

Determining potato price drivers: A statistical modelling approach

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Potato fresh produce prices at South African markets can vary significantly depending on seasonality, the specific market under consideration, qualitative characteristics (such as potato class, size and packaging size), and even the potato cultivar or variety offered.

Using high-frequency fresh produce market data supplied by Potatoes SA from 2013 to 2021, the Bureau for Food and Agricultural Policy (BFAP) undertook a hedonic price modelling study to inform industry stakeholders of the key relationships between potato market prices and qualitative characteristics of the potatoes being sold. Results of the study (exploratory analysis and findings) are summarised and discussed in this article.

Class 1 Medium are favourites

Daily potato sales at the top-five markets in South Africa (in terms of volume of sales contributed) were considered for this study, namely at the fresh produce markets in Johannesburg, Tshwane, Durban, Springs and Cape Town.

With regard to potato quality, Class 1 potatoes are most commonly sold at these markets, followed by Class 2 potatoes. Medium-sized potatoes are most common, followed by Large/Medium and Large potatoes. Extra Large potatoes are rarely seen on the markets (Figure 1).

The 10 kg packaging is by far the most commonly sold on markets. Market demand for 7 kg is very specific (e.g., higher demand during periods with higher prices i.e., the festive season and during the Covid-19 lockdown period, or with specific off-takers) and small (11% of all sales) by comparison. Small/Medium, Medium and

Large/Medium potato sizes represent the majority of potatoes packaged in 7 kg bags, while the full spread of potato sizes is proportionally sold in 10 kg bags (Figure 2).

The hedonic price model analysis found that qualitative characteristics such as class, size, mass (packaging size), variety and market are all significant in explaining variation in the average potato price

between 2013 and 2021 (statistical quantification that found a significant or true relationship between the variables).

On average, the R/kg price difference between a 7 kg potato bag and a 10 kg potato bag, given the same class and size, is the largest, with the prices of 7 kg bags being consistently higher than those of 10 kg bags. However, as previously noted,

Figure 1: Daily potato price instances according to size from 2013 to 2021. (Source: Freshmark, Potatoes SA and BFAP)

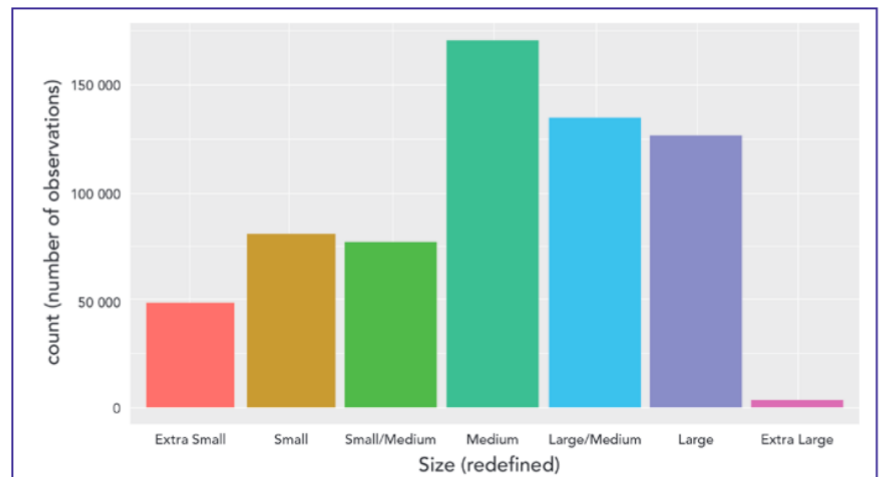
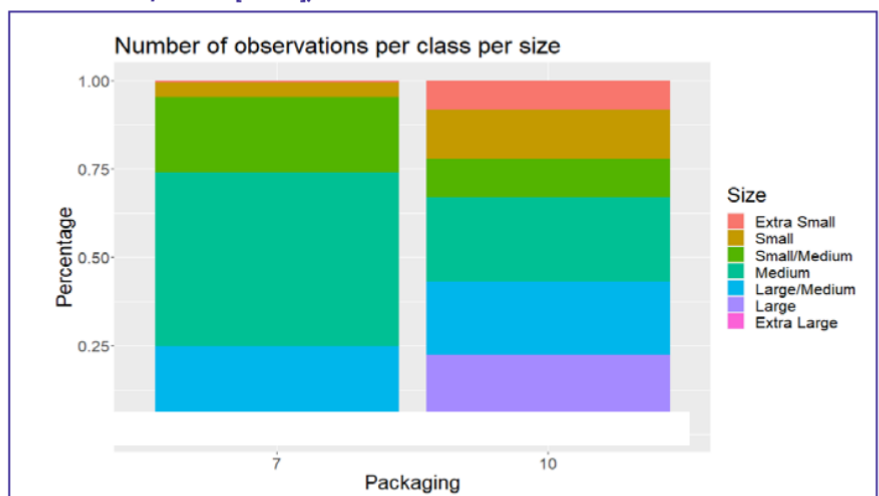


Figure 2: Packaging versus size cross-tabulation. (Source: Freshmark, Potatoes SA, BFAP [2022])



the market demand for 7 kg bags is very specific and small compared to the 10 kg bags and is not necessarily a characteristic all producers can afford to take into account.

