different type of customer and having a different value proposition. Such products include craft beers, local honey, organic produce (fruit and veg), baked goods, soaps, home knitting, clothing, etc. Businesses that produce and sell such products exist in larger towns but are very important in small towns and rural areas, creating job opportunities for many who are unable to obtain more formal employment.

As mentioned above, local or regional products/brands supplied by SMEs focus on different customer profiles to those of national or international brands. Traditionally, the orientation of SMEs has been described as that of niche businesses that know their customers intimately, offering customized service (Gilmore et al., 1999). Since local brands do not have the economies of scale of national brands, their prices are often higher. Moreover, customized products are often more expensive than standardised versions (Bardakci and Whitelock, 2004). Therefore, they rely on perceptions of better quality, local authenticity or 'buy local' perceptions. This inevitably means higher prices than the national or international brands. Although there has been a reasonable amount of research on the subject of SME success, there has not been much research into the consumers' willingness to purchase and to pay a premium for SME products or brands, nor into the consumers' attitudes towards such products and brands. Therefore, there appears to be a lack of knowledge about the attitudes of consumers about their willingness to purchase and pay for local or regional products supplied by SMEs. It is therefore worthwhile to identify the critical success factors related to the image, perceptions and characteristics of SME products and brands, where "success" is defined as the ongoing survival and maintenance of profitability that will at least enable the firm to continue its existence and employment of a staff at least more than the founders. Furthermore, what research there is into local brands has mostly been done in developed countries, with little having been done in developing or emerging economies like South Africa. Therefore, we decided to compare the consumer attitudes to, and willingness to purchase, local brands between South Africa and their biggest trading partner in the European Union, namely Germany (South African Market Insights (2019).

Therefore, the main objectives of this study are to: Identify consumers' perceptions and beliefs about, preference behaviour towards, and willingness to purchase local FMCG goods in a developed country (Germany) versus an emerging country (South Africa); Identify consumers' willingness to pay (WTP) for such products and what premium they are prepared to pay for such local brands compared to national brands, differentiated according to Germany and South Africa, and to Identify which of the consumer related criteria are critical to success of FMCG brands produced by local or regional SMEs, and whether these criteria differ between Germany and South Africa.

In order to achieve these research objectives, we first define and clarify the research constructs through a detailed literature review. After explaining the method used to conduct the empirical study, the results of the empirical study are presented and discussed. Lastly, conclusions relevant to further local FMCG brand research are drawn, marketing recommendations for small local FMCG firms are made and the limitations of the study are presented.

2. Literature review

Consumer interest in the purchase of locally produced products has attracted researchers to investigate the influences of place of origin on consumer behaviour. Studies have been conducted in European countries revealing the willingness of consumers to pay premium prices for local products (Lombart et al., 2018). However, other industries, such as the craft industry, which thrive on local patronage, struggle to benefit from regional product purchases. Therefore, it is worthwhile to investigate some of the factors that lead to the success of such businesses and that increase the consumers' willingness to pay for such products.

2.1. Region of origin

The ideal of localism has brought about the emergence of brands that have explicitly linked the production and origins of such products to specific geographic locations. A consumer's perception of local products, especially food products, defines such products as produced and marketed within specific distances from the point of production. These distances vary from region to region, e.g. 644 km (United States), 50 km (Canada) and 150 km (France). Thus, the understanding of what is local varies from region to region (Coelho et al., 2018). Nonetheless, the process of globalisation seems to have pushed the need for the use of geographic indicators even further which gave birth to 'made-in' labelling. Country-of-origin is a cognitive cue used by consumers when forming attitudes and beliefs about products (Kabadayi and Lerman, 2011). Furthermore, in the wake of continued competitive pressures, brands have marketed their authenticity by linking them to particular regions and communities (Shi et al., 2016; Fernández-Ferrín and Bande-Vilela, 2015). Such 'region of origin' issues are important because, in German cities, local retailers are losing market share to international and national retail brands (IHK Darmstadt, 2017), while in South Africa, international retailers like Walmart, Zara and H&M are penetrating the markets in larger cities (Euromonitor International, 2018).

FMCGs

Fast moving consumer goods (FMCGs), also known as consumer packaged goods, are fast turnover, relatively inexpensive, products (Malhotra, 2014; Srinivasu, 2014), that can be sold at fairly low prices and still make a profit (Mustapha, 2010), generating high volume at low margins (Malhotra, 2014). FMCGs have been classified into subgroups such as personal care, and domestic care, household care, food and beverages (Selvakumar et al., 2013; Gough, 2003). The following is a list of typical FMCG products: processed foods; prepared meals; beverages; baked goods; fresh and frozen foods; dry goods; medicines; cleaning products; cosmetics and toiletries (Kenton, 2019). FMCGs are an essential part of the manufacturing sector and increasing competition caused by the emergence of new products, aggressive marketing and technological innovations presents a challenge for manufacturers (Kvitka and Kramarenko, 2018), especially for SME enterprises.

2.2. SME Success

Many studies have investigated SMEs in developing or emerging countries, seeking to establish the factors that lead to SME success. Studies have been carried out in Jordan, Malaysia, Bangladesh and Taiwan. The success of SMEs varies from country to country and the factors that lead to success in one country may not lead to success in another (Al-Mahrouq, 2010).

The nature of customers and the overall market characteristics determine SME success. Gray et al. (2012:10) argued that the sector of the market in which an organisation operates plays a critical role in the success of that organisation. As SME success may be measured through financial performance, an indicator of success may be a market's willingness to pay for products. Consumer willingness to pay has been measured for several product categories (Anselmsson et al., 2014; Chatterjee and Kumar, 2017; Biswas and Roy, 2016; Vecchio and Annunziata, 2015), but not much research has been done into consumers' willingness to pay for SME products.

