

Abstracts of articles in other South African journals

INVESTMENT ANALYSTS JOURNAL

De Wit, JD & Polakow, D (2017). How disruptive can smart beta be to the South African active fund management fraternity. *IAJ* 46(1), 17–31

This research paper explores the theme of Smart Beta and the current state of inefficiency of active fund fee structures in South African domestic equity unit trusts. The emerging understanding is that many of the latent sources of value-add (or alpha) of active fund managers are currently accessible in cheaper form via Smart Beta products. Smart Beta products use mechanical and automated rules to establish exposures to tradeable instruments that emulate many of the understood and replicable themes in current active asset management. We sample 91 well-known general equity funds along with nine local Smart Beta funds and demonstrate how disruptive Smart Beta products could be to the fee structures of many of these active funds. We do this by mapping the reproducible elements of the active return of these funds to fungible Smart Beta factors. We conclude with five broad predictions around the active fund management industry in South Africa. Additionally, we focus on how active managers might prudently align themselves with an understanding of what aspects of their value-add are not replicable in order to persist and thrive.

Gonzalez, M, Rodriguez, A & Stein R (2017). Portfolio performance under reference-day risk. *IAJ* 46(1), 32–43

Reference-day risk has been previously identified as a type of sampling variation phenomenon, and its effect on the estimation of stock returns and their volatility and market betas has been documented. Using a dataset of daily equity mutual fund returns, we extend previous studies to analyse the effect of reference-day risk on regression alphas, a metric that is widely used to measure fund performance. The results follow the trend observed for other financial asset statistics: for a large proportion of funds that show significant alphas, significance depends only on the reference day used as a basis for the estimation of the returns. This finding casts doubt on all inferences previously obtained using this measurement. Further tests show that the variability of the alpha and its significance does not appear to have

a systematic pattern and is not related to fund characteristics. Methodologies tested that may diminish the problem, which include the use of factor models and robust regression using Student-t distributed errors, do not yield encouraging results.

Qureshi, F, Ismail, I & Chan SG (2017). Mutual funds and market performance: New evidence from ASEAN markets. *IJAJ* **46**(1), 61–79

The contemporaneous growth in ASEAN financial markets over the last two decades raises empirical questions regarding the role of institutional investors in financial market performance. Our study examines the dynamic relationship of aggregate mutual fund flows with market performance variables, i.e. stock market returns and volatility in ASEAN financial markets. Findings suggest that equity and balanced flows have a positive (negative) relationship with market returns (volatility), whereas bond and money market flows have a negative (positive) linkage with market returns (volatility). Furthermore, equity and balanced mutual funds contribute towards reducing market volatility. In addition, mutual funds respond concurrently to risk-related information as compared to returns-related information in the stock market. We also identify that risky securities have a stronger relationship with the market variables than less risky securities do. Moreover, investors direct flows away from equity-based funds to fixed income-type funds in times of high market risk.

French, J (2017). The time traveler's CAPM. *IJAJ* **46**(2), 81–96

This empirical study comprises six emerging market portfolios and five industry replicating portfolios from the USA, using data from 2005 to 2014. The purpose of this study is to test the ability of the ex-ante beta against the ex-post beta using six different generalised autoregressive conditional heteroscedasticity (GARCH) models and the machine learning artificial neural network (ANN) to construct the ex-ante models. Whereas most studies use GARCH models for ultra-short forecasts, little is known about long-run forecasts using these models. The ANN model is also trained to learn the capital asset pricing model (CAPM) to see if the computer can improve upon the traditional model. This study uses a one month (five week) forecast window in all its sample and subsample horseraces, 55 races in all. The ability to forecast the CAPM beta parameters, travel to the future, was found to be more accurate than the historical method across all 11 markets for the three three-year, two five-year and one full 10-year sample periods. Using out-of-sample testing (backtests), the SGARCH was the best predictor overall in developed markets while the IGARCH was in emerging markets.

