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# STOCK MARKET RETURNS AND INFLATION: EVIDENCE FROM SOUTH AFRICA

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- Outline
- Introduction and background
- Brief Literature review
- Causality
- Econometric methodology and data
- Results
- Conclusion

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## Introduction and Background

- Relationship between stock market returns and inflation studied extensively.
- Theory suggests that there is relationship between the two variables.
- No consensus on whether positive or negative.
- Ambiguity on the causal relationship between the two variables.
- There was a general belief until the 1970s that the relationship is positive.

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- After the late 1970s it was discovered that the relationship can also be negative.
- If the relationship is positive, stock market is a hedge against inflation.
- If negative, stock market is not a hedge against inflation.
- Changes in South Africa's inflation attracts interest in understanding this relationship.
- Interest on whether stock market returns are a hedge against inflation in South Africa.
- Objectives of the study:
  - Investigate the relationship between stock market returns and inflation in South Africa.
  - Causal relationship

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- Literature
  - No consensus on the relationship between stock market returns and inflation.
  - It was generally believed that the relationship is positive until the late 1970s (Fisher, 1930).
  - Fisher hypothesis states that equity stocks represent claim against real assets of the company.
  - Serve as hedge against inflation.
  - Investors sell financial assets in exchange for real assets when inflation is pronounced.
  - Stock prices in nominal terms should reflect fully the expected inflation.

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- Hence the relationship between the two variables should be positive.
- Equities are hedge against inflation because they are claims against real assets of the firm (Bodie, 1976).
- Real change on the price of equities should not be affected especially in the long run (Ioanides *et al.* 2005).
- Investors compensated against increase in inflation through increase in nominal stock market returns.
- Hence, real returns will not be changed. Inflation pressures will not affect real value of the stock market.

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- However, some studies argued the relationship between stock market returns and inflation is negative (Fama, 1981).
- Two propositions for the negative relationship:
  - There is a negative relationship between inflation and real output.
  - Relationship between real output and return on stock market is positive.
- A negative relationship between stock market returns and inflation because of correlation between inflation and future output.
- Stock market returns reflects future earning potential.
- Economic downturn predicted by increase in inflation will depress stock prices.

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- The empirical evidence is mixed.
- Studies (Firth, 1979; Gultekin, 1983; Boudhouch and Richardson, 1993; Choundhry, 2001) found evidence in support of Fisher hypothesis.
- Spyrou (2001); Ioannides et al. (2005) found negative relationship (support Fama, 1981).
- Others found negative relationship in the short run and positive relationship in the long run.
- Empirical studies on South Africa (such as Bethlehem, 1972; Roome, 1986; Firer and McLeod, 1999) concluded that equities are a hedge against inflation.

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- However, Jorion and Goetzman (1996) found negative relationship.
- The studies did not use econometric analysis.
- Hence, this paper use econometric analysis to investigate the relationship.

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**Causality**

- Granger (1969) to test causal relationship

$$INF_t = \sum_{j=1}^p \delta_j INF_{t-j} + \sum_{j=1}^p \phi_j STOCK_{t-j} + u_t$$

$$STOCK_t = \sum_{j=1}^p \phi_j INF_{t-j} + \sum_{j=1}^p \gamma_j STOCK_{t-j} + v_t$$

- INF, STOCK are inflation and stock market returns. There are two null hypotheses to be tested:
  - $H_1: \phi_j = 0, j=1, \dots, p$  inflation does not Granger causes stock market returns.
  - $H_2: \phi_j = 0, j=1, \dots, p$  stock market returns does not Granger cause inflation.

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- Econometric Methodology and Data
  - Econometric Methodology:
    - Cointegrated vector autoregression.
    - First step is univariate characteristics of data
    - Test cointegration using Johansen.
    - If variables I(0) they can be modelled using VAR in levels.
    - If I(1) and cointegrated, use VECM.
    - If I(1) and not cointegrated, VAR in first differences.
  - Data:
    - Quarterly data 1980-2008.
    - Variables used are all share index (ALSI), gold index (GOLD), CPI.
    - Source from JSE, IMF and South African Reserve Bank.

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- Empirical Results
  - Unit root test results
    - Used ADF test statistic.
    - Variables are I(0)
    - Modeled using VAR in levels.
    - One cointegrating vector
    - Results in Table 1

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Table 1. Long-run results

Variables	$\beta^2$
<i>(a) Variables included in the VAR: LNALSI and LNCPI</i>	
LNALSI	1.000
LNCPI	-0.837 (-17.011)***
<i>(b) Variables included in the VAR: LNGOLD and LNCPI</i>	
LNGOLD	1.000
LNCPI	-0.830 (-18.444)***

Table 2. Causality test results

H <sub>0</sub>	Wald test/Chi-square	Conclusion
LNCPI does not Granger cause LNALSI	16.748 (0.000)***	Reject the null hypothesis. There is causality from LNCPI to LNALSI
LNALSI does not Granger cause LNCPI	4.274 (0.118)	Fail to reject the null hypothesis. There is no causality.
LNCPI does not Granger cause LNGOLD	8.663 (0.013)**	Reject the null hypothesis. There is causality from LNCPI to LNGOLD.
LNGOLD does not Granger cause LNCPI	1.385 (0.500)	Fail to reject the null hypothesis. There is no causality.

\*/\*\*/\*\* Significant at 10/5/1 percent level

• Conclusion

- Positive relationship between stock market returns and inflation.
- Evidence in favour of Fisher hypothesis.
- Equities are hedge against inflation in South Africa.
- Investors compensated against an increase in inflation through corresponding increase in stock market returns.
- Causality from inflation to stock market returns.

Thank you

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