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Owning the Economy

An optimal portfolio of Botswana's economic sectors

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Abstract. If an investor could own a slice of every sector of Botswana's economy, which mix would deliver the most growth for the least risk? This paper treats each of 17 private sectors as an asset, uses its real growth from 2015 to 2025 as the return, and applies portfolio optimisation. The economy as it is grew 2.6% a year in this framework, with growth swinging by 5.5 points from year to year and a worst year of −9.2%. The optimised mix grew 4.7% a year with about half the volatility and never had a negative year. It is built on six sectors that recur in every robustness check: finance and insurance, ICT, health, professional services, real estate, and wholesale and retail. Mining, diamond trading and manufacturing receive no weight. A version estimated only on 2015–2021 data and tested on 2022–2025 averaged 4.2% growth a year, against 0.3% for the economy's own mix. The results point to a clear strategy for building businesses in Botswana that do not depend on diamonds.

Keywords: Botswana; sector allocation; portfolio optimisation; economic diversification; diamonds.

1 Introduction

Diamonds have made Botswana one of Africa's success stories, and they also make it one of its most volatile economies. Mining fell from 28.4% of real value added in 2014 to 15.3% in 2025, yet its swings still drive the economy: real GDP fell 8.7% in 2020, rose 11.9% in 2021 and fell again in 2024 and 2025 as diamond demand collapsed (Bank of Botswana, 2026a,b). For anyone building or buying businesses in Botswana, the question is which parts of the economy offer steady growth that does not rise and fall with diamonds.

Portfolio theory gives a structured way to answer it (Markowitz, 1952). An investor choosing shares weighs each one's expected return against its risk and against how it moves with the others. The same logic applies to sectors of an economy. A sector that grows steadily, and does not fall when mining falls, is worth more to a long-term owner than one that grows fast but collapses with diamonds.

This paper builds that portfolio. It asks three questions: which sectors offer the best growth for their risk; how much a well-chosen mix improves on the economy as it stands; and whether the answer is stable enough to act on.

2 Data and method

Data. The data are real value added by economic sector, in constant 2006 prices, from BEFS Table 1.4 (Bank of Botswana, 2026a). The table gives annual figures for 2014 to 2020 and quarterly figures from 2021 to the second quarter of 2026. Quarters were summed to annual totals for 2021 to 2025, giving 11 years of annual growth from 2015 to 2025. The 18 sectors sum exactly to total value added in every period.

Assets. Each sector's annual real growth rate is its "return". Public administration is excluded because it is not open to private ownership, leaving 17 sectors. Mining, diamond traders and manufacturing stay in the set, so the optimiser can choose them if they earn their place.

Risk. Risk is the standard deviation of annual growth. Because 11 years is a short history for 17 sectors, the covariance matrix is estimated with Ledoit–Wolf shrinkage (Ledoit and Wolf, 2004), which pulls extreme estimates towards a stable average; the estimated shrinkage intensity is 0.22. Each sector's exposure to diamonds is measured by its correlation with mining growth and by its "mining beta": how many points its growth moves for each point of mining growth.

Portfolios. All portfolios are long-only, sum to 100% and hold at most 25% in any one sector, so no single sector can dominate. Three optimised portfolios are compared with two benchmarks:

- **Minimum risk**: the lowest volatility achievable.
- **Best growth per unit of risk**: the highest ratio of mean growth to volatility, the equivalent of a Sharpe ratio.
- **Low diamond exposure**: the best growth per unit of risk, subject to a mining beta of at most 0.05, so that a 10-point fall in mining growth lowers the portfolio's growth by at most 0.5 points.
- **Economy as it is**: each sector weighted by its 2025 share of private-sector output, the benchmark.
- **Equal weight**: one-seventeenth in every sector.