Page, D & Auret, C (2017). Univariate tests of momentum on the JSE. *IJAJ* **46**(3), 149–64

This study intends to test whether medium-term price momentum is present on the cross-section of shares listed on the JSE. Using the methodology of Jegadeesh and Titman (1993; 2001), shares are sorted applying four estimation periods ($E = 3, 6, 9$ and 12 months) and held for four portfolio holding periods ($H = 3, 6, 9$ and 12 months) post sort. The portfolio 'optimisation' methodology employed in this study provides additional insight when compared with previous tests conducted in South African literature, as further robustness tests are applied in order to determine the sensitivity of momentum to variations in sorting

methodology, liquidity and trading costs. The study finds that estimation and holding periods between six and nine months generate the highest levels of excess return. Consistent with the findings of Basiewicz and Auret (2009) in relation to the size and value anomalies and Oladele and Bradfield (2016), equally weighted momentum excess real returns provide a premium when compared to value weighting. Bid-ask bounce and microstructure effects are present on the JSE, given that momentum profits consistently increase when applying the skipping of most recent estimation month per Asness (1997) and, lastly, momentum is consistently more sensitive to direct transaction costs when compared to liquidity.

Zaremba, A (2017). Seasonality in the cross section of factor premia. *IAJ* 46(3), 165–99

This study examines the seasonality effect in the cross-section of factor premia representing a broad set of stock market strategies. Using cross-sectional and time-series tests, we investigated the cross-sectional seasonality of market, value, size, momentum, quality and low-risk premia within a sample of 24 international equity markets for the years 1986–2016. We provide convincing evidence that the factors with the highest (lowest) mean returns in the same calendar months in the past continue to overperform (underperform) in seven of the studied countries: Denmark, Finland, France, Israel, Spain, Sweden and the United States. Furthermore, when the factors in multiple countries are considered, the past same-month returns display strong predictive power for future size and low-risk premia.

Sayed, A, Auret, C & Page D (2017). Do share prices lead economic activity in emerging markets? Evidence from South Africa using Granger-causality tests. *IAJ* 46(3), 200–12

The forward-looking characteristic of share prices and their subsequent role as leading indicators of economic activity has been widely documented in advanced economies, with evidence in emerging countries being less prevalent. This paper investigates the information content of share prices as a leading indicator in South Africa using both nominal and real quarterly and monthly time-series data for the period March 1998 to December 2016. Taking market segmentation on the JSE into account, causality between the All-Share index, the Industrial index, the Resources index and the Financial index is examined against GDP and industrial production using the test proposed by Granger (1969). Investigating causal relationships by econometrics models and cross-spectral methods. *Econometrica*, 37(3), 424–38). The empirical investigation reveals overwhelming evidence in favour of the JSE as a leading indicator of economic activity, as unidirectional causality is established between the four market segmentation proxies and the macroeconomic variables.

Du Plessis, H & Van Rensburg, P (2017). Diversification and the realised volatility of equity portfolios. *IAJ* 46(3), 213–34

In Markowitz's (1952) portfolio theory, a reduction in volatility for a given level of expected return is implied as being equivalent to an increase in diversification. The recent development of risk-based portfolio construction methods, which emphasise diversification separately from volatility reduction, challenges this equivalence. Using a point-in-time database of liquid equities listed on the Johannesburg Stock Exchange between 1998 and

2016, a numerical simulation technique is employed to study the behaviour of a range of diversification measures as a portfolio-level attribute and assess and compare their usefulness in estimating out-of-sample portfolio volatility. The empirical performance of maximum diversification portfolios based on each measure is then investigated. It is found that a portfolio's diversification level is a significant predictor of future portfolio risk beyond that of historic volatility, and that the empirical performance of maximum diversification portfolios, attractive in all cases, depends critically on the definition of diversification applied.

Charteris, A (2017). Feedback trading on the JSE. *IJ* **46**(3), 235–48

Speculators constantly search for mispriced securities, with many studying past prices to identify patterns, known as feedback trading. Positive feedback trading perpetuates a trend and is thus destabilising, as it drives prices away from their fundamental value and contributes to volatility. In contrast, negative feedback trading, trading in the opposite direction of the trend, is stabilising, as it drives prices back to their fundamental value. This study examined whether individual shares on the South African market are prone to feedback trading strategies; the results of which have importance for regulators and policymakers, arbitrageurs and portfolio managers. On average, 23% of the shares showed evidence of feedback trading, with approximately 9% of this being positive feedback trading and 14% negative feedback trading. The implications of these findings for various market participants are discussed.