SMEs' turnover in South Africa shows it to be the second largest turnover of any industry in South Africa (Bureau of Economic Research, 2016), focused mainly on retailing and product manufacture (Fischer and Reuber, 2000). Research has shown that SME activity in countries such as the United Kingdom and Germany, fuels growth in these economies (Kvitka and Kramarenko, 2018), but despite overall rises in total revenue and employment in Germany, studies have shown regional differences. SME success seems to vary with turnover, a key indicator of profitability, showing variances between regions. According to a KFW research report by Schwartz and Gerstenberger (2018), some regions in Germany show higher than average turnover rates, while others show high losses. Moreover, in South Africa, growth within SMEs also varies geographically with some provinces witnessing higher SME growth rates than others (Bureau of Economic Research, 2016). Governments seek to protect and promote SMEs in the hope of stimulating economic growth (Makhitha, 2013; Font et al., 2016). Consumers are encouraged to buy local to support local businesses (Fenwick and Wright, 2000), but such marketing tactics are mostly used by national brands. There is therefore a need to investigate the use of such tactics for local brands and by SMEs in different regions.

2.3. Willingness to pay

Consumers' intention to purchase is linked to their willingness to pay (WTP) for the products under consideration. The WTP is one of the determinants of consumer brand loyalty. A consumers' WTP a high price is linked to their perceptions of quality as well as the value that the consumer places on the brand, expressed through the brand's features and benefits. Five measures of perceived brand value, namely, conspicuous value, unique value, social value, emotional value and quality value have been used to measure consumers' WTP for products (Li et al., 2012).

Factors such as the familiarity of a brand also play a role in the WTP for a product based on its country-of-origin (Koschate-Fischer et al., 2012). Moreover, a consumer's WTP premium prices for products based on their geographical identification has been influenced by other factors such as the length of the supply chain, the level of processing that each product undergoes, as well as the nature of the product and its differentiation. Particularly, in the case of food products, which have undergone extensive study, the presence of legislative support to protect regional products has been regarded as influential to the use of premium pricing for regional products (Deselnicu et al., 2013:205). The likelihood of purchase of products may be determined by the benefits of purchasing local, the branding and quality of the product, product convenience, product price and the presence or absence of safety risks (Cranfield et al., 2012). Therefore, these same factors may be used to determine consumer willingness to purchase other FMCGs. Furthermore, among the factors that have been found to influence consumers' WTP, consumer demographic characteristics (age, gender, education and income) have been highlighted. However, the findings from these studies show conflicting results. Therefore, comparison studies may provide further insight into consumers' WTP for products (Radam et al., 2010).

2.4. Consumer attitudes and the willingness to pay

Perceptions are similar to attitudes as both influence consumer behaviour (Radam et al., 2010) and are influential in consumer product and brand decision making. Some researchers have pointed out that the valence or strength of an attitude, whether positive or negative, determines the choices that a consumer makes (Park et al., 2010). Evaluations of a brand's or product's image create perceptions and feelings that affect consumer behaviour (Lakeh et al., 2015). However, strong attitudes, whether negative or positive, highlight the confidence that consumers have about an evaluation of a product or brand. Such evaluations are built on objective value indicators that the consumer uses. Thus, strong positive attitudes have been linked with a greater likelihood of purchase, while strong negative attitudes have been linked to purchase avoidance (Park et al., 2010). Thus, it can be assumed that consumers possessing strong positive attitudes towards any product (e.g. a local brand) may be more willing to buy, or pay for, such products.

A number of factors related to brand image and brand characteristics seem to affect the willingness of a consumer to purchase and pay for products. These factors may determine the success or failure of FMCG SMEs. Furthermore, the literature seems to indicate that consumer beliefs about local products and attitudes about quality also influence the success of brands. These findings from the literature

are summarised in Figure 1 that illustrates the framework of relationships used to develop the data collection instrument, to structure the data collection and analysis, and to guide the discussion of the findings from this descriptive study.

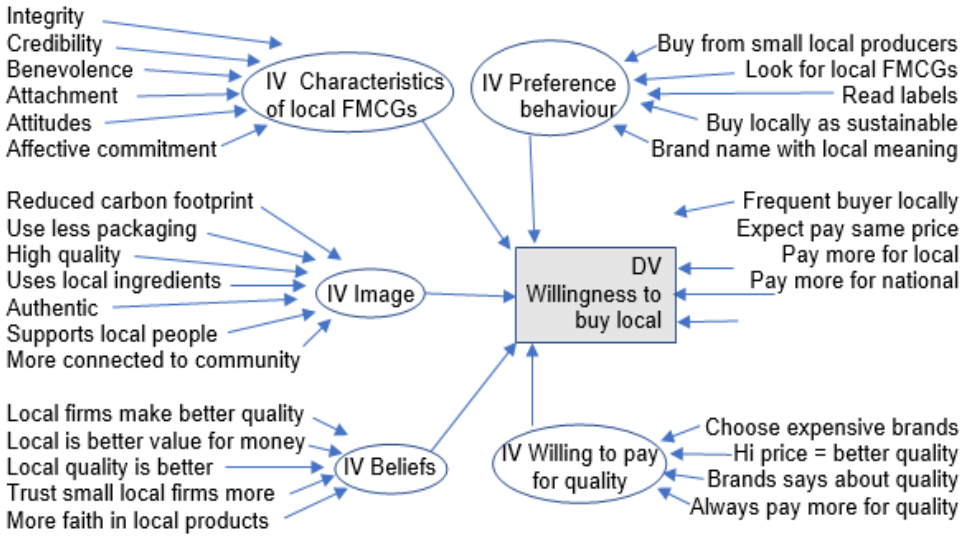

Fig. 1: Framework of dimensions

Understanding these factors and how they influence willingness to buy and WTP for local products may be useful to determine the success of marketing actions such as using local or regional labelling and branding for local FMCGs.

