Economic impact of the Klein Karoo National Arts festival: investigating the application of different models

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March 2012

Abstract

This article focuses on an economic assessment of the target obtained in South Africa regarding the Klein Karoo National Arts Festival (KKNK) applying both SAM and CGE models. Since both models have advantages and disadvantages, tourism economists are confronted with the predicament of determining which model is most suitable for application to any specific event. The findings reveal that when different models are applied to the same dataset from an event, the reported economic impact results differ significantly. Results indicate that considerations such as the data collection or compilation, expected output, research objectives and costs involved will determine the choice of a specific modelling framework. Data from a visitor survey conducted at the KKNK during 2010 were used in the analyses. This finding serves as a warning to assessors that economic impact results can be misleading and, therefore, the application thereof should be handled with the utmost care as the results can readily be misinterpreted by stakeholders.

Keywords

Arts festivals, Economic impact, Event tourism, Multiplier analysis, Regional CGE modelling, Social accounting Value at Risk, asymmetric GARCH, Extreme Value Theory, violations

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1. INTRODUCTION

In recent years, serious criticisms have been raised against the integrity of analyses conducted and the outcomes of economic impact studies. Crompton (1999) states bluntly that the integrity of many economic impact assessment studies is questionable. A number of researchers and consultants have succumbed to the temptation to adopt inappropriate procedures and assumptions in order to generate high economic impact results (Saayman & Rossouw, 2008). This is done with the intention of portraying the event more favourably in the mind of taxpayers, elected officials and politicians to sustain or even increase the resources that were allocated. Comments such as, 'They are, in truth, the exact equivalent of an expert witness in a lawsuit who comes to testify in support of the side that is paying the expert's bill' and, 'The fees for the study are like a religious tithe paid to a priest to come and bless the endeavour', (Curtis, 1993:7), unfortunately confirm this opinion.

Crompton's (1999) research records a regrettable incident in which two independent tourism agencies were requested to evaluate the same event. Their reports contained disparate data resulting from the different approaches used for accounting for the use of public funds. Crompton is of the opinion that several underlying assumptions were made during the survey that had a substantial impact on the results. Whether these errors were made due to a genuine lack of understanding of the principles and procedures of an economic impact analysis, or were committed deliberately in order to generate a better picture, is somewhat immaterial. The result of either error is that the stakeholders were misled.

Literature indicates that various methods of assessment have been applied in numerous international studies to determine the economic impact of events. The most prevalent models used in these surveys include Input-Output (I-O), Social Accounting Matrix (SAM) and Computable General Equilibrium (CGE) models. As may be anticipated, each model is characterised with individual strengths and weaknesses.

This article will investigate the application of two of the aforementioned models (CGE and SAM) to determine the economic impact of the Klein Karoo National Arts Festival (hereafter referred to as KKNK).

2. LITERATURE REVIEW

In recent years, events and festivals have served as agents to accomplish objectives such as creating infrastructure, providing jobs, generating revenue, attracting investment, growing the arts, promoting a region and building a better image (Gursoy, Kim & Uysal, 2004; Snowball, 2000). It becomes clear that an event influences several aspects of a community, and to a large extent, the economy of the community.

With regard to the most popular models in use, the literature reveals that, in applying models to estimate the economic impact of changes in an economy since 2000, two approaches, namely I-O and CGE models, were primarily used. Very often, SAM models, seen as an improvement on or expansion of I-O models, were included in these referrals. The referrals refer to what the literature study revealed. Since 2000, I-O, SAM and CGE appear to be the most popular models used to assess the economic impact of events (including arts festivals).

An I-O model analyses the interdependence of industries in an economy. In its most basic form, it represents a system of linear equations that describes the distribution of an industry's product through the economy. This model is a comprehensive method for estimating the flow of money between sectors, sub-sectors, businesses, organisations and consumers, by monitoring the effects when various multipliers are applied (Reeves, 2002). The application of this model can measure the effects of macro-economic changes to the local economy and can investigate the monetary contribution of a certain sector to the local economy. Models can be tailored to specific conditions and economies or can be used to address economies of scale associated with changes of output. SAM models include both social and economic data of an economy and are regarded as broader-based models and their application is, therefore, favoured. I-O tables, national income statistics and household income and expenditure statistics serve as the foundations of this model and they will, therefore, include typical national accounts that present different kinds of transactions within an economy (Cameron, 2003). Therefore, a SAM is broader than an I-O table and typical national accounts, showing more detail about all kinds of transactions within an economy. However, an I-O table records economic transactions irrespective of the social background of the transactors. According to Cameron (2003), SAM models present a means for the logical arrangement of statistical information concerning the flow of income in a country's economy within a set period (usually for a period of 12 months).

White and Patriquin (2003) indicate that potential changes in one sector of an economy can have a significant impact on other sectors within the economy. By applying an I-O, SAM or CGE model, this sectoral impact can be estimated. Even though these models can be regarded as competitors, each model is applicable to specific situations and may even be complementary to each other, under certain conditions. For example, I-O and SAM serve as building blocks to develop CGE models. Although CGE models require a large amount of data and are costly to implement, they overcome many of the limitations experienced with the I-O and SAM models.

Cordier and Hecq (2008) define CGE models as a class of economic models that use actual economic data to predict how an economy might react in an event of changing policy, technology or other external factors. The inclusion of the SAM within a conceptual framework as provided by the CGE model (that contains the behavioural and technical relationships between variables within and among sets of accounts) could prove very useful when evaluating the economic effects of event policy changes and other economic phenomena.

Studies using a SAM for the assessment of the economic impact of events were conducted by Wagner (1997), Edmiston and Thomas (2004), Saayman, Rossouw and Saayman (2008), Rivera, Hara and Kock (2008), Saayman and Rossouw (2010), as well as by Kruger, Saayman, Saayman and Rossouw (2011). On the other hand, examples of studies that applied CGE models for evaluation are evident in the assessments conducted by various researchers such as Adams and Parmenter (1995), Narayan (2004), URS Finance and Economics (2004), Blake (2005), PricewaterhouseCoopers (2005), Dwyer, Forsyth and Spurr (2006a and 2006b), Bohlmann and Van Heerden (2008), Saayman and Rossouw (2008) and Rossouw and Saayman (2011). The question that remains is which one should be used or is the preferred approach for an arts festival?