Huang, Hsin-Yi & Chiang, Min-Hsien (2017). Do mutual fund flows drive the disposition behaviour of fund managers? *IJ* **46**(4), 311–23

This study examines the relationship between fund flows and the disposition behaviour of fund managers. During our sample period of 1996–2014, we find that the disposition biases of fund managers are significantly and negatively correlated with unexpected fund flows but insignificantly correlated with expected fund flows. Additionally, funds embedded with a higher capital gains tax overhang tend to have managers with lower disposition biases. Further evidence shows that fund performance is influenced more by the flow-induced than the non-flow-induced disposition behaviour of fund managers.

JOURNAL OF SOUTHERN AFRICAN STUDIES

Lukasiewicz, M (2017). From diamonds to gold: The making of the Johannesburg Stock Exchange, 1880–1890. *JSAS* **43**(4), 715–32

Despite the emphasis on materialism prompting many debates about the growth of the gold industry and the outbreak of the South African War in 1899, little research has focused on the financial institutions of South Africa's early gold industry. The growth of the Johannesburg Stock Exchange (JSE) is woven interchangeably with that of Witwatersrand's gold industry. This article investigates why and how the Exchange came into existence, and its early interaction with southern Africa's gold-mining revolution. Using original documentation

from the JSE and its landlord, the Johannesburg Estate Company, the article juxtaposes accounts of the London Stock Exchange, with South African financial developments in the last quarter of the 19th century. It describes the intentional deregulation of stock exchange listing requirements that led to the establishment of the JSE. In addition, the article outlines the JSE's organisational developments by quantifying and qualifying trends in membership numbers up until the end of the first 'Golden Boom' of 1890. The early institutional growth of the Exchange can be seen as a balancing of organisational power between the Exchange's landowner, Barney Barnato's Johannesburg Estate Company, and JSE members.

Carmody, P (2017). The geopolitics and economics of BRICS' resource and market access in Southern Africa: Aiding development or creating dependency? *JSAS* 43(5), 863–77

What has been the impact of BRICS (Brazil, Russia, India, China, South Africa) on southern African states' development policy, practice and outcomes? Have they allowed for the creation of development space and, potentially, the emergence of developmental states, or has their influence reinforced the extractive, neo-liberal nature of most southern African economies? Drawing on key informant interviews with policy analysts and shapers in South Africa, trade data and secondary sources, this article explores the BRICS countries' relations with, and strategies towards, the region, with a specific focus on the impact of China and South Africa. It explores the nature and influence of BRICS countries' engagement in the region and the potential for policy space opened up by this.

MANAGEMENT DYNAMICS

Lambrechts, H & Roos, M (2017). Applying Joel Greenblatt's value investment strategy to the JSE. *MD* 26(1), 2–15

The researchers investigated the effectiveness of Joel Greenblatt's value investment strategy on the Johannesburg Stock Exchange (JSE) from January 1996 until December 2013. This investment strategy ranks stocks based on their price-to-earnings ratio and their return on assets. The effectiveness of the investment strategy was measured by means of excess returns and excess risk-adjusted returns over the market index. The optimal portfolio size and holding periods were also investigated. The results indicate that Greenblatt's value investment strategy can be effectively implemented on the JSE to produce statistically significant excess returns above the market index as well as superior risk-adjusted returns. The results of the study confirm the findings of Greenblatt (2006: 56) and Sareewiwatthana (2011: 10–11).

MEDITARI

Kholvadia, F (2017). Islamic banking in South Africa—form over substance? *MAR* 25(1), 65–81

PURPOSE: The purpose of this study is to understand the economic substance of Islamic banking transactions in South Africa and to analyse whether the economic substance is closely related to the legal form. Additionally, this study highlights the similarities and differences in the execution of Islamic banking transactions across different South African banks. The transactions analysed are deposit products of *qard* and *Mudarabah* and financing products of *Murabaha*, *Ijarah* and diminishing *Musharaka*.

DESIGN/METHODOLOGY/APPROACH: The study was conducted through interviews with representatives from each of the four South African banks that offers Islamic banking products. Interviews were semi-structured and allowed interviewees to voice their perspectives, increasing the validity of the interviews.

FINDINGS: The study found that specific *Shariah* requirements of Islamic banking transactions are considered and included in the legal structure of the contracts by all four banks offering Islamic banking products. However, the economic reality of these transactions was often significantly different from its legal form and was found to, economically, replicate conventional banking transactions. The study also found that all four banks offer Islamic banking products under the same *Shariah* principles, but in some instances (e.g. diminishing *Musharaka*), execute these transactions in different ways. This study is the first of its kind in South Africa.