3. Method

A quantitative, descriptive, cross sectional survey, based on an e-mailed questionnaire to an online-accessed panel of consumers provided by a commercial panel provider, was used. Because there has been so little comparative research, especially involving emerging nations, this study adopts an exploratory approach.

3.1. Respondents

Since small, local or regional brands are often sold via local shops, flea markets or craft fairs, a mainly urban or metro target market was appropriate, especially because of the large distances and low-density rural populations in South Africa. Furthermore, many local products from SMEs are more expensive and are therefore bought by upper income consumers. Therefore, it was decided to select the South African Living Standards Measure (LSM) categories of 7 to 10 (predominantly urbanised and wealthier) as the population (Chronison, 2012).

The selection of these LSM groups is supported by the fact that South Africa's Gini coefficient (63.0 in 2015) is so high (The World Bank Group, 2019), indicating a relatively small proportion of the population who would be able to afford the premium prices usually charged for local or regional brands.

Regarding Germany, where these limitations of low-density rural populations and large distances do not apply, and where income level is generally high, with only 13,8% of income being spent on food, beverages and tobacco (Destatis, 2019), most of the population can afford a slightly higher price for local products, if wanted. The German Gini coefficient of 31.7 indicates a much wider spread of wealth through the country (The World Bank Group, 2019). Thus, a large proportion of the population would be able to afford the premium prices charged for local brands. Therefore, a quota based on income, gender and age (18+) representing the total German population was drawn as the study population.

To obtain samples of these two populations, an online panel that meets the above criteria was accessed from a commercial research company that guaranteed the number of respondents set by the researchers as the sample size. The researchers determined quotas (gender, age and income for Germany and LSMs 7 – 10 for South Africa) to ensure that the countries' populations were adequately represented. The quotas for LSMs 7 to 10 were adjusted slightly to cater for the changing South African demographics identified by KANTAR TNS (2019) in the Establishment Survey research. The resultant quota that was achieved (as shown in Table 2) was very close to the actual population and can be considered as adequately representative of the population.

Since sampling was based on quotas and resulted in a self-selected sample (i.e. list members chose whether to respond or not) the sampling method was non-probability. With a 95% level of significance, an allowed error of 0,1 (on a 7-point Likert type scale) and assuming a variance of 1, the t-distribution requires a sample size of 384 (excluding a correction factor). Thus, a total sample of 800 was sought (400 from each country) to allow for any unusable or rejected responses. The details of the actual sample achieved are presented in Table 2 – in summary they are 427 for South Africa, 442 for Germany, and 869 in total.

3.2. Data collection

The questionnaire was developed to obtain data on the various study variables, which accounted for six of the questionnaire sections, with a seventh being devoted to demographic data, namely country, gender, age, habitation, education and household income. To obtain measures for the variables to be researched, questions were developed from academic literature as follows:

- *Willingness to buy (WTB)* products and brands from local SMEs - Angulo et al. (2003); Brunsø et al. (2002); Mugera et al. (2017)
- *Preference behaviours* covering activities that show a preference for locally produced FMCGs - Angulo et al. (2003); Gatrell et al. (2018); Horlings and Marsden (2014); Krystallis and Chryssohoidis (2005); Mugera et al. (2017); Vermeulen and Bienabe (2007).
- *Image* criteria displayed/promoted by local/regional FMCG that are critical to success - Argent (2018); Carroll and Wheaton (2009); Gatrell et al. (2018); Mugera et al. (2017); Melewar and Skinner (2018); Pearson et al. (2011).
- *Characteristics* of local FMCG brands - Charton-Vachet and Lombart (2018).

- *Beliefs* about local FMCG goods and brands - Charton-Vachet and Lombart (2018); Grunert et al. (2004); Marian et al. (2014); Pearson et al. (2011); Roddy et al. (1994); Worner and Meier-Ploeger (1999)
- *Willingness to pay (WTP)*for quality - Brunsø (2002); Lichtenstein (1993); Sprotles and Kendall (1986); Strizhakova et al. (2008)

Sections 1 to 6 of the questionnaire included statements with 7-point Likert type scaled responses anchored with 1 = strongly disagree to 7 = strongly agree. A live electronic pilot test of the questionnaire was conducted with eighty consumers who matched the population criteria, which showed the questionnaire to be understandable and acceptable – no changes were required. The questionnaire was administered by e-mail to the opt-in panel. The e-mail with an embedded link, together with the quotas, was provided to the list broker who distributed the questionnaire.

3.3. Data analysis

Analysis was done using SPSS version 23. Completed questionnaires were received by the researchers who did a quality check of the data using different cross tabulations, e.g. where a respondent was “prepared to pay MORE for a nationally or internationally produced FMCG” and was “prepared to pay MORE for a locally made FMCG product”. Thus, where two or more answers did not fit logically, the relevant questionnaire was removed from the analysis. Thus, the valid South African answers were reduced from 442 to 427, and the valid German answers from 448 to 442.

Thereafter univariate descriptive statistics, analysed by country and total, were calculated. The mean values and standard deviations for each question, by country, together with their statistical significances are shown in the Appendix. Then, using exploratory factor analysis (EFA) with Principle Component Analysis extraction method and Varimax rotation with Kaiser normalization, as shown in Table 1, the questions comprising the dimensions identified from the literature review were checked for accuracy and validity. This initial EFA confirmed the structure of ‘belief’, ‘image’, preference behaviour’ and ‘pay for quality’ as expected from the literature, but the dimensions from Charton-Vachet and Lombart (2018) were grouped inappropriately into one factor. To check this, a separate factor analysis on the questions comprising these dimensions, namely, ‘commitment’, ’integrity’, ‘attachment’, ‘credibility’, ‘attitude’ and ‘benevolence’, was conducted. This confirmed that the structure obtained from our research in Germany and South Africa was consistent with that found in France by Charton-Vachet and Lombart (2018). The only difference was that the ‘Attachment’ and ‘Affective commitment’ dimensions were found to be similar, so they were merged into one dimension that we named ‘Commitment’. The Cronbach Alpha coefficients of between 0.865 to 0.967, and a total explained variance of 84.9% (Table 1) further confirms the acceptability of the dimensions identified from the literature.