3 Growth and risk by sector

Sectors differ sharply in both growth and stability (Table 1 and Figure 1). Wholesale and retail grew fastest, at 7.2% a year, followed by finance and insurance at 6.0%. ICT grew more slowly, at 3.6%, but with by far the least volatility, giving it the best growth per unit of risk of any sector. Mining shrank by 2.6% a year on average with volatility of 16.5 points, and diamond traders and manufacturing also had negative or near-zero returns for their risk. Accommodation and food looks weak only because of the pandemic: its output fell 28.5% in 2020, but in the other nine years it grew a steady 3.9% a year.

Table 1: Real growth, risk and diamond exposure by sector, 2015–2025

Sector	Share of output (%)	Mean growth (%)	Volatility (pts)	Growth per unit of risk	Correlation with mining
ICT	2.9	3.6	1.4	2.57	0.44
Real estate	5.4	4.3	2.9	1.51	0.70
Professional services	1.9	3.3	2.2	1.50	0.59
Health	3.4	4.3	3.2	1.34	0.29
Wholesale and retail	12.3	7.2	7.1	1.02	0.52
Finance and insurance	5.7	6.0	5.9	1.02	−0.24
Transport and storage	1.9	2.8	3.6	0.78	0.73
Other services	2.3	2.1	2.9	0.72	0.53
Administrative services	1.8	2.6	3.9	0.66	0.70
Construction	9.7	2.8	5.4	0.51	0.59
Education	5.6	3.3	8.0	0.41	0.10
Agriculture	1.8	1.4	6.2	0.22	0.11
Water and electricity	1.2	4.6	21.4	0.21	0.18
Accommodation and food	2.1	0.5	9.8	0.05	0.38
Diamond traders	1.3	0.8	42.5	0.02	0.79
Manufacturing	5.8	−0.6	8.1	−0.07	0.69
Mining	15.3	−2.6	16.5	−0.15	1.00
Public administration (excluded)	19.9	4.9	2.8	1.75	−0.31

Share is of 2025 real value added. Volatility is the standard deviation of annual growth, in percentage points. Source: author's calculations from BEFS Table 1.4.

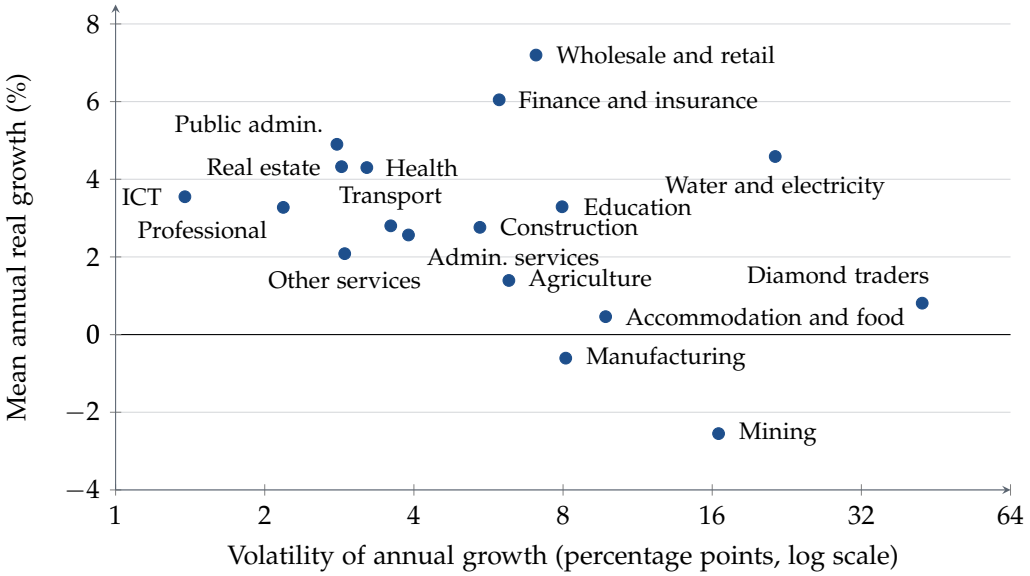


Figure 1: Mean real growth against volatility by sector, 2015–2025, with volatility on a log scale. Steady growers sit top left; mining and diamond traders sit to the right. Source: author's calculations from BEFS Table 1.4.