RESEARCH LIMITATIONS/IMPLICATIONS: While safeguards have been used to ensure the reliability and validity of the research, there remain a few inherent limitations which should be noted: interviewees, while chosen for their expertise and level of knowledge, may provide highly technical insight which may be difficult to interpret. Detailed technicalities were therefore excluded from this research. The regulatory environment of banks in South Africa, for example, regulation imposed by the Financial Service Board on all financial institutions in South Africa, has not been explored. However, the regulatory environment was brought to the readers' attention to help illustrate certain themes. This research uses only *Shariah* requirements as detailed in Section 2.2 to analyse transactions. Fatwas (rulings) issued by the *Shariah* Boards of South African Islamic banks have not been included in this study and may be an area of future research.

ORIGINALITY/VALUE: This study is the first of its kind in South Africa. The study adds to the Islamic banking literature by analysing the real execution of Islamic banking transactions rather than the theoretical compliance with *Shariah* law.

SOUTH AFRICAN JOURNAL OF ACCOUNTING RESEARCH

Bradfield, D & Munro, B (2017). The number of stocks required for effective portfolio diversification: the South African case. *SAJAR* **31**(1), 44–59

This article considers several insights surrounding the number of stocks needed in portfolios in South Africa to achieve effective risk reduction. The majority of studies in the literature use equally-weighted portfolio construction schemes and conclude that at most 20 stocks are needed for effective diversification. We point out that more stocks are potentially needed in concentrated portfolios that typify portfolios in South Africa. To this end a market-capitalisation-weighting scheme is investigated and contrasted with an equal-weighting scheme in the construction of portfolios. Our findings confirm that more stocks are needed in the South African environment and we give recommendations for the number of stocks required to achieve effective diversification in South Africa.

Van Wyk, E & Terblanche, M (2017). Section 12M contributions in terms of the Income Tax Act No. 58 of 1962: Normal tax implications for the retired employee. *SAJAR* **31**(3), 181–92

Section 12M of the Income Tax Act No. 58 of 1962 allows a normal tax deduction for employers who pay the post-retirement medical contributions by way of lump sum payments on behalf of retired employees. Although a full deduction is granted to the employer for a contribution in terms of section 12M, an area of uncertainty has been identified by the authors of this paper. This area of uncertainty involves the income tax implications for the retired employee upon receipt of such contribution or upon receipt of a benefit regarding such contribution from the former employer. Possible tax implications were considered in terms of paragraphs (a), (c), (d), (f) and (i) of the gross income definition, as well as in terms of paragraphs 2(i) read with 12A of the Seventh Schedule to the Act. A number of binding class rulings and one binding private ruling published by SARS were investigated, supported by a scrutiny of the relevant provisions of the Act. It is concluded that a contribution in terms of section 12M(2)(b) will be regarded as a fringe benefit in terms of paragraph 2(i) read with paragraph 12A of the Seventh Schedule to the Act, whilst a section 12M(2)(a) contribution might be a paragraph (c) paragraph (d) or paragraph (f) inclusion in gross income. The latter two might qualify as severance benefits. Lastly, the employee will be entitled to a section 6A(2)(a) medical scheme fees tax credit should the amount be applied for medical contributions.

Badenhorst, WM (2017). Premiums and discounts of Exchange-traded funds. *SAJAR* **31**(3), 212–22

The objective of this study is to determine whether the spread in underlying exchange-traded fund (ETF) investments is a significant cause of the premium/discount of the ETF. Spreads of underlying investment portfolios are alternatively calculated using weighted bid-ask and bid-close spreads for a sample of ETFs listed on the Johannesburg Stock Exchange (JSE) in South Africa from 2010 to 2014. Results show that spreads of underlying investment portfolios are positively associated with larger premiums/discounts of ETFs as a whole.

However, stratified results show that this relationship exists only for premiums; underlying spreads are not significantly associated with discounts. In addition, the findings show that expense ratios offer a significant explanation for premiums/discounts of ETFs. This paper contributes to the existing literature by offering an explanation for the size of premiums of ETFs at reporting date. Its findings imply that relative illiquidity in the underlying portfolio of the ETF means that a premium will likely persist. A deeper understanding in this regard assists investors in determining whether an ETF premium is worth paying for. In addition, this paper reveals that premiums and discounts of ETFs do not always arise from the same causes and should be investigated as separate phenomena in future research.