Table 1: Exploratory Factor Analysis of dimensions

Dimension	Item	Factor loading
Preference behaviours Explained variance = 15.15% Cronbach α = 0.873	1. I always read labels on FMCG products to see where they are made	.793
	2. I always try to look for locally made FMCGs during each purchase	.762
	3. I prefer to buy products from small local producers in preference to those from large national or international producers	.637
	4. I like to buy local FMCG products, especially food, as I believe this is more sustainable and is better for the planet	.678
	5.Brand name with local meaning encourages me to buy from small local firm	.499
Beliefs Expl variance = 21.2% Cronbach α = 0.909	1. I think quality of product/brand made in my local region is higher than of a similar national/international product	.683
	2. Products made by small local firms are better quality, even if shelf life is not as long as national/international products	.744
	3. Products from small local producers are better value for money than national or international products	.642
	4. I trust the products of smaller local producers more than I trust national or international products	.741
	5. I have more faith in how products are made by small local producers than by large national or international producers	.719
Willingness to pay for quality Expl var=13.7% Cr α = 0.822	1. The more expensive brands are usually my choice	.779
	2. I am always prepared to pay more for quality products	.610
	3. I believe the higher the price of a product, the better the quality	.829
	4. A brand name tells me a lot about the quality of a product	.739
Image Expl var=19.7% Cronbach α = 0.898	1. FMCG products made by small local firms have lower carbon footprint	.654
	2. FMCG products made by small local firms have high product quality	.519
	3. FMCG products made by small local firms use local ingredients	.575
	4. FMCG products produced by small local firms are more authentic	.690
	5. FMCG products made by small local firms support local people	.765
	6. Small local firms are more connected with local communities and so understand local needs better	.721
Integrity Expl var=19.0% Cr α = 0.913	1. In my view, local brands are honest towards consumers'	.769
	2. In my view, local brands' communication is sincere towards consumer	.777
	3. I find that local/regional brands show an interest in their consumers	.673

Credibility Expl var=14.4% Cr α = 0.89	1. Products of local and regional brands reassure me (traceability, compliance with standards, expertise)	.561
	2. I prefer products of local brands because their quality is guaranteed	.721
	3. I trust in the quality of the products of local and regional brands	.644
Benevolence: Expl var=13.0% Cr α = 0.967	1. I think that local/regional brands constantly try to improve their products to better satisfy consumers	.695
	2. I think local/regional brands constantly renew their products to adapt them to consumers' expectations	.800
Commitment Expl var=25.1% Cr α = 0.943	1. I feel committed to local and regional brands	.814
	2. Local and regional brands are very meaningful to me	.798
	3. I identify strongly with local and regional brands	.781
	4. I'm attracted to local and regional brands (was Attachment 1)	.573
	5. I feel connected to local and regional brands (was Attachment 2) -	.644
Attitude Expl var=13.4% Cr α = 0.865	1. I find local and regional brands interesting	.680
	2. Local and regional brands are brands that I buy or could buy	.726

The research questions were assessed using means, tests of significance and multivariate regression, the requirements for which show mainly acceptable results – see the Findings section for Objective 3.

3.4. Validity and reliability

A detailed deconstruction, analysis and discussion of the questionnaire was conducted by subject matter and statistical experts in South Africa and Germany, providing face and construct validity. All questions were matched to the relevant variables to ensure the questionnaire assessed what it was intended to assess. A pilot test was conducted with eighty respondents who matched the population criteria. Quality and plausibility checks of the data proved acceptable. The final sample proved to be acceptably representative of the two populations.

Reliability was assessed via Cronbach's Coefficient Alpha, both in the pilot study and the final sample. Coefficients of between 0.822 and 0.926 were obtained for all the dimensions, indicating an acceptable level of reliability. This acceptability is confirmed by the Exploratory Factor Analysis as shown in Table 1.

4. Results

In this section, the sample profile is presented, followed by the descriptive statistics for each question, and an analysis of the three research questions.

4.1. Demographic Profile of Respondents

Table 2 reflects the profile of the 869 useable responses, split by country, gender, age, where respondent lives, education, and monthly household net income.

Table 2: Demographic profile of respondents

Dimension	Category	Total		South Africa		Germany	
		f	%	f	%	f	%
Gender	Female	479	55.1	254	59.5	225	50.9
	Male	390	44.9	173	40.5	217	49.1
Age	18-24	104	11.9	67	15,7	37	8,4
	25-34	224	25.8	160	37,5	64	14,5
	35-49	243	28.0	140	32,8	103	23,3
	50-64	167	19.2	45	10,5	122	27,6
	65+	131	15.1	15	3,5	116	26,2
Habitation	Rural (< 5000 people)	82	9.4	10	2.3	72	16.3
	Small town/village (5000-39999)	178	20.5	53	12.4	125	28.3
	City/large town (40000-249 999)	279	32.1	178	41.7	101	22.8
	Metro (250 000 +)	330	38.0	186	43.6	144	32.6
Education	None, some, or all primary	81	9.3	1	0,2	80	18.1
	Some high school	189	21.8	15	3,5	174	39,4
	Matric	206	23.7	149	34,9	57	12,9
	Technikon	138	15.9	85	19,9	53	12,0
	University degree	208	23.9	139	32,6	69	15,6
	Other post matric	47	5.4	38	8,9	9	2,0
Monthly Household net income	0 – R8 000/ 0-€1300	161	18.5	76	17,8	85	19,2
	R8 001 – 18 000/€1300-2000	244	28.1	144	33,7	100	22,6
	R18 001 – 37 000/€2001-3200	248	28.6	128	30,0	120	27,1
	R37001 – 63 000/€3201-6000	175	20.1	63	14,8	112	25,3
	More than R63000/€6000	41	4.7	16	3,7	25	5,7
Total		869	100.0	427	100.0	442	100.0

This profile shows a reasonable distribution for both the developed and the emerging countries, across all demographic categories. However, the sample reflects the LSM groups but is not identical to the South African population statistics –e.g. the sample shows a higher proportion of females (59.5%) than the South African population. This is explained by the fact that LSMs 7, 8 and 9 are biased towards females (Living Standards Measure, 2017) and by the probability that shopping is more often done by females, especially in emerging countries. Docrat (2007) found females account for 59% of mall shoppers in South Africa. Regarding the developed country, the German sample is representative of the population, since it was based on quotas predetermined according to the German population.