3. METHODOLOGY

Since the initial festival in March 1995, the KKNK has evolved into a contemporary event that claims to be liberated from any political, cultural or religious affiliations. Approximately 1 000

artists perform in more than 200 productions and exhibitions over a period of eight days in the Klein Karoo town of Oudtshoorn. The festival is renowned for exciting open-air concerts that receive overwhelming support and accolades (Erasmus, Slabbert, Saayman, Saayman & Oberholzer, 2010). The cited research confirms that the KKNK has the highest attendance rate of all the national festivals and is, therefore, recognised as the largest national arts festival in South Africa.

A destination-based survey, where interviews were held on-site during the event, was conducted. Participants responded to predetermined questions using the recall method. During the 2010 KKNK, data from 481 completed questionnaires were analysed. In order to ensure a scientific data analysis, the collected sets of data were coded in Microsoft™ Excel™ and processed by means of the Statistical Package for Social Science (SPSS).

3.1 SAM multiplier model

A SAM for the Western Cape was used to determine the direct, indirect and induced impact of visitor and organiser spending. Within the SAM framework, data are organised in a logically consistent manner. The SAM ties all expenditure made by the sector to the recipients of the relevant sector (Schwarm & Cutler, 2003).

According to Saayman and Rossouw (2010), data from supply and use tables, national statistics and household income and expenditure statistics are required to compile a SAM. Providing a consistent framework for economy-wide models, a SAM generates detailed accounts for industries, workforce categories, institutional sub-sectors and various socio-economic household groups (Raa & Sahoo, 2007). The various institutions are classified according to their socio-economic backgrounds despite their economic or functional contribution (Chowdhury & Kirkpatrick, 1994).

The analysis was based on a SAM using a consistent and comprehensive dataset of all manual transactions among productive and institutional sectors of the province's economy. Using 2006 prices as a baseline, it distinguishes between 55 sectors, 12 household types and four ethnic groups. By making use of multipliers calculated from the SAM, the direct spending of visitors at the KKNK, as calculated in TABLE 1, is converted to the linked increase in production, income and jobs in the region, represented by the indirect and induced impact.

3.2 CGE model

According to Liu and Chen (2004), CGE models combine the advantages of econometric I-O and SAM models that strengthen the theoretical basis of the modelling effort and, therefore, enable more precise policy analyses.

We use a Western Cape Province adaptation of the Paraná SAM model[1] to execute our simulations. The simple SAM-based CGE model was constructed in GEMPACK (General Equilibrium Modelling PACKage) and adapted with data from the Western Cape SAM[2]. The resulting model had 55 industrial sectors that produce 55 products. The model followed traditional neo-classical hypotheses of economic rationality, which means that each sector minimises its production costs subject to constant returns to scale, and input prices are given. Families used their income according to traditional functions of utility maximisation (Rolim & Kureski, 2006).

Two regions for world trade were considered: the Rest of South Africa and the Rest of the World. Furthermore, imports were regarded as compound goods used in different proportions

throughout all sectors. The model also considered that all payments for production factors were received by local families.

The matrix did not distinguish between activities and products. The entrance of commodities signified the purchase of compound goods formed by local and imported commodities. Imported products were only used directly by firms.

The specific model closure used for simulating the economic impact of the expenditure incurred by festival attendants at the KKNK in 2010 is a modified version of a standard short-run closure. Given the short-run nature of the simulation (owing to the short-run nature of the festival), investment is, therefore, held constant.

The shocks applied to the Western Cape economy were made by means of a simulation where the household consumption expenditure for the specified industries per spending group was increased by a certain percentage each. The scenarios (that is, different spending patterns per spending group) also simulated the overall impact of spending at the festival.

In order to reflect correctly the period under consideration, and to allow for the economic components as identified above, certain variables were held to be exogenous. Private consumption expenditure, capital stocks, technical change, tax rates and investment were all considered to be exogenous, while employment was regarded as endogenous. From a macro-economic point of view, the impact on GDP and employment levels naturally attracts the most attention, but the results of the various shocks on an industry level are also of great value to business enterprises and investors.

The shocks applied in the various simulations and the respective magnitudes per sector were based on calculations made from expenditure figures taken from festival surveys as well as household expenditure figures per sector for the Western Cape. However, the precise magnitude of festival-specific capital and infrastructure expenditures remains a contentious issue. Therefore, the impact of these investments was not considered in the analysis.

4. RESULTS OF THE SAM MULTIPLIER ANALYSIS

The impact scenario chosen for this study is the impact of expenditures by visitors to the KKNK in Oudtshoorn in 2010 on the Western Cape economy. This application presents as near as possible a valid comparison of the two models (i.e. SAM and CGE), since visitor expenditures can be classified as final demand (final consumption expenditure of visitors) in both models.

The expenditure data by visitors have been deflated to 2006 values, allocated to industry sectors and converted to producers' values to be compatible with the Western Cape SAM. All the results are expressed in 2006 values. The implementation of the impact analyses in both models is similar, in that the visitor expenditures are incorporated into the models as final demand shocks.

4.1 SAM: Total direct spending

Direct spending by visitors at an event serves as the first input when assessing the economic impact that occurs. Visitor spending via a survey at the KKNK was sectioned into foreign visitors, local visitors and visitors from the rest of South Africa. Leakages, such as Value Added Tax (VAT) payments to SARS in Pretoria, commission payable to Computicket in Johannesburg and

remuneration payable to artists residing outside the province, were excluded. After considering these adjustments, the direct spending (including visitors and organiser spending) totalled R47 252 259.

Based on the information obtained from the questionnaires, the spending pattern of visitors who attended the 2010 KKNK could then be determined and the specific item spending (deflated to 2006 values) per visitor category is listed in TABLE 1.

TABLE 1:   Total adjusted expenditure (ZAR, 2006 Prices) by visitors at the KKNK

SPENDING ITEM	FOREIGN	LOCAL (WESTERN CAPE)	REST OF RSA	TOTAL
Accommodation	108 996	8 340 743	1 713 211	10 162 950
Food and Restaurants	72 767	6 935 288	966 461	7 974 515
Liquor	16 887	3 106 701	433 319	3 556 907
Soft drinks	37 458	1 451 115	232 805	1 721 378
Performances	23 027	6 174 886	742 661	6 940 575
Purchases: Retailers	73 688	2 626 542	518 216	3 218 446
Purchases: Stalls	81 364	5 962 918	711 582	6 755 863
Amusement Parks / Adventure Activities	0	344 317	67 477	411 794
Transport to KKNK	58 336	3 543 280	1 046 046	4 647 662
Transport at the KKNK	0	410 903	116 792	527 695
Parking	0	254 998	39 488	294 487
Other	0	1 012 730	27 259	1 039 989
TOTAL	472 523	40 164 420	6 615 316	47 252 259

Source: *Authors' calculations based on visitor surveys*

4.2   SAM: Foreign expenditure

The acquisition of goods and the utilisation of services by visitors from abroad contribute significantly to the revenue generation within the province. From the results displayed in TABLE 2, it is evident that the spending incurred by foreign visitors was mostly tourism related.