SOUTH AFRICAN JOURNAL OF BUSINESS MANAGEMENT

Dube, S & Maroun, W (2017). Corporate social responsibility reporting by South African mining companies: evidence of legitimacy theory. *SAJBM* 48(1), 23–34

This paper offers evidence on the relevance of legitimacy theory for explaining changes in the frequency of corporate social responsibility (CSR) disclosures by South African platinum mining companies following violent strike action during 2012 at Marikana. The results show that all of the South African platinum mining companies provide additional information dealing specifically with the strike taking place at Marikana. This is more pronounced for the company directly involved in the incident. The research also finds evidence of a reaction to the social event by other companies in the South African platinum industry which alter the nature and extent of general CSR disclosures to maintain legitimacy. In this way, the study offers evidence in support of the relevance of legitimacy theory for explaining changes in CSR reporting. The findings of this study complement existing research which has ignored the South African market. Although there has been some work on legitimacy theory in the context of environmental disclosure by South African companies, the study is the first to examine a significant social event using legitimacy theory as the frame of reference.

Van der Merwe, R & Krige, JD (2017). Perfect foresight portfolios on the JSE. *SAJBM* 48(2), 1–9

The main aim of this study was to determine the effect of unanticipated information, or noise, on the returns of cap-weighted portfolios in various segments of the JSE for the period 1995 to 2014.

According to Fuller, Han and Tung (2012), all investors in a segment would gain maximum alpha from a portfolio weighted by ex-post market capitalisation—in other words, a ‘perfect foresight’ (PF) portfolio. The PF portfolio is a buy-and-hold portfolio of all shares in a particular segment with weights at the beginning of the return period set to be proportional to the market capitalisation of the shares at the end of the return period. The excess return of the PF portfolio over the benchmark portfolio therefore is an estimate of the effect of unanticipated information on the return of the benchmark portfolio. It provides an estimate of the maximum annual amount of available alpha to all investors involved in that segment

in a given year. In this study, the returns of PF portfolios were compared with the All Share, Large Cap, Mid Cap and Small Cap segments of the JSE.

Intuitively, information to guide decisions on portfolio weighting would be more valuable and deliver more profit when the cross-sectional standard deviation of share returns is high. Therefore a secondary aim was to investigate the correlation between cross-sectional standard deviation and PF excess return. It was found that a strong positive correlation (more than 90%) existed between cross-sectional standard deviation and PF excess return in all segments.

In ascending order of annual PF excess return and average cross-sectional standard deviation the results for the segments were: Large Cap (8% and 29%), All Share (9% and 32%), Mid Cap (13% and 36%) and Small Cap (17% and 43%).

Desta, TS (2017). Consequence of loan loss provisions on earnings management behaviour: a study on the best African commercial banks. *SAJBM* **48**(3), 1–11

This study aimed at analysing the relationship between loan loss provision (LLP) and earnings management in the African commercial banks. The study selected the 11 banks among the 32 best commercial banks as identified by the *Global Finance Magazine* in 2014. These 11 banks are available online in the Bureau van Dijk Bankscope data and helped observe 10 years (2004–2013, of which 2003 is the base) financial statements, which accounts 34.38% of the 32 best banks. Accounting data derived from 11 years audited financial statements were used; 110 bank-year observations. A two stage panel regression, partial and pairwise correlation, and independent t-test were applied in order to analyse the relationship between the discretionary LLP (DLLP) and earnings management. Accordingly, the study found that loan to deposit (LD), return on asset (ROA), and earnings before tax and provision (EBTP) significantly influence the DLLP. Besides, banks with high premanaged earnings and well-capital more indulge in the DLLP. The study supports empirical findings on income smoothing and external financing hypotheses, but not the capital management hypothesis. Finally, further research on this topic is recommended, among others, by taking relatively large bank-year observations.

De Jager P, De Kock, F & Van der Spuy, P (2017). Do not feed the predators. *SAJBM* **48**(3), 35–45

This study investigates the prevalence and characteristics of papers published in popular predatory journals by South African academics in economic and management sciences. Our aim is to raise awareness and to deepen understanding of the predatory publishing phenomenon. We collected 728 recent (2013 to mid-2016) articles with South African authors in five popular in the field journals classified as ‘potential, possible, or probable predatory’ according to Beall’s list. Our data shows that publishing in these predatory journals is widespread across authors and universities. However, the data also shows that most of the authors only published once in these journals, suggesting that they perhaps mistakenly perceived the journals as being legitimate research outlets. We found evidence of low-quality publishing by the journals in our data, consistent with deficient peer review and copy editing

processes. Thus, low-quality publishing was evident from spelling and grammar mistakes in the titles of articles, publishing the same paper twice in the same journal, so-called ‘salami slicing’, and the publishing of an article already published in another journal. If a large number of South African academics publish papers in predatory journals, then those journals become legitimised locally, leading to other South African academics also publishing in them. This can create a dangerous downward spiral in research quality.