4.2. Perceptions/beliefs/preference behaviour about local FMCG brands

The mean values for each variable have been calculated as per the questions listed in the appendix. Table 3 provides the mean values for the total sample and for each country.

Table 3: Mean values of variables

Variable	Total	SA	Germany
IV. Attitude	5,1364	5,1885	5,0860
IV. Credibility	4,9379	4,9336	4,9419
IV. Image	4,9349	4,9841	4,8873
IV. Benevolence **	4,9125	5,0480	4,7817
IV. Integrity	4,9053	4,9297	4,8816
IV. Commitment **	4,8104	4,9471	4,6783
IV. Belief	4,7869	4,7316	4,8403
IV. Preference behaviour towards local FMCG	4,5068	4,4810	4,5317
IV. Willingness to pay for quality **	4,0616	4,3407	3,7919
DV. Willingness to buy local FMCG *	4,5086	4,4169	4,5973

With a maximum of 7, 'attitude' reaches the highest mean of 5,14 indicating a positive attitude towards local brands provided by small local firms. The difference between the two countries is 0,1 and not significant.

In the total sample 'credibility' and 'image' follow as the second and third most positively rated variables, with nearly identical means. The differences between the two countries are smaller than 0,1 and are not significant, indicating that respondents from both countries hold positive feelings regarding the image and credibility of local brands. Thus, it can be concluded that South Africans feel more strongly about the localness and authenticity of local products, while Germans see the benefit in sustainability, since they scored higher on the questions about lower carbon footprint.

'Benevolence' recorded a mean score of 4,91 for the total sample, and showed a highly significant difference between South Africa (5,05) and Germany (4,78), with South Africans feeling more strongly that local brands are better at satisfying customers' needs and expectations.

Other highly significant differences between the two countries were obtained for 'commitment' and 'willingness to pay for quality'. Both are higher for South Africa than for Germany, with South African respondents indicating more commitment and loyalty towards local brands. 'Willingness to pay for quality' is the variable with the lowest mean score (4,06) but with the highest difference between South Africa (4,37) and Germany (3,79). Considering the higher purchasing power in Germany this was quite surprising and appears to show that Germans are not strongly influence by price as a guide to quality, whereas South Africans are. These findings are discussed in more detail in Section 5.3.

The remaining three independent variables, 'integrity', 'belief' and 'preference behaviour' reflect above average (4.0), but similar means for the two countries, none of which are statistically significant. 'Integrity' and 'preference behaviour' had slightly higher means for South Africa, whereas the German mean for 'belief' was slightly higher. Overall, respondents felt more positive about these three variables.

The dependent variable 'willingness to buy local FMCG' shows a total mean of 4,5, implying a slightly above average preference for local brands. This preference was slightly higher for Germany than for South Africa, with the difference being statistically significant.

The overall conclusion is that the self-reported behaviour does not really differ that much between German and South African consumers. All the means were above the mid-point, indicating that the purchasing behaviour of consumers in both countries leans towards the purchase of local or regionally branded FMCG products, rather than those produced by large national or international producers. Both sets of respondents believed quite strongly about local products being better quality, better value for money and having more trust and faith in local products

The brand characteristics of 'integrity', 'credibility', 'benevolence', 'commitment' and 'attitude' have been shown to be of importance to all respondents, as conceptualised by Charton-Vachet and Lombart (2018). Means ranged from 4.39 to 5.26, all considerably above the mid-point, thus indicating their importance to the respondents. Feelings of 'integrity' and 'credibility' did not differ significantly between German and South African respondents, but 'commitment' to local or regional brands did reflect a significant difference, with South Africans feeling more committed to such brands than German respondents were.

4.3. Consumers' willingness to pay (WTP) and premium

For the total sample, respondents were prepared to pay about the same percentage more for national/international brands (mean of 17.23%) as for local brands (mean of 17.47%). However, the 'willingness to pay more' for local brands was stronger (mean of 4.24) than for national/international brands (mean of 3.53).

Looking at differences between the two countries, there was a slight, but not statistically significant ($p=0.612$), difference between their 'willingness to pay more' for international or national products whereas there was a significant difference for 'willingness to pay more' for locally produced products (German mean = 4.38; South African mean = 4.10; $p=0.008$).

Although German respondents felt more strongly about being prepared to pay more for local products (mean of 4.38) than the South African respondents (mean of 4.10), the South Africans were prepared to pay considerably more in monetary terms (23.41% more) than the Germans (only 12.95% more), a finding that was statistically significant ($p<0,000$)

Clearly, respondents overall are prepared to pay more for locally produced products, and South Africans are prepared to pay a higher price than Germans for local/regional brands, implying that South Africans may place a higher value on the benefits of locally produced brands and products than Germans do.