A direct impact was encountered in the trade and accommodation (61.6%)[3], transport and communication (44.9%)[4] and financial and business services (17.5%)[5] sectors. Applying the principle of backward linkages, the same sectors revealed a significant indirect and induced impact, namely for trade and accommodation (indirect R171 683, induced R114 934), transport and communication (indirect R46 245, induced R24 073) and the financial and business services (indirect R61 162, induced R37 376).

TABLE 2:   Impact through production multipliers (ZAR, 2006 prices) – foreign, local (Western Cape), rest of South Africa and total

SECTOR	DIRECT IMPACT	INDIRECT IMPACT	INDUCED IMPACT	TOTAL IMPACT	PERCENTAGE (TOTAL)
FOREIGN					
Agricultural	0	664	350	1 873	0.2%
Mining	0	42	48	209	0.0%
Manufacturing	0	21 976	10 058	56 874	6.1%
Electricity and water	0	1 037	762	3 754	0.4%
Construction	0	980	321	2 116	0.2%
Trade and accommodation	391 159	171 683	114 934	539 562	58.3%
Transport and communication	58 336	46 245	24 073	127 536	13.8%
Financial and business services	23 027	61 162	37 376	185 214	20.0%
Community services	0	2 714	2 256	8 776	0.9%
TOTAL	472 523	306 503	190 178	925 913	100.0%
LOCAL (WESTERN CAPE)					
Agricultural	0	53 885	28 577	152 431	0.2%
Mining	0	3 479	3 986	17 201	0.0%
Manufacturing	0	1 824 469	836 269	4 731 788	6.0%
Electricity and water	0	84 496	62 029	305 726	0.4%
Construction	0	80 822	26 424	174 463	0.2%
Trade and accommodation	28 423 307	12 818 428	8 572 440	40 423 000	51.4%
Transport and communication	3 954 182	3 537 918	1 836 204	9 720 252	12.4%
Financial and business services	6 519 203	6 772 681	4 293 980	20 731 316	26.4%
Community services	1 267 729	365 167	668 460	2 399 273	3.1%
TOTAL	40 164 420	25 541 344	16 328 368	78 655 449	100.0%
REST OF SOUTH AFRICA					
Agricultural	0	9 604	5 125	27 270	0.2%
Mining	0	654	749	3 234	0.0%
Manufacturing	0	322 119	145 932	833 864	6.4%
Electricity and water	0	15 605	11 456	56 464	0.4%
Construction	0	13 406	4 383	28 938	0.2%
Trade and accommodation	4 575 593	2 100 265	1 400 460	6 624 442	50.8%
Transport and communication	1 162 838	754 388	394 013	2 093 805	16.1%
Financial and business	810 138	1 033 000	648 798	3 151 851	24.2%

SECTOR	DIRECT IMPACT	INDIRECT IMPACT	INDUCED IMPACT	TOTAL IMPACT	PERCENTAGE (TOTAL)
services					
Community services	66 747	48 287	59 098	219 841	1.7%
TOTAL	6 615 316	4 297 327	2 670 013	13 039 709	100.0%
			TOTAL IMPACT		
Agricultural	0	64 153	34 052	181 573	0.2%
Mining	0	4 176	4 783	20 644	0.0%
Manufacturing	0	2 168 563	992 259	5 622 526	6.1%
Electricity and water	0	101 138	74 246	365 944	0.4%
Construction	0	95 209	31 127	205 517	0.2%
Trade and accommodation	33 366 059	15 090 376	10 087 834	47 587 004	51.4%
Transport and communication	5 175 356	4 338 550	2 254 290	11 941 593	12.9%
Financial and business services	7 352 368	7 866 842	4 980 154	24 068 381	26.0%
Community services	1 334 475	416 167	729 813	2 627 890	2.8%
TOTAL	47 252 259	30 145 174	19 188 559	92 621 071	100.0%

Source: *Authors' SAM model results*

It should be noted that the direct effect of the expenditure by foreign visitors was 46.4%, the indirect effect 33.1% and the induced effect 20.5% of the total increase in expenditure. Sectors affected by experiencing a significant impact were trade and accommodation (58.3%), financial and business services (20.0%) and transport and communication (13.8%).

4.3 SAM: Local (Western Cape) expenditure

From the data collected (refer to TABLE 2), it was estimated that the total impact of local expenditure totalled R78 655 449. The sectors that benefited the most were trade and accommodation (51.4%), financial and business services (26.4%) and transport and communication (12.4%). Of the total increase in expenditure in the province related to local spending, the direct impact represented 46.8%, the indirect impact 32.5% and the induced impact 20.8%.

TABLE 2 indicates that the direct impact on the province's economy as result of spending by local visitors was R40 164 420. Although nine activity sectors were identified, only four benefited from the direct impact, namely trade and accommodation (60.7%), transport and communication (41.5%), community services (39.7%) and financial and business services (36.4%). By applying the principle of backward linkages, large indirect (R25 541 344) and induced (R16 328 368) impacts were also noted. In view of this, it may be assumed that in the absence of the festival, expenditure by local visitors would have been reduced and, therefore, a smaller amount would have been spent within the province.

4.4 SAM: Rest of South Africa expenditure

As confirmed with the expenditure by foreign and local visitors, again the most significant impact occurs within the trade and accommodation (50.8%), financial and business service (24.2%) and transport and communication (16.1%) sectors. The application of the backward linkages principle indicates that the trade and accommodation sector amounts to R4 575 594 (60.4%) when evaluating the direct impact. Significant indirect impacts are also noted in the construction (46.3%), manufacturing (38.6%), agricultural (35.2%) and electricity (27.6%) sectors.