SOUTH AFRICAN JOURNAL OF ECONOMIC AND MANAGEMENT SCIENCES

Badenhorst, WM (2017). Tax preferences, dividends and lobbying for maximum value. *SAJEMS* 20(1), 1476–98

BACKGROUND: The value of equity investments depends to some extent on the tax consequences for investors. When groups of investors have different tax preferences, this can lead to conflicting pressures on firms to either retain earnings or pay dividends. The findings of this study will be of interest to researchers of taxation and corporate governance alike, as they highlight the role that corporate shareholders play in the decisions of the firm. Investors and regulators will also be interested in the findings as they reveal more about the interaction between shareholders with conflicting interests. Lastly, changes in behaviour as a result of changes in tax legislation are of interest to those with fiscal responsibility.

SETTING: A 2012 dividend tax change in South Africa, which simultaneously altered the tax preferences of individual and corporate investors, provides a unique opportunity to investigate firms’ reaction to their investors’ tax preferences.

AIM: This article seeks to determine whether firms respond to changes in their investors’ tax preferences in their decisions to either retain earnings or pay dividends.

METHOD: The article investigates the responses of firms to the 2012 dividend tax change using multivariate regressions.

RESULTS: Findings show that firms consider changes in the tax preferences of their investors in setting dividend policies. In addition, it appears that corporates have greater success in lobbying for beneficial dividend changes than individuals.

CONCLUSION: Changes in investors’ tax preferences impact on firms’ dividend policy decisions. These decisions ultimately affect the value of the firm to its investors.

Flint, E & Maré, E (2017). Fractional Black–Scholes option pricing, volatility calibration and implied Hurst exponents in South African context. *SAJEMS* 20(1) [online]

BACKGROUND: Contingent claims on underlying assets are typically priced under a framework that assumes, inter alia, that the log returns of the underlying asset are normally distributed. However, many researchers have shown that this assumption is violated in practice. Such violations include the statistical properties of heavy tails, volatility clustering, leptokurtosis and long memory. This paper considers the pricing of contingent claims when the underlying is assumed to display long memory, an issue that has heretofore not received much attention.

AIM: We address several theoretical and practical issues in option pricing and implied volatility calibration in a fractional Black–Scholes market. We introduce a novel eight-parameter fractional Black–Scholes-inspired (FBSI) model for the implied volatility surface, and consider in depth the issue of calibration. One of the main benefits of such a model is that it allows one to decompose implied volatility into an independent long-memory component—captured by an implied Hurst exponent—and a conditional implied volatility component. Such a decomposition has useful applications in the areas of derivatives trading, risk management, delta hedging and dynamic asset allocation.

SETTING: The proposed FBSI volatility model is calibrated to South African equity index options data as well as South African Rand/American Dollar currency options data. However, given the focus on the theoretical development of the model, the results in this paper are applicable across all financial markets.

METHODS: The FBSI model essentially combines a deterministic function form of the 1-year implied volatility skew with a separate deterministic function for the implied Hurst exponent, thus allowing one to model both observed implied volatility surfaces as well as decompose them into independent volatility and long-memory components respectively. Calibration of the model makes use of a quasi-explicit weighted least-squares optimisation routine.

RESULTS: It is shown that a fractional Black–Scholes model always admits a non-constant implied volatility term structure when the Hurst exponent is not 0.5, and that 1-year implied volatility is independent of the Hurst exponent and equivalent to fractional volatility. Furthermore, we show that the FBSI model fits the equity index implied volatility data very well but that a more flexible Hurst exponent parameterisation is required to fit accurately the currency implied volatility data.

CONCLUSION: The FBSI model is an arbitrage-free deterministic volatility model that can accurately model equity index implied volatility. It also provides one with an estimate of the implied Hurst exponent, which could be very useful in derivatives trading and delta hedging.