4.4. Success criteria of local FMCG brands

In order to achieve Objective 3, a multiple regression analysis (MRA) was conducted, regressing the nine independent variables ('Integrity', 'Credibility', 'Benevolence', 'Commitment', 'Attitude', 'Image', 'Pay for quality', 'Belief' and 'Preference behaviour') against the dependent variable of 'Willingness to buy'. The results are shown in Table 4, with the adjusted R^2 of 0.643 for both countries, 0.579 for South Africa and 0.736 for Germany, being significant at p<0.000. This analysis shows that, for all respondents (i.e. for both countries) 'preference behaviour' is the most important, with 'credibility', 'belief' and 'pay for quality' also significant but considerably less important. Looking at the two countries separately, 'preference behaviour' was the most important significant variable for both countries, while 'credibility' was next most important for South Africa and 'belief' the second most important in Germany. For South Africa, 'commitment' and 'pay for quality', and for Germany, 'attitude', 'image' and 'pay for quality' were also significant, but less important with relatively low standardised beta scores.

Table 4: Multiple Regression ('Willingness to buy' as Dependent Variable)

Independent variables	Standardised Beta (Sig)		
	Both countries	**SA**	**Germany**
Integrity	0.045 (0.280)	0.050 (0.358)	-0.011 (0.847)
Credibility	0.175 (0.000)	0.228 (0.001)	0.049 (0.417)
Benevolence	-0.017 (0.633)	0.053 (0.316)	-0.037 (0.406)
Commitment	0.054 (0.204)	0.163 (0.017)	0.041 (0.420)
Attitude	0.028 (0.483)	-0.091 (0.151)	0.108 (0.031)
Image	0.016 (0.661)	-0.055 (0.287)	0.122 (0.021)
WTP for quality	0.127 (0.000)	0.129 (0.000)	0.151 (0.000)
Beliefs	0.151 (0.000)	0.081 (0.114)	0.210 (0.000)
Preference behaviours	0.396 (0.000)	0.374 (0.000)	0.387 (0.000)

All adjusted R^2 significant at 0.000 Shaded = significant at p< 0.05

The evaluation of this MRA shows acceptable results, namely:

- The plot of standardized predicted values against standardized residuals provides an indicator of very low heteroscedasticity.
- Tolerance values to test multicollinearity are >0.1 (least 0.246) which are good.
- Normal-distributed residuals: histogram of residuals and P- P-Plot of standardized residuals show no indication of non-normal-distributed residuals for South Africa and the overall regression, but a slight violation for German regression.
- The Durban-Watson test shows results between 1,151 and 1,340. This is a clear indication for autocorrelation.

5. Discussion

5.1. Perceptions/beliefs/preference behaviour about local FMCG brands

From the results presented above, consumers in both South Africa and Germany prefer to purchase locally or regionally branded FMCG products, rather than those produced by large national or international producers, e.g. those that are better for the planet and that have local meaning. South Africans tended to feel more strongly about the localness and authenticity of local products, which is probably consistent with the parochiality felt by South Africans because of their relative geographic isolation. Germans, on the other hand, saw the benefit in terms of sustainability, e.g. a lower carbon footprint, which is to be expected since Germany is much more in the forefront of the climate change fight than an emerging nation like South Africa.

There is also little difference between the beliefs in the two countries about the relative quality, value for money and trust in local companies – both sets of respondents held more positive beliefs about local brands. Although neither South African or German respondents tend to prefer higher priced products or believe that higher prices are indicative of higher quality, they both believe it is worth paying more for quality goods and that a brand name can be indicative of quality. The fact that South Africans held the belief that price is a guide to quality more strongly than Germans did is interesting – it may be that consumers in developed countries are more sophisticated in terms of judging the quality of branded products, whereas consumers in an emerging country may not be as sophisticated and still rely on price as a quality indicator.

These findings generally support the findings of Charton-Vachet and Lombart (2018), with the brand characteristics of integrity, credibility, benevolence, commitment and attitude all being perceived as important by both South African and German respondents.

5.2. Consumers' willingness to pay (WTP) and premium

As has been shown in the results presented in the previous section, there is little difference between the premium in percentage terms that South African and German respondents are prepared to pay for international/national brands or for local/regional brands. In both countries, respondents felt more strongly about paying more for local products, with Germans' willingness to pay more than South Africans being significantly stronger. However, South Africans were prepared to pay a premium of 23.4% more for local products, whereas the premium Germans were willing to pay was only 12.9%.

Clearly there is a perception by both sets of respondents that local brands are worth paying more for, but there appear to be differences in the value perceptions of local brands between South African and German consumers. These differences could be due to various reasons. Firstly, local or regional products are a relatively newer phenomenon in emerging countries than in developed countries, where farmers' markets have been established for centuries. So, consumers in such emerging markets may have an over exaggerated belief in the benefits of local produce, thus leading them to be prepared to pay more than in a developed

country. A second reason could be due to the South African sample being biased against lower income consumers, resulting in a higher price premium because these higher income sample consumers could afford to pay more.

5.3. Success criteria of local FMCG brands

The regression analysis shows that, for all respondents (i.e. for both countries) 'preference behaviour' is the criterion that is most important to success of small local FMCG brands, with 'credibility', 'commitment' and 'willing to pay for quality' the next most important for South Africa and 'beliefs' and 'willing to pay for quality' the next most important in Germany. The fact that 'willing to pay for quality' scores highly for both countries shows its importance, implying that implanting, in consumers' minds, positive beliefs about quality and value for money of small local brands is critical.

Secondary findings indicate other slight differences between the two countries. In Germany additional emphasis can be placed on 'image' and 'attitude', whereas in South Africa emphasis should also be placed on 'beliefs'', as this was the only other criterion that showed significant influence for South African respondents. From this discussion, it can be seen that the main difference is that Germans place more emphasis on 'image' and 'pay for quality'. This is consistent with the concepts of strong brands and emphasis on quality in Germany – it should thus not be surprising to see these beliefs continuing through to smaller, local brands.