Price impacts

Table 1 shows average real potato prices (in R/kg) for 10 kg bags, given various class and size combinations. As expected, price discounts occur as quality (Class 1 to 4) and potato size decrease.

The second largest price impact is captured in the class variable. On average, if all other factors are kept the same, a one-class downward movement represents a 27%

Table 1: Average potato price (R/kg) for a 10 kg bag of potatoes.

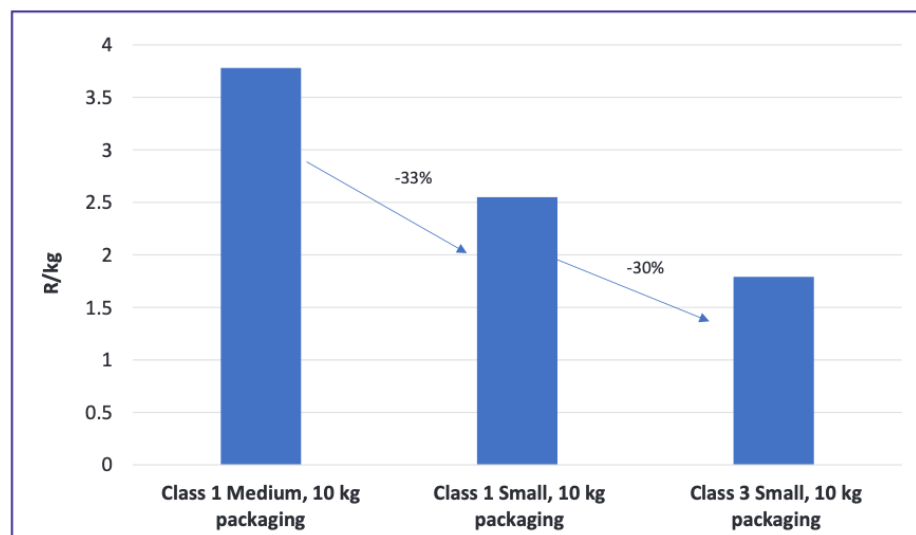
Potato size	Class 1	Class 2	Class 3	Class 4
Large	4.48	3.86	3.04	2.37
Large/Medium	4.24	3.59	2.85	2.10
Medium	3.78	3.16	2.42	1.92
Small/Medium	3.09	2.58	2.02	1.46
Small	2.55	2.12	1.79	1.28
Extra Small	2.25	1.56	1.32	0.95

downward price impact. Note that exceptions to this 'average outcome' can be found in some qualitative characteristic permutations.

Figure 3 shows that the price for a Class 1 Medium potato packaged in a 10 kg bag decreases to R1.79/kg

(-30%) if the class deteriorates to Class 3. a 10 kg bag decreases from R3.78/kg to R2.55/kg (-33%) if the potato size decreases to Small. In turn, the price of a Class 1 Small potato packaged in a 10 kg bag decreases to R1.79/kg (-30%) if the class deteriorates to Class 3.

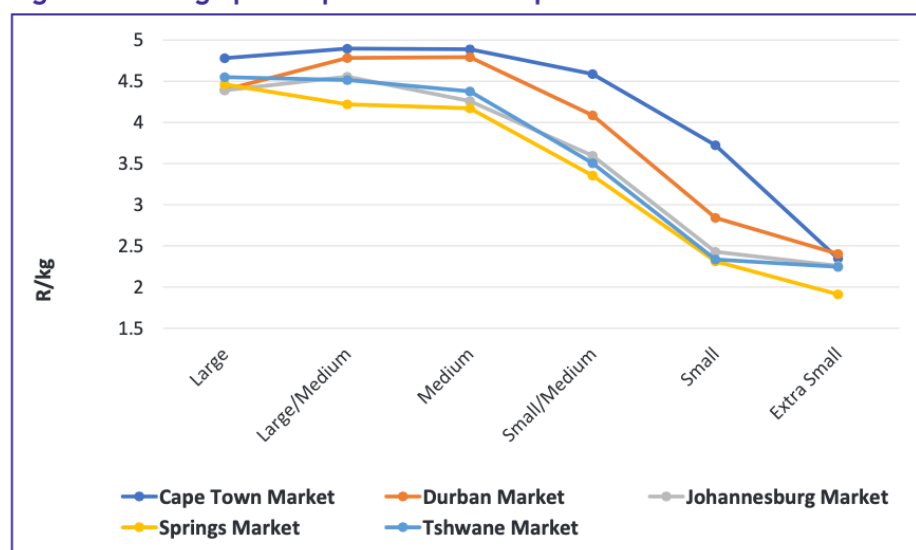
Figure 3: An example of price impacts for one specific sequence of characteristic changes using the national average potato price from 2013 to 2021.