The direct impact of visitors from the rest of South Africa is estimated at R6 615 316 (46.6%), the indirect impact R4 297 327 (33.0%) and the induced impact at R2 670 013 (20.5%). The total increase in local expenditure is estimated at R13 039 709. Sectors that benefited the most are similar to those of foreign visitors, namely trade and accommodation, financial and business services and transport and communication. The total of these three sectors represents approximately 91% of the total expenditure by KKNK visitors from the rest of South Africa.

4.5 SAM: Total impact

In order to evaluate the total economic impact within the province, the calculated direct impact needs to be adjusted by means of the multiplier effect.

TABLE 3: The impact of the KKNK on regional production

SECTOR	FOREIGN SPENDING	LOCAL SPENDING (WC)	REST OF SOUTH AFRICA SPENDING	DIRECT IMPACT	PRODUCTION MULTIPLIERS[a]	TOTAL IMPACT
Agricultural	0.000	0.000	0.000	0.000	2.823	0.182
Mining	0.000	0.000	0.000	0.000	2.745	0.021
Manufacturing	0.000	0.000	0.000	0.000	2.815	5.623
Electricity and water	0.000	0.000	0.000	0.000	2.560	0.366
Construction	0.000	0.000	0.000	0.000	3.003	0.206
Trade and accommodation	0.391	28.423	4.576	33.390	2.840	47.587
Transport and communication	0.058	3.954	1.163	5.175	2.754	11.942
Financial and business services	0.023	6.519	0.810	7.352	2.684	24.068
Community services	0.000	1.268	0.067	1.334	3.160	2.628
TOTAL	0.473	40.164	6.615	47.252		92.621

Source: *Authors' SAM model results*

[a]Unit in R million excluding variable production multipliers

The total impact of the festival on each of the province's economic sectors (as summarised in TABLE 3) was calculated by multiplying the direct economic impact in each sector by means of specific production multipliers. An estimated total impact of the festival within the province was then determined by means of adding the total impact values of the different sectors.

From TABLE 2 it can be noted that the direct impact (R47 252 259) increased to a total impact of R92 621 071 when the indirect (R30 145 174) and induced impact (R19 188 559) are also taken into account. This represents an aggregated production multiplier of 1.96. This implies that for every rand that visitors spent in the province, an additional 96 cents are generated in terms of indirect expenditure. In order to calculate the aggregated production multiplier, the total impact is divided by the direct impact.

In TABLE 4, specific household income multipliers for each activity sector are calculated and then multiplied with the values of the total sector's impact on family income due to the presentation of the KKNK. It is estimated that an annual remuneration total of R38 435 193 would have been lost to Western Cape households should the festival not have taken place. The aggregated income multiplier is valued at 0.39 and this can be interpreted as an increment of the Western Cape family's income for each rand that is spent by visitors to the province.

Labour, as an important factor in the production process, is also positively impacted. As can be seen from TABLE 5, in addition to the number of employees directly involved in the event, 760 jobs may be exclusively dependent on the festival. These employment opportunities include direct, indirect and induced impacts, and represent both full- and part-time jobs. The sectors that would be the most affected by the absence of the festival are trade and accommodation, financial and business services and community services.

TABLE 4:   The impact of the KKNK on family income

Sector	Total Impact (R Million)	Direct Impacts (R Million) and Induced			
		Rest of the Households	Low-Income Households	Total Households	Percentage (Total)
Agricultural	0.182	0.005	0.062	0.067	0.2%
Mining	0.021	0.000	0.008	0.008	0.0%
Manufacturing	5.623	0.117	1.967	2.085	5.4%
Electricity and water	0.366	0.007	0.126	0.133	0.3%
Construction	0.206	0.004	0.069	0.074	0.2%
Trade and accommodation	47.587	1.031	18.532	19.563	50.9%
Transport and communication	11.942	0.195	4.853	5.048	13.1%
Financial and business services	24.068	0.355	9.977	10.332	26.9%
Community services	2.628	0.098	1.029	1.127	2.9%
TOTAL	92.621	1.813	36.622	38.435	100.0%

Source: *Authors' SAM model results*

It is important to bear in mind that the I-O tables can only be used to this effect when the job coefficients are known. This requires the existence of estimates for the relationship job-production. Therefore, based on the values presented previously, an alternative method can be applied to present an estimate of the festival's impact at the level of jobs in the region.

TABLE 5:   The impact of the KKNK on employment

SECTOR	TOTAL IMPACT (R MILLION)	LABOUR MULTIPLIERS	EQUIVALENT JOBS (NUMBER)
Agricultural	0.182	20.93	4
Mining	0.021	4.82	0
Manufacturing	5.623	3.63	20
Electricity and water	0.366	4.91	2
Construction	0.206	11.26	2
Trade and accommodation	47.587	11.12	529
Transport and communication	11.942	1.67	20
Financial and business services	24.068	5.89	142
Community services	2.628	15.54	41
TOTAL	92.621		≈760

Source: *Authors' SAM model results*

[a]The labour multiplier indicates the number of job opportunities that will be created as a result of change in production of 1 million by a particular activity.

This can be done by converting the event's expenditure in the region to equivalent job units. Although the input-output analysis can be used for this purpose, Wilson and Raymond (1973) proposed an equation that allows the calculation of credible estimates for these values and which is given by:

$$Equivalent\ Jobs = \sum \frac{S_i}{R_i} \qquad (1)$$

where S_i represents the amount of expenditure in the activity sector I and R_i represents the average business volume per worker of the sector i. Based on this equation, and using data from Statistics South Africa relative to the business volume and jobs by activity sector in the province in 2006, it was possible to obtain an estimate of the impact of the festival with regard to the regional job level (refer to TABLE 6).

TABLE 6 indicates the number of employment opportunities that were generated within the regional economy as a result of the festival being presented. In addition to the number of employees directly employed by the festival organisers, a total of 946 job opportunities may depend upon the festival.

TABLE 6:   **The regional impact of the KKNK on the level of employment**

SECTOR	*TOTAL IMPACT (R MILLION)*	*TRANSACTION VOLUME/ VOLUME OF JOBS*	*EQUIVALENT JOBS (NUMBER)*
Agricultural	0.182	0.019	10
Mining	0.021	7.905	0
Manufacturing	5.623	2.512	2
Electricity and water	0.366	0.009	43
Construction	0.206	0.061	3
Trade and accommodation	47.587	0.076	627
Transport and communication	11.942	0.416	29
Financial and business services	24.068	0.126	191
Community services	2.628	0.063	42
TOTAL	92.621		≈946

Source: *Authors' calculations*

5. RESULTS OF THE CGE MODEL ANALYSIS

The assessment after applying a CGE model in order to determine the economic impact of the KKNK will now be discussed in terms of its total direct spending and simulated results.