In summary, it is concluded that critical criteria for local FMCG brands differ slightly in Germany compared to those in South Africa. When comparing the specific question findings by country, some differences, in addition to those discussed above, were found in the relative importance of the following image criteria, namely:

- 'Local products having a reduced carbon footprint' was more strongly agreed to in Germany than in South Africa. A possible explanation for this is that German consumers are probably more knowledgeable about such climate change issues than consumers in an emerging market.
- 'Products produced by local companies support local people' was more strongly agreed to in South Africa than in Germany. South Africans have developed a strong sense of patriotism, belonging and love of country which probably brings about this feeling of support for those closest, for neighbours and friends.
- 'Small local firms are more connected to local communities and understand local needs better' was more strongly agreed to in South Africa than in Germany. As mentioned above, a strong sense of community and communal support exists in South Africa, while Germany, which is a more internationally connected country, may not generate such strong local feelings.

6. Conclusion, limitations and further research

The study has shown that respondents from both South Africa and Germany preferred local brands, believing they are better quality, and that they are more supportive of, and connected to, local communities. South Africans feel this

more strongly and show greater commitment and are prepared to pay more for local brands than Germans. Possible reasons for this have been suggested in the Discussion section. Consumers' beliefs regarding quality, value for money and trust in local product manufacture were found to be critical to success of such local brands in smaller local or regional markets.

Although local or regional FMCG brands that are mostly sold in delimited geographic areas are a growing trend, as the literature review shows, very little research on such brands produced by small firms has been done. Thus, this study has contributed to knowledge about both entrepreneurial small businesses and to knowledge about the branding of local, regional products, differentiated between a developed country and an emerging country. This new knowledge includes a better understanding of consumer attitudes towards local FMCG products supplied by small local firms, what prompts consumers to be willing to buy and pay more for them, and what the critical success criteria for these local brands are. The comparative nature of the study, between a developed nation (Germany) and an emerging nation (South Africa), has also provided additional knowledge about such consumer behaviour according to the level of a country's development.

The findings from this study have indicated that specific FMCG brand marketing advice should be provided for local SMEs, irrespective of geographic location. Marketing activities, including advertising, sales promotions, brand labelling, sales pitches, etc. should all be geared towards establishing top of mind awareness of positive beliefs about local brands, namely, positive perceptions of quality, value for money, and trust and faith in small local brands.

Since some differences were found between German and South African perceptions, the following different marketing activities are suggested:

- In Germany, promotional activities for local brands should emphasise their strong local commitment, their local connections and authenticity and their better quality, justifying a higher price. Also, the lower carbon footprint can be stressed.
- In South Africa, marketing activities should include a strong emphasis on identifying with, and commitment to, local brands, and showing a strong link between local brands and their local communities.

As with all research, this study has its limitations. First, the results are delimited to Germany and South Africa. Although the German sample was representative of the German population, the South African sample included only LSMs 7 to 10, and so generalizability of the results is limited. Although it is believed that most purchasers of small local brands in South Africa fall in the LSM 7-10 categories, this could be changing as more members of lower LSMs become more urbanised and possibly strive for the standards of living experienced by the upper LSM categories. Therefore, research into lower LSMs, for example 5 and 6, might be beneficial to avoid possible sample bias.

Second, since the regression analysis explained only about half the variation in 'willingness to buy', a qualitative study could help to identify other possible influencing variables, that were not identified in the literature.

Finally, research is needed into each of the less important, but significant, factors (i.e. 'credibility', 'commitment', 'attitude', 'image') that influence consumers' attitudes towards the purchase of small local/regional brands.

Appendix – Descriptive statistics (n = Germany 442; South Africa 427)*

	Question	Coun-try	Mean	SD	Sig 2 tail	Mean diff	95% conf difference	
1 Preference behaviour	1.1 I always read the labels on FMCG products to see where they are made	Ger	4.28	1.510	.349	.107	-.117	.332
		SAf	4.17	1.849	.350	.107	-.118	.332
	1.2 I always make an effort to look for locally produced FMCGs when purchasing	Ger	4.26	1.491	.270	.122	-.095	.339
		SAf	4.14	1.760	.271	.122	-.095	.340
	1.3 I prefer to buy products from small local producers in preference to those from large national or international producers	Ger	4.56	1.400	.022	.240	.034	.446
		SAf	4.32	1.685	.023	.240	.034	.447
	1.4 I like to buy local FMCG products, especially food, as I believe this is more sustainable and is better for the planet	Ger	4.83	1.431	.634	-.048	-.246	.150
		SAf	4.88	1.542	.635	-.048	-.246	.150
	1.5 A brand name with local meaning encourages me to buy from small local firm	Ger	4.73	1.380	.089	-.168	-.362	.026
		SAf	4.89	1.532	.089	-.168	-.363	.026
2 Beliefs	2.1 I think quality of product/ brand made in my local region is higher than that of a similar national/international product	Ger	4.73	1.377	.005	.281	.084	.478
		SAf	4.45	1.571	.005	.281	.084	.478
	2.2 I believe products made by small local firms are better quality, even if shelf life is not as long as national/international brands	Ger	4.87	1.402	.247	.115	-.080	.309
		SAf	4.75	1.515	.247	.115	-.080	.309
	2.3 I believe products from small local producers are better value for money than those from national/international producers	Ger	4.83	1.358	.934	.008	-.186	.202
		SAf	4.82	1.555	.934	.008	-.186	.203
	2.4 I trust the products of smaller local producers more than I do those produced by national or international manufacturers	Ger	4.89	1.335	.429	.076	-.113	.266
		SAf	4.82	1.506	.430	.076	-.113	.266
	2.5 I have more faith in how products are made by small local producers than by large national or international producers	Ger	4.87	1.344	.510	.063	-.124	.250
		SAf	4.81	1.469	.510	.063	-.125	.251