Exposure to diamonds is widespread. Of the 17 private sectors, only finance and insurance moved against mining over the period, with a correlation of −0.24 (Figure 2). Transport, administrative services and real estate are the most closely tied to mining among the service sectors, which suggests that much of their demand comes from the mines and the spending they generate. Education, agriculture, water and electricity, and health are the least tied.

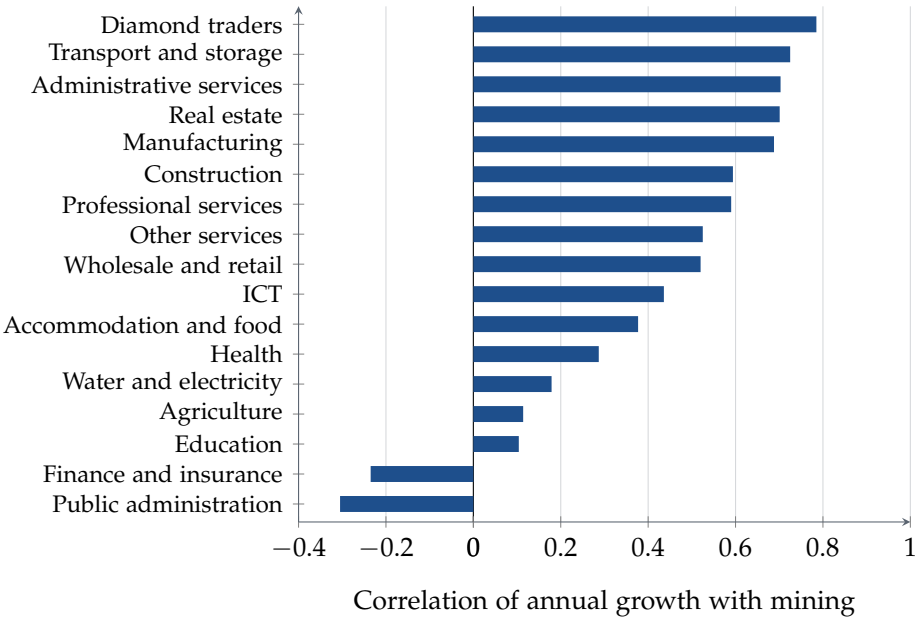


Figure 2: Correlation of each sector's annual real growth with mining growth, 2015–2025. Source: author's calculations from BEFS Table 1.4.

4 The optimal portfolios

Optimisation roughly triples the growth earned per unit of risk (Table 2). The economy as it is grew 2.6% a year with volatility of 5.5 points, and its worst year was a fall of 9.2%. The portfolio with the best growth per unit of risk grew 4.7% a year with volatility of 3.0 points, and over the period its weakest year was still positive, at 0.1%. Even the minimum-risk portfolio, which ignores growth altogether, grew faster than the economy.

Table 2: Portfolio results, 2015–2025

Portfolio	Mean growth (%)	Volatility (pts)	Worst year (%)	Mining beta
Minimum risk	3.6	2.7	−1.5	0.07
Best growth per unit of risk	4.7	3.0	0.1	0.07
Low diamond exposure	4.7	3.1	0.6	0.05
Economy as it is	2.6	5.5	−9.2	0.34
Equal weight	2.7	5.2	−8.4	0.29

Mean growth and volatility use the shrinkage covariance estimate; the worst year and mining beta are from each mix's actual history. Source: author's calculations from BEFS Table 1.4.

Figure 3 shows the efficient frontier: the highest growth achievable at each level of risk. The economy and the equal-weight mix sit well below it. An investor could take the same risk as the economy and earn much more growth, or match its growth with half the risk.