5.1   CGE: Total direct spending

When applying the CGE model, the local economy was shocked by stimulating the household consumption expenditures for the specified industries per spending group by means of increasing each by a specific percentage. The different spending patterns per spending group also stimulated the overall impact of spending at the festival. The results after applying shocks are summarised in TABLE 7.

5.2   CGE: Western Cape wide macro-economic effects

When interpreting the findings of the shock to the Western Cape economy, it is essential to keep the type of model closure, or assumptions under which this simulation is run, in mind. In the simulated scenario, the impact of the increased demand for the relevant goods and services is measured. TABLE 8 presents a summary of selected macro-economic results obtained for the given shocks applied to the economy.

In the simulated scenario, the increase in household expenditure leads to higher GDP growth and employment, higher prices, lower exports owing to a decrease in competitiveness, and a negative impact on the balance of trade. Given the nature of the shock and model closure, these results are to be expected. Prices increase in this scenario because of the increase in demand for goods.

TABLE 7: **Spending of visitors at the KKNK (% change)**

SECTORS WHERE SPENDING WAS INCURRED	FOREIGN	LOCAL (WC)	REST OF RSA	TOTAL
Trade	0.001%	0.020%	0.003%	0.023%
Accommodation	0.002%	0.134%	0.024%	0.159%
Transport services	0.001%	0.012%	0.004%	0.016%
Business activities	0.001%	0.021%	0.003%	0.023%
Activities / services	0.001%	0.072%	0.004%	0.075%
Total increase in HH expenditure due to festival	0.006%	0.258%	0.036%	0.297%

Source: *Authors' calculations based on visitor surveys*

The increase in productivity owing to the increased demand enables output to increase relative to inputs. Growth in GDP and employment improves because of the relatively cheaper cost of production. Higher prices in the economy would weaken the real exchange rate of the country, decrease its competitiveness in international trade and lead to a lower demand for domestic exports. This increase in the cost of a specific parcel of the provincial labour force led to a 0.011% increase of the real provincial GDP and a 0.05% nominal increase. It shows only a small effect over total employment, yet it provided a 0.063% increase in real household consumption.

TABLE 8: **Summary of results for scenarios – provincial and sectoral level impacts**

MACRO-ECONOMIC EFFECTS	FOREIGN	WESTERN CAPE PROVINCE	REST OF RSA	TOTAL
	ZAR	ZAR	ZAR	ZAR
Western Cape Economy				
Real GDP	1.804 635	46 343 654	8.660.298	56.808.587
%Change	0.000	0.009	0.001	0.011
Production	1 423 741	36 689 145	6 809 058	44 077 727
%Change	0.000	0.008	0.001	0.009
Employment (#)	5	198	23	222
%Change	0.000	0.017	0.003	0.020
Consumer prices	–	–	–	–
%Change	0.001	0.033	0.006	0.041
Price of labour	1 036 851	26 639 083	5 024 737	32 700 670
%Change	0.001	0.033	0.006	0.041
Total exports	-4 613 926	-116 202 578	-22 044 313	-142 860 816
%Change	–0.003	–0.068	–0.013	–0.084
Competitiveness	–	–	–	–
%Change	–0.001	–0.034	–0.007	–0.042

MACRO-ECONOMIC EFFECTS	FOREIGN	WESTERN CAPE PROVINCE	REST OF RSA	TOTAL
Balance of trade	–333 819	–8 568 033	–1 641 279	–10 543 131
%Change	–0.001	–0.031	–0.006	–0.038
Sector effects Value added (Price)				
Natural Resources	3 061	22 747	15 497	47 047
%Change	0.000	0.001	0.000	0.002
Manufacturing	138 221	3 544 921	673 828	4 290 113
%Change	0.001	0.024	0.004	0.029
Employment (Volume)				
Natural Resources	–1	–36	–6	–42
%Change	–0.001	–0.022	–0.004	–0.027
	ZAR	ZAR	ZAR	ZAR
Manufacturing	–3	–80	–14	–95
%Change	–0.001	–0.039	–0.007	–0.047
Services	9	313	43	359
%Change	0.001	0.030	0.005	0.036
Household effects				
Real household consumption	649 835	17 570 537	3 215 850	21 111 304
%Change	0.002	0.053	0.010	0.063

Source: *Authors' CGE model results*

TABLE 8 shows a relatively large increase in production and imports. This is mostly due to the respective increase in demand for goods and related productivity. The changes in investment and inventory levels are zero because of the nature of the short-run model closure used in this simulation. In order to fully understand the magnitude and direction of change to macro-economic variables such as GDP, employment and exports caused by the simulated shocks, it is essential to look at the disaggregated micro-economic or industry-specific results. The following tables in this section present a view of the changes in activity levels of selected industries.

5.2.1 CGE: Foreign expenditure

TABLE 9 indicates that the increase in output of R1 423 741 can be ascribed to foreign expenditure and represents only 3.23% of the increase in output by all spending groups. The financial and business services as well as the transport and communication sectors reveal an increase in output of 0.002%, the largest for this spending group. All remaining sectors reflect a minor impact.

TABLE 9:   Aggregate sectoral level impacts (structural effects for the regional model only) - foreign

EFFECT OF INCREASED EXPENDITURE DUE TO FESTIVAL Sector annualised % change	VALUE ADDED		EXPORTS		IMPORTS		EMPLOYMENT	
	Volume	Price (ZAR)	Volume	Price (ZAR)	Volume	Price (FCU)	Volume	Nominal Wage
Agriculture, forestry and fishing (1)	-	2 871	-	5 699	-	-	-1	4 102
% Change	0.000	0.000	-0.001	0.000	0.000	0.000	-0.001	0.001
Mining (2-4)	-	190	-	15	-	0	0	479
% Change	-0.001	0.000	0.000	0.000	0.000	0.000	-0.001	0.001
Manufacturing (5-25)					-	0	-3	28 144
% Change	-0.001	0.001	-0.004	0.001	0.002	0.000	-0.001	0.001
Electricity & water (26-27)	-							
% Change	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000
Construction (28)	-	41 272	-	0	-	0	0	6 546
% Change	0.000	0.001	-0.002	0.001	0.000	0.000	0.000	0.001
Trade & accommodation (29-30)	-	205 661	-	262 234	-	0	0	23 783
% Change	0.000	0.001	-0.005	0.001	0.002	0.000	0.000	0.001
Transport & communication (31-32)	-	176 576	-	113 702	-	0	1	10 915
% Change	0.001	0.002	-0.007	0.002	0.002	0.000	0.002	0.001
Financial & business services (33-35)	-	602 579	-	362 562	-	0	4	26 327
% Change	0.001	0.002	-0.009	0.002	0.000	0.000	0.002	0.001
Community services (36-37)	-	240 593	-	1 708	-	0	3	53 764
% Change	0.001	0.001	-0.006	0.001	0.003	0.000	0.001	0.001
Industry average	-	158 193	-	95 514	-	0	0	17 278
% Change	0.000	0.001	-0.004	0.001	0.001	0.000	-0.001	0.001
TOTAL	-	1 423 741	-	859 629	-	-	4	155 501