	Question	Coun-try	Mean	SD	Sig 2 tail	Mean diff	95% conf difference	
3 Willing to buy	3.1 I am a frequent buyer of FMCG brands produced in my local region	Ger	4.81	1.385	.414	.079	-.111	.270
		SAf	4.73	1.474	.415	.079	-.111	.270
	3.2 I expect to pay same price for locally as nationally/ internationally produced FMCGs	Ger	4.54	1.370	.003	.311	.107	.516
		SAf	4.23	1.692	.003	.311	.106	.517
	3.3 I am prepared to pay MORE for a nationally/internationally produced FMCG compared to locally produced FMCG	Ger	3.50	1.617	.612	-.055	-.269	.158
		SAf	3.56	1.590	.612	-.055	-.269	.158
	3.4 I am prepared to pay MORE for a locally made FMCG product compared to one nationally or internationally produced	Ger	4.38	1.514	.008	.282	.074	.489
		SAf	4.10	1.604	.008	.282	.074	.489
4 Willing pay for quality	4.1 The more expensive brands are usually my choice	Ger	3.64	1.542	.060	.207	-.009	.423
		SAf	3.43	1.697	.060	.207	-.009	.423
	4.2 I am always prepared to pay more for quality products	Ger	4.52	1.438	.000	-.639	-.828	-.450
		SAf	5.16	1.397	.000	-.639	-.828	-.450
	4.3 I believe the higher the price of a product, the better the quality	Ger	3.31	1.568	.000	-.641	-.870	-.411
		SAf	3.95	1.870	.000	-.641	-.871	-.411
	4.4 A brand name tells me a lot about the quality of a product	Ger	3.70	1.444	.000	-1.123	-1.32	-.923
		SAf	4.82	1.557	.000	-1.123	-1.32	-.923
5 Image local/ regional FMCG	5.1 FMCG products made by small local/ regional firms have lower carbon footprint	Ger	4.86	1.323	.038	.185	.010	.360
		SAf	4.68	1.299	.038	.185	.011	.360
	5.2 FMCG products made by small local / regional firms have high product quality	Ger	4.71	1.196	.792	.022	-.141	.184
		SAf	4.69	1.246	.792	.022	-.141	.185
	5.3 FMCG products made by small local / regional firms use local ingredients	Ger	4.65	1.255	.000	-.421	-.586	-.256
		SAf	5.07	1.218	.000	-.421	-.586	-.256
	5.4 FMCG products made by small local / regional firms are more authentic	Ger	4.96	1.306	.330	-.085	-.257	.087
		SAf	5.05	1.274	.330	-.085	-.257	.086
	5.5 FMCG products made by small local / regional firms support local people	Ger	5.25	1.344	.038	-.184	-.358	-.011
		SAf	5.43	1.262	.037	-.184	-.358	-.011
	5.6 Small local/regional firms are more connected with local communities and so understand local needs better	Ger	5.20	1.281	.012	-.218	-.388	-.047
		SAf	5.41	1.278	.012	-.218	-.388	-.047
Characteristics of local FMCGs								

	Question	Coun-try	Mean	SD	Sig 2 tail	Mean diff	95% conf difference	
6 Integrity	6.1 In my view, local and regional brands are honest towards consumers'	Ger	4.82	1.296	.904	.011	-.167	.189
		SAf	4.81	1.375	.904	.011	-.167	.189
	6.2 In my view, local/regional brands' com-munication is sincere towards consumer	Ger	4.81	1.241	.596	-.047	-.221	.127
		SAf	4.85	1.370	.596	-.047	-.221	.127
	6.3 I find that local and regional brands show an interest in their consumers	Ger	5.02	1.276	.225	-.108	-.284	.067
		SAf	5.13	1.356	.226	-.108	-.284	.067
7 Credibility	7.1 Local/regional brands reassure me traceable, comply to standards, expertise	Ger	5.00	1.288	.454	.066	-.106	.237
		SAf	4.93	1.289	.454	.066	-.106	.237
	7.2 I prefer buying products of local brands because their quality is guaranteed	Ger	4.77	1.283	.302	-.093	-.269	.083
		SAf	4.86	1.359	.302	-.093	-.269	.084
	7.3 I trust in the quality of the products of local and regional brands	Ger	5.06	1.234	.551	.052	-.119	.222
		SAf	5.00	1.327	.551	.052	-.119	.223
8 Benevolence	8.1 Local brands constantly try to improve products to better satisfy consumers	Ger	4.87	1.257	.014	-.216	-.387	-.044
		SAf	5.08	1.315	.014	-.216	-.387	-.044
	8.2 I think local/regional brands renew pro-ducts to adapt to consumers' expectations	Ger	4.69	1.249	.000	-.317	-.486	-.148
		SAf	5.01	1.288	.000	-.317	-.486	-.148
9 Attachment	9.1 I'm attracted to local and regional brands	Ger	4.88	1.341	.025	-.206	-.387	-.026
		SAf	5.08	1.363	.025	-.206	-.387	-.026
	9.2 I feel connected to local/regional brands	Ger	4.95	1.356	.453	-.069	-.248	.111
		SAf	5.02	1.339	.453	-.069	-.248	.111
10 Commitment	10.1 I feel committed to local and regional brands	Ger	4.39	1.492	.000	-.520	-.712	-.327
		SAf	4.91	1.395	.000	-.520	-.712	-.327
	10.2 Local and regional brands are very meaningful to me	Ger	4.62	1.359	.003	-.279	-.463	-.096
		SAf	4.90	1.399	.003	-.279	-.463	-.096
	10.3 I identify strongly with local and regional brands	Ger	4.55	1.430	.005	-.270	-.458	-.081
		SAf	4.82	1.401	.005	-.270	-.458	-.081
11 Attitude	11.1 I find local and regional brands interesting	Ger	5.10	1.274	.843	-.017	-.189	.155
		SAf	5.11	1.310	.843	-.017	-.190	.155
	11.2 Local and regional brands are brands that I buy or could buy	Ger	5.08	1.263	.027	-.188	-.354	-.021
		SAf	5.26	1.232	.027	-.188	-.354	-.022

** Grey colour indicates where the answers were statistically significantly different between German and South African respondents, i.e. p<.0.05.*

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