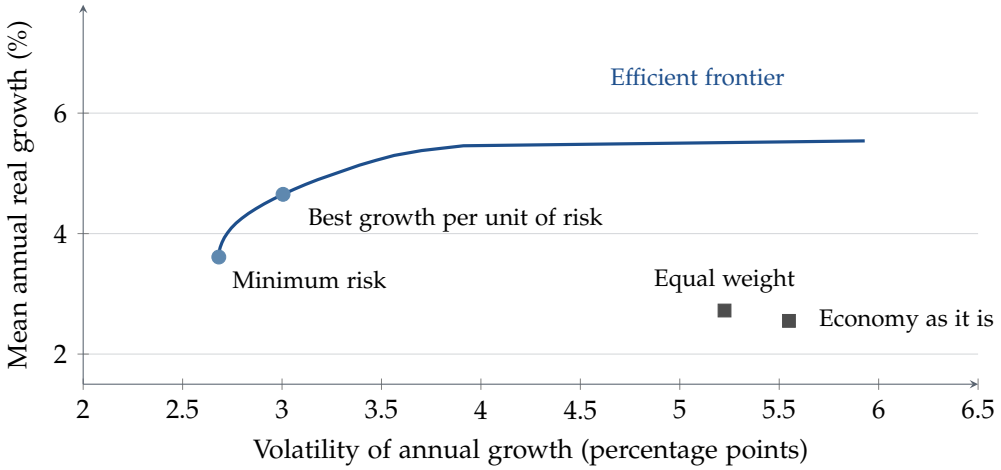


Figure 3: Efficient frontier of long-only sector portfolios with a 25% cap per sector, 2015–2025. The low diamond exposure portfolio lies almost on top of the best-ratio portfolio. Source: author's calculations from BEFS Table 1.4.

The optimised portfolios are built from the same core (Table 3). Finance and insurance, ICT, health, professional services, real estate, and wholesale and retail together make up about 90% of the best-ratio and low-diamond portfolios. Mining, diamond traders, manufacturing, construction and accommodation receive nothing. Limiting diamond exposure costs almost nothing: the low diamond exposure portfolio grows as fast as the best-ratio portfolio, mainly by holding close to the maximum in finance and insurance, the one sector that has moved

against mining.

Table 3: Portfolio weights (%)

Sector	Minimum risk	Best growth per unit of risk	Low diamond exposure	Economy as it is
Finance and insurance	11.9	20.6	24.8	7.0
ICT	17.0	16.2	18.1	3.6
Health	11.8	13.3	14.7	4.3
Professional services	14.0	12.6	13.1	2.4
Real estate	10.2	13.5	11.9	6.7
Wholesale and retail	0.4	13.4	10.1	15.4
Administrative services	8.3	3.9	1.2	2.2
Other services	10.7	2.9	2.6	2.9
Education	3.4	1.1	2.0	7.0
Water and electricity	1.5	1.8	1.5	1.5
Transport and storage	6.3	0.7	–	2.4
Agriculture	4.6	–	–	2.2
Construction	–	–	–	12.0
Accommodation and food	–	–	–	2.6
Manufacturing	–	–	–	7.2
Diamond traders	–	–	–	1.6
Mining	–	–	–	19.1

Columns may not sum to exactly 100 due to rounding. "Economy as it is" is each sector's 2025 share of private real value added. Source: author's calculations from BEFS Table 1.4.

5 How robust is the answer?

Optimisation on a short history is notoriously sensitive: small changes in the data can produce very different weights. Four checks test whether the core result survives.

Resampling. The best-ratio portfolio was re-estimated on 500 bootstrap samples, each drawn by resampling the 11 years with replacement, in the spirit of resampled efficiency (Michaud, 1998). ICT, finance and insurance, and health appeared in every sample; professional services in 99%; real estate in 98%; and wholesale and retail in 95%. Averaged across samples, the weights were finance and insurance 17.6%, ICT 14.7%, health 12.5%, wholesale and retail 11.3%, professional services 11.2% and real estate 11.0%. Mining and diamond traders held more than 1% in no more than 5% of samples.

Excluding the pandemic. Dropping 2020 and 2021, when the economy fell and rebounded sharply, spreads the weights more evenly. Finance and insurance and real estate remain the largest holdings, with professional services and ICT close behind; accommodation and food enters at 11%, because its weak average was driven by the pandemic years.