Source: *Authors' CGE model results*

5.2.2 CGE: Local (Western Cape) expenditure

In general, the expenditure by local visitors is excluded when calculating the economic impact of an event. However, in this simulation, the impact due to the spending of locals was calculated in order to obtain a more comprehensive assessment. As per TABLE 10, the local spending group

contributes to the largest increase in output (R36 689 145). The most significant increase in output is experienced in the financial and business services sector (0.058%). This sector is followed by transport and communication (0.049%) and the community services sectors (0.038%).

TABLE 10: Aggregate sectoral level impacts (structural effects for the regional model only) – local

EFFECT OF INCREASED EXPENDITURE DUE TO FESTIVAL *Sector annualised % change*	*VALUE ADDED*		*EXPORTS*		*IMPORTS*		*EMPLOYMENT*	
	Volume	Price (ZAR)	Volume	Price (ZAR)	Volume	Price (FCU)	Volume	Nominal Wage
Agriculture, forestry and fishing (1)	–	17.225	–	56 992	–	0	-34	105 388
% Change	-0.005	0.001	-0.008	0.002	-0.006	0.000	-0.017	0.033
Mining (2-4)	–	5.522	–	438	–	0	-1	12.315
% Change	-0.014	0.001	-0.012	0.003	-0.011	0.00	-0.025	0.033
Manufacturing (5-25)	–	3 544 921	–	2.939.575	–	0	-80	723.078
% Change	-0.024	0.024	-0.094	0.024	0.040	0.000	-0.039	0.033
Electricity & water (26-27)	–	380.923	–	0	–	0	1	37 031
% Change	0.003	0.034	0.000	0.000	0.000	0.000	0.010	0.033
Construction (28)	–	1 061 278	–	–	–	0	-4	168 186
% Change	-0.002	0.027	0.055	0.014	0.000	0.000	-0.004	0.033
Trade & accommodation (29-30)	–	5 299 721	–	6 616 357	–	0	15	611 035
% Change	0.006	0.034	-0.131	0.033	0.041	0.000	0.006	0.033
Transport & communication (31-32)	–	4 801 886	–	3 085 755	–	0	45	280 428
% Change	0.031	0.049	-0.195	0.049	0.076	0.000	0.070	0.033
Financial & business services (33-35)	–	15 064 473	–	9 032 520	–	0	91	676 404
% Change	0.019	0.058	-0.229	0.057	0.000	0.000	0.058	0.033
Community services (36-37)	–	6 513 196	–	47 697	–	0	147	1 381 322
% Change	0.048	0.038	-0.156	0.039	0.092	0.000	0.057	0.033
Industry average	–	4 076 572	–	2 419 926	–	0	20	443 910
% Change	-0.011	0.026	-0.096	0.024	-0.034	0.000	-0.018	0.033
TOTAL	–	36 689 145	–	21 779 335	–	–	178	3 995 188

Source: *Authors' CGE model results*

5.2.3 CGE: Rest of South Africa expenditure

Expenditure incurred by the rest of South Africa spending group accounts for approximately 15% of the total output increase (R6 809 058).

TABLE 11: Aggregate sectoral level impacts (structural effects for the regional model only) – rest of South Africa

EFFECT OF INCREASED EXPENDITURE DUE TO FESTIVAL Sector annualised % change	VALUE ADDED		EXPORTS		IMPORTS		EMPLOYMENT	
	Volume	Price (ZAR)	Volume	Price (ZAR)	Volume	Price (FCU)	Volume	Nominal Wage
Agriculture, forestry and fishing (1)	–	14 354	–	22 797	–	0	–6	19 897
% Change	–0.001	0.001	–0.003	0.001	0.000	0.000	–0.003	0.006
Mining (2-4)	–	1 143	–	82	–	0	0	2 323
% Change	–0.003	0.000	–0.002	0.001	–0.002	0.000	–0.005	0.006
Manufacturing (5-25)	–	673 828	–	559 800	–	0	–14	136 389
% Change	–0.004	0.004	–0.018	0.004	0.008	0.000	–0.007	0.006
Electricity & water (26-27)	–	76 635	–	0	–	0	0	6 985
% Change	0.001	0.007	0.000	0.000	0.000	0.000	0.003	0.006
Construction (28)	–	198 498	–	0	–	0	–1	31 724
% Change	0.000	0.005	–0.010	0.003	0.000	0.000	–0.001	0.006
Trade & accommodation (29-30)	–	1 004 574	–	1 270 825	–	0	3	115 255
% Change	0.001	0.006	–0.025	0.006	0.009	0.000	0.001	0.006
Transport & communication (31-32)	–	902 500	–	577 987	–	0	8	52 895
% Change	0.006	0.009	–0.037	0.009	0.014	0.000	0.013	0.006
Financial & business services (33-35)	–	2 803 302	–	1 686 701	–	0	17	127 585
% Change	0.004	0.011	–0.043	0.011	0.000	0.000	0.011	0.006
Community services (36-37)	–	1 134 224	–	8 295	–	0	14	260 549
% Change	0.005	0.007	–0.027	0.007	0.013	0.000	0.005	0.006
Industry average	–	756 562	–	458 498	–	0	2	83 731
% Change	–0.002	0.005	–0.018	0.005	0.007	0.000	–0.003	0.006
TOTAL	–	6 809 058	–	4 126 486	–	–	20	753 583

Source: *Authors' CGE model results*

From TABLE 11, the sectors that primarily contribute to the output increase are the financial and business services (0.111%), transport and communication (0.009%), electricity and water (0.007%) and community services (0.007%).