The third most influential factor was found to be the potato size characteristic. On average, if keeping all other characteristics equal, the movement from one potato size to the next represents an 18% price impact. The price difference at various markets is typically smaller than the price differences found as a result of other qualitative characteristics of potatoes.

Figure 4 shows that the average prices for Class 1 potatoes at the Gauteng markets (Johannesburg, Springs and Tshwane) trade very closely to one another, regardless of the potato size. For most potato sizes, a Class 1 potato achieves a higher price in Durban than at the Gauteng markets (R0.60/kg for a Small/Medium potato), and even higher (R1.10/kg for a Small/Medium potato) at the Cape Town market.

Figure 4: Average potato prices for Class 1 potatoes at various markets.



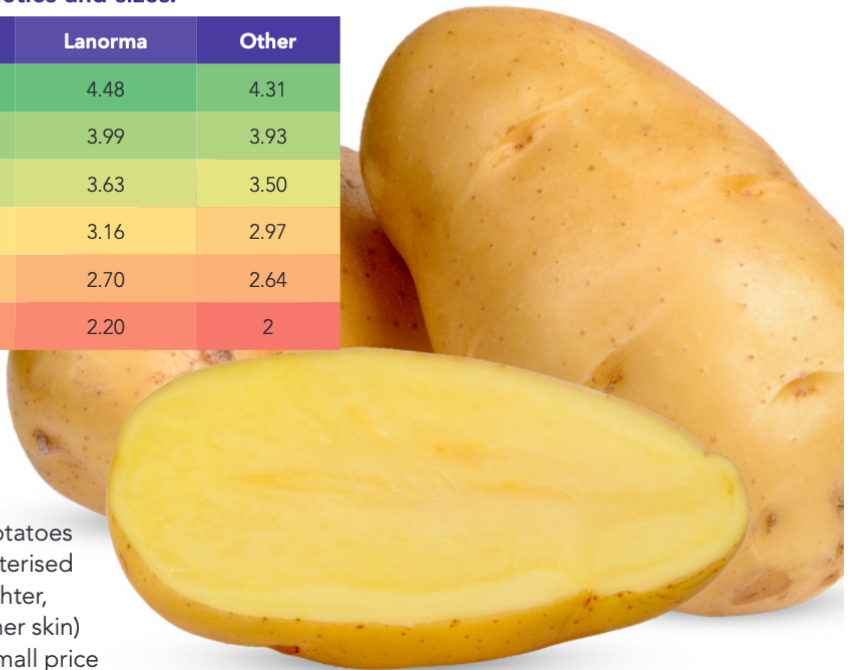
The price impact of the specific potato variety was also tested in the analysis. The three most common varieties were singled out (Mondial, Sifra and Lanorma), while all other varieties were grouped under 'Other'. Table 2 shows that Class 1 Sifra achieved slightly higher prices than the other varieties for every potato size.

Quality trumps size

In conclusion, producers' focus on achieving the highest quality product (potato class) will ensure higher prices,


Table 2: Average price for various Class 1 varieties and sizes.

Potato size	Mondial	Sifra	Lanorma	Other
Large	4.51	4.53	4.48	4.31
Large/Medium	3.80	4.05	3.99	3.93
Medium	3.38	3.70	3.63	3.50
Small/Medium	2.95	3.21	3.16	2.97
Small	2.62	2.88	2.70	2.64
Extra Small	1.83	2.38	2.20	2




and while high price premiums for larger potatoes were recorded, they are not as high as the premiums on higher quality potatoes.

From the analysis, it seems that some price arbitrage might be possible for regions that would have to travel similar distances to Durban than to Gauteng (since for most Class 1 potatoes Durban market prices are slightly higher than Gauteng market prices). However, the higher prices achieved at the Cape Town market are likely more than offset by transport costs.

Sifra potatoes (characterised by a lighter, smoother skin) fetch small price premiums compared to Mondial, Lanorma and other varieties. 

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Oop Variëteite: Mondial, BP1, UTD, Hertha, Fianna.

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