Rateiwa, R & Aziakpono, MJ (2017). Non-bank financial institutions and economic growth: Evidence from Africa's three largest economies. *SAJEMS* 20(1) [online]

BACKGROUND: In order for the post-2015 world development agenda—termed the sustainable development goals (SDGs)—to succeed, there is a pronounced need to ensure that available resources are used more effectively and additional financing is accessed from the private sector. Given that traditional bank lending has slowed down, the development of non-bank financing has become imperative. To this end, this article intends to empirically test the role of non-bank financial institutions (NBFIs) in stimulating economic growth.

AIM: The aim of this article is to empirically test the existence of a long-run equilibrium relationship between economic growth and the development of NBFIs, and the causality thereof.

SETTING: The empirical assessment uses time-series data from Africa's three largest economies, namely, Egypt, Nigeria and South Africa, over the period 1971–2013.

METHODS: This article uses the Johansen cointegration and vector error correction model within a country-specific setting.

RESULTS: The results showed that the long-run relationship between NBF development and economic growth is relatively stronger in Egypt and South Africa than in Nigeria. Evidence in respect of Nigeria shows that such a relationship is weak. The nature of the relationship between NBF development and economic growth in Egypt is positive and significant, and predominantly bidirectional. This suggests that a virtuous relationship between NBFs and economic growth exists in Egypt. In South Africa, the relationship is positive and significant and predominantly runs from NBF development to economic growth, implying a supply-leading phenomenon. In Nigeria, the results are weak and mixed.

CONCLUSION: The study concludes that in countries with more developed financial systems, the role of NBFs and their importance to the economic growth process are more pronounced. Thus, there is need for developing policies targeted at developing the NBF sector, given their potential to contribute to economic growth.

Liebenberg, F, Van Vuuren, G & Heymans, A (2017). Contingent convertible bonds and countercyclical capital measurement. *SAJEMS* **20**(1), 1600–17

BACKGROUND: The procyclical nature of capital models under the Basel II Accord has been widely criticised for exacerbating lending in economic expansions and restricting lending during economic contractions. These criticisms have led regulators to employ countercyclical measures in subsequent Basel accords. One of these measures, the countercyclical capital buffer (CCB), has been proposed as an effective countercyclical measure in expansionary periods as a deterrent to excessive lending through increased bank capital requirements.

AIM: The effectiveness of the CCB during contractions is not obvious. Contingent convertible (CoCo) bonds—which are bond-like until triggered by a deterioration of a prescribed capital metric, at which point they convert into a form of equity—are explored as a supplementary countercyclical capital measure for such periods to establish whether or not they function effectively.

SETTING: The analysis is undertaken using global bank CoCo data, and then applied to South African banks.

METHODS: The Hodrick Prescott filter was applied to empirical historical data.

RESULTS: The CCB functions as a good countercyclical capital measure in times of economic expansion by absorbing losses and stabilising the capital base through equity issuance.

CONCLUSION: The issuance of CoCo bonds—if their trigger mechanisms are designed correctly—may prove helpful to banks and the broader financial sector in times of economic contraction through the countercyclical capital properties that manifest through CoCo bonds under these economic conditions.

Foggitt, G, Heymans, A, Van Vuuren G & Pretorius, A (2017). Measuring systemic risk in the South African banking sector. *SAJEMS* **20**(1), 1619–21

BACKGROUND: In the aftermath of the sub-prime crisis, systemic risk has become a greater priority for regulators, with the National Treasury (2011) stating that regulators should proactively monitor changes in systemic risk.

AIM: The aim is to quantify systemic risk as the capital shortfall an institution is likely to experience, conditional to the entire financial sector being undercapitalised.

SETTING AND METHODS: We measure the systemic risk index (using the SRISK) of the South African (SA) banking sector between 2001 and 2013.

RESULTS: Although the results indicated only moderate systemic risk in the SA financial sector over this period, there were significant spikes in the levels of systemic risk during periods of financial turmoil in other countries. Especially the stock market crash in 2002 and the subprime crisis in 2008. Based on our results, the largest contributor to systemic risk during quiet periods was Investec, the bank in our sample which had the lowest market capitalisation. However, during periods of financial turmoil, the contributions of other larger banks increased markedly.

CONCLUSION: The implication of these spikes is that systemic risk levels may also be highly dependent on external economic factors, in addition to internal banking characteristics. The results indicate that the economic fundamentals of SA itself seem to have little effect on the amount of systemic risk present in the financial sector. A more significant