5.2.4 CGE: Total impact

In TABLE 12, the scenario clearly indicates the increased activity in all selected industries. The increased demand and spending seem to have a positive impact on most industries. When the interrelatedness among most industries is considered, this is to be expected. This specific scenario also illustrates that activity in the service industries naturally increases, but shows little influence on other industries.

TABLE 12: Aggregate sectoral level impacts (structural effects for the regional model only) – total

EFFECT OF INCREASED EXPENDITURE DUE TO FESTIVAL *Sector annualised % change*	VALUE ADDED		EXPORTS		IMPORTS		EMPLOYMENT	
	Volume	*Price (ZAR)*	*Volume*	*Price (ZAR)*	*Volume*	*Price (FCU)*	*Volume*	*Nominal Wage*
Agriculture, forestry and fishing (1)	–	40 192	–	88 338	–	0	–41	126 845
% Change	-0.006	0.001	-0.012	0.003	-0.005	0.000	-0.020	0.040
Mining (2-4)	–	6 855	–	534	–	0	–1	14 822
% Change	-0.016	0.002	-0.014	0.004	-0.013	0.000	-0.030	0.040
Manufacturing (5-25)	–	4 290 113	–	3 558 104	–	0	–95	870 292
% Change	-0.028	0.029	-0.114	0.028	0.049	0.000	-0.046	0.040
Electricity & water (26-27)	–	466 574	–	0	–	0	1	44 570
% Change	0.004	0.041	0.000	0.000	0.000	0.000	0.013	0.040
Construction (28)	–	1 275 499	–	0	–	0	–5	202 427
% Change	-0.003	0.032	-0.066	0.017	0.000	0.000	-0.005	0.040
Trade & accommodation (29-30)	–	6 399 215	–	8 018 299	–	0	18	735 437
% Change	0.007	0.040	-0.159	0.040	0.051	0.000	0.007	0.040
Transport & communication (31-32)	–	5 797 578	–	3 723 752	–	0	54	337 522
% Change	0.038	0.059	-0.235	0.059	0.092	0.000	0.084	0.040
Financial & business services (33-35)	–	18 051 168	–	10 829 566	–	0	108	814 115
% Change	0.023	0.069	-0.274	0.069	0.000	0.000	0.069	0.040
Community services (36-37)	–	7 750 532	–	56 602	–	0	161	1 662 550

EFFECT OF INCREASED EXPENDITURE DUE TO FESTIVAL	VALUE ADDED		EXPORTS		IMPORTS		EMPLOYMENT	
Sector annualised % change	Volume	Price (ZAR)	Volume	Price (ZAR)	Volume	Price (FCU)	Volume	Nominal Wage
% Change	0.052	0.045	-0.186	0.046	0.106	0.000	0.062	0.040
Industry average	–	4 897 525	–	2 919 466	–	0	22	534 287
% Change	-0.014	0.031	-0.116	0.029	0.042	0.000	-0.021	0.040
TOTAL	–	44 077 727	–	26 275 196	–	–	200	4 808 579

Source: *Authors' CGE model results*

TABLE 12 also presents some detail on an aggregated level. Nominal wages all increase in tandem with the national inflation (0.04%, as in TABLE 12) bearing in mind the assumption that the real wage rate is kept constant. Since the world price of goods is kept fixed (the *numéraire*[6] by assumption), no change in national or sectoral level import prices will be observed. From TABLE 12, it is clear that at the sectoral level, there are losers as well as winners as result of the increase in expenditure due to the festival. Following the service industries that directly cater for visitors (29 to 37), electricity and water services exhibit the largest increase in output (0.041%). This is possibly due to the relative share of tourist expenditure in the income base of these sectors, as well as the fact that these industries are directly and indirectly affected by an increase in expenditure by visitors. The transport sector also experiences a significant increase (0.059%). Because of its link to the strongly stimulated service industries directly catering for visitors, manufacturing is an obvious example of the sectors that experience the indirect benefits of increased tourism. The electricity and water sector is a less obvious example. Its growth prospects are enhanced by the expansion of investment or increased demand induced by the additional tourism.

Certain sectors, such as the traded-goods industries, experienced output declines due to the increase in expenditure as a result of the festival. These sectors were adversely affected by the higher domestic prices within their specific industries that the expansion of tourism generated. Foremost examples include the traditional exporters (agriculture; mining; non-metallic mineral products; and basic and fabricated metal products) and the import-competing sectors such as textiles, clothing and footwear. Agriculture, forestry and fishing (traditional exporters), which might be expected to experience a significant decline because of the increase in imports, are saved indirectly to some extent from major declines by the increase in tourists' demand (indirectly) for their outputs.

TABLE 12 also displays the changes in employment by industry in the simulated scenario. The increase in expenditure and productivity increases the demand for labour in most industries. For all other sectors, employment increases in line with the increase in total output.

6. FINDINGS AND CONCLUSIONS

This article compares the SAM and CGE models as assessment tools in order to evaluate the economic impact of the KKNK. The following findings resulted from this comparison of the two tools.

Firstly, this article reveals that the economic assessment by means of a SAM multiplier analysis and a CGE model generates different results. These differences became clear with regard to the results that were measured in terms of sectoral, visitors' residence and total impact (as per TABLE 13). The most significant difference in total impact is measured in the manufacturing, trade and accommodation, financial and business services as well as community services sectors. A very substantial difference with regard to the measured economic impact is noted within the local segment when the visitors' origins are considered by SAM and CGE models. The significant local support that is measured by both models may be ascribed to the geographical positioning of Oudtshoorn as the hosting town. The isolated location of the festival as well as the sparsely populated neighbouring provinces may contribute to the meagre support from other provinces and the obviously concentrated local representation.

TABLE 13:   Economic impact summary when applying a SAM and CGE model to the KKNK —
foreign, local, rest of South Africa and total impact

SECTOR	FOREIGN		LOCAL (WC)		REST OF RSA		TOTAL	
	TOTAL IMPACT							
	SAM	CGE	SAM	CGE	SAM	CGE	SAM	CGE
Agricultural	1 873	2 871	152 431	17 225	27 270	14 354	181 573	40 192
Mining	209	190	17 201	5 522	3 234	1 143	20 644	6 855
Manufacturing	56 874	138 221	4 731 788	3 544 921	833 864	673 828	5 622 526	4 290 113
Electricity and water	3 754	15 778	305 726	380 923	56 464	76 635	365 944	466 574
Construction	2 116	41 272	174 463	1 061 278	28 938	198 498	205 517	1 275 499
Trade and accommodation	539 562	205 661	40 423 000	5 299 721	6 624 442	1 004 574	47 587 004	6 399 215
Transport and communication	127 536	176 576	9 720 252	4 801 886	2 093 805	902 500	11 941 593	5 797 578
Financial and business services	185 214	602 579	20 731 316	15 064 473	3 151 851	2 803 302	24 068 381	18 051 168
Community services	8 776	240 593	2 399 273	6 513 196	219 841	1 134 224	2 627 890	7 750 532
TOTAL	925 913	1 423 741	78 655 449	36 689 145	13 039 709	6 809 058	92 621 071	44 077 727
ADDITIONAL JOB OPPORTUNITIES								
Additional positions created (Excluding positions directly involved)							760	222
Employment opportunities lost if festival terminates							946	

Source: *Authors' SAM and CGE model results*

In reflection of the calculated impact summarised in TABLE 13, the total impact when applying a SAM model is 110.13% higher (R48 543 344) than when applying a CGE model. The greater calculated impact when applying a SAM model is experienced in the local (R41 966 304 or 114.38%) and rest of South Africa (R6 230 651 or 91.51%) spending groups. However, in the foreign spending group, the impact calculated by applying the CGE model was larger

(R1 423 741) than when calculated with the SAM model (R925 913). The calculated additional job opportunities created due to the KKNK taking place also differ considerably when applying the two different models. The SAM multiplier analysis reflects a much higher employment rate than that calculated with a CGE model. A possible reason for this is that the CGE model captures or accounts for crowding-out effects, while the SAM-based multiplier analysis does not. These differences again highlight the fact that economic assessors should pay meticulous attention when deciding on the most appropriate model to apply. When reporting on inflated figures, potentially misleading information could have negative consequences for all stakeholders.

Secondly, the methodological application of the assessment models indicates that, despite the enhancement of I-O models with multiplier effects, certain limitations still persist during applications. Therefore, the development of SAM models, based on I-O models, is envisaged as an improvement. Application of these models is regarded as simple, quick, reliable, effective, efficient and flexible and the data required are generally readily available.

The methodological problems that may be experienced when applying SAM models incorporating I-O tables are that:

- these tables are published on a national level although the application is needed on a regional level;
- published tables may be outdated;
- economic assessors of events should be aware of the possible hindrance where the geographical area for which the results are reported on and that of the I-O table has no relation;
- when applying these models, limited, if any, price movements and supply constraints are accommodated;
- these models do not allow for any changes in the relationship between sectoral inputs and outputs;
- no integrated economic effects are taken into account;
- the assumption is made that the consumption preference of the host region equals that of tourists;
- impact estimates are often overestimated due to multipliers used that include consumption effects;
- the employment impact is often misinterpreted;
- capital expenditure not directly attributable to tourism is often included in the analysis; and
- value-added multipliers can be applied to spending that is calibrated in output terms.

CGE models are the most detailed and informative economic modelling technique available and are predominantly used in surveys where a large shock is to be applied to a complex economy (Adams & Parmenter, 1999). These models are normally utilised to address specific what-if economy-wide scenarios and their application is often discouraged due to factors such as the mechanical complexity, the lack of available data and insufficient time to compile an assessment. Consequently, these models are applied during economic impact studies on national level. Of course, these national surveys have limited use during lower-level surveys. Although CGE models are data intensive and relatively expensive to set up and run, they seem to be the preferred economic impact-measuring tool as they may compensate for many of the limitations experienced by I-O models, including supply constraints and price movements.

Despite this apparent preference, analysts are often required to become familiar with CGE modelling software and techniques, despite these being much more complicated to implement and interpret.

Finally, this article clearly indicates the definite economic impact of events and the role of the various stakeholders such as event organisers, visitors, the hosting community and academics who have interests when an event is planned and presented. In view of the fact that the assessment outcomes between the various models differ, the application of these results will also influence the stakeholders on different levels. The possible over-inflated impact, as measured by a SAM model, may be favoured by event organisers to lobby for sponsorships, while others, such as residents and business owners within the hosting community, are misled. Reporting exaggerated economic impacts may render locals that offer services during the event despondent when they perceive their personal benefit as much less than those of the inflated figures. Moreover, when event organisers report higher impact values, sponsors are misinformed and may be presented with an inflated economic impact together with over-estimated job opportunities. In view of the more simplistic and affordable manner in which SAM models can be applied, organisers may be tempted to use them, rather than employing the more complicated and expensive CGE models.

The unique contribution of this article is imbedded in the fact that, within the South African context, it is the first study of its kind that aimed to determine the economic impact by means of applying more than one assessment model, that is, SAM and CGE, to the dataset of a single event. Furthermore, this article affirms that regardless of the assessment method or measuring tool applied, popular national events will doubtless have a variable impact on the economy.

In conclusion, possible future research may have to examine whether such a significant difference occurs when the same models are applied to a similar event. It is suggested that a SAM and CGE assessment should be conducted at other similar festivals to get an understanding of the impact of these models in other studies. The outcomes thereof may confirm or contradict the assumption that various models of economic assessments produce different outcomes.

Notes

1. The original regional SAM model and data—a regional SAM of the state of Paraná, Brazil and a matching SAM-based GEMPACK model (TPMH0060)—can be accessed at http://www.monash.edu.au/policy/archivep.htm.
2. The Western Cape Province SAM is available online from the DBSA Website and can be accessed at http://www.dbsa.org/%28S%28ljt3xv55ifxdjc55r0urey55%29%29/SAM/Pages/default.aspx.
3. Percentage indicates proportion direct impact of the total impact within the trade and accommodation sector.
4. Percentage indicates proportion direct impact of the total impact within the transport and communication sector.
5. Percentage indicates proportion direct impact of the total impact within the financial and business service sector.
6. Numéraire is a basic standard by which values are measured. Acting as the numéraire is one of the functions of money in order to serve as a unit of account. This is to measure the worth of different goods and services relative to one another, i.e. in equal units. Numéraire goods are, therefore, regarded as goods with a fixed price of 1 used to facilitate calculations when only the relative prices are relevant, as in general equilibrium theory.

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