Quarterly data. Using year-on-year growth in each quarter from 2022 to the second quarter of 2026 (18 observations) gives a more diversified mix, with education, finance and insurance, and wholesale and retail the largest weights. Mining receives just 0.5%.

Out of sample. The most demanding test is to estimate the portfolio only on 2015–2021 data

and see how it would have done afterwards. That portfolio held finance and insurance, ICT, real estate, wholesale and retail, health, and professional services. Over 2022–2025, a period that included the diamond slump, it averaged 4.2% growth a year and its worst year was 3.4% (Table 4). The economy's own mix averaged 0.3%, with a worst year of −5.0%.

Table 4: Out-of-sample test: portfolios chosen with 2015–2021 data, results in 2022–2025

Portfolio	Mean growth (%)	Volatility (pts)	Worst year (%)
Best growth per unit of risk	4.2	0.7	3.4
Economy as it is (2021 weights)	0.3	5.0	−5.0
Equal weight	2.2	3.6	−0.6

Source: author's calculations from BEFS Table 1.4.

6 Limits of the approach

Three cautions apply. First, **growth is not return**. A fast-growing sector can still be a poor investment if businesses in it are overpriced, earn thin margins or face strong competition. This analysis says where demand is growing steadily, not what any particular business is worth.

Second, **the history is short**. Eleven years include one pandemic and two diamond slumps, so estimates of average growth carry wide margins of error. The robustness checks show that the core sectors are stable, but the exact weights should be read as ranges, not targets.

Third, **the future may differ from the past**. Botswana's diversification policies, a recovery in natural diamond demand or a fiscal squeeze on public spending could change which sectors lead. Health and education, for example, depend heavily on government spending, which is under pressure (Molebatsi, 2026).

7 Implications

For an investor building a portfolio of Botswana businesses, the results suggest a clear set of priorities:

1. **Build around steady service sectors.** Financial services, ICT, health and professional services combine solid growth with low volatility.
2. **Use finance as the diamond hedge.** Finance and insurance is the only private sector that has moved against mining, so it earns the largest weight whenever diamond exposure is limited.
3. **Be selective in mining-linked sectors.** Transport, administrative services and construction are closely tied to the mines. Businesses in these sectors need strong individual merits to justify the extra diamond risk.
4. **Judge accommodation and food on its normal years.** Outside the pandemic it grew steadily, at 3.9% a year, and with little link to mining. Its real risk is a rare, severe shock such as 2020, which calls for strong balance sheets rather than avoiding the sector.

8 Conclusion

Botswana's economy as it stands is a poorly diversified portfolio, weighted heavily towards mining and the sectors that depend on it. A portfolio built around finance and insurance, ICT, health, professional services, real estate and wholesale and retail would have delivered almost twice the growth with about half the volatility, and it held up out of sample during the latest diamond slump. The exact weights are uncertain, but the direction is clear and consistent: the best place to build durable businesses in Botswana is in the services that serve its households and firms, not in the industries that depend on diamonds.

This is a working paper and may be revised. Figures are calculated from the sources cited and were correct as of 31 October 2026. Published by Menori Capital for research and educational purposes. It is not investment advice and is not an offer of any investment.

A Technical notes

1. **Data.** BEFS Table 1.4, real value added at constant 2006 prices. Annual values for 2021 to 2025 are sums of four quarters; 2026 is excluded from the annual analysis because only two quarters are available.
2. **Optimisation.** Long-only weights between 0% and 25%, summing to 100%, solved by sequential quadratic programming from multiple starting points. Expected growth is the sample mean of annual growth; the covariance matrix uses Ledoit–Wolf shrinkage.
3. **Mining beta.** The covariance of a sector's growth with mining growth, divided by the variance of mining growth.
4. **Economy as it is.** Each private sector's share of 2025 private real value added (2021 for the out-of-sample test).
5. **Code.** The extraction and analysis scripts that produce every figure in this paper are available from Menori Capital on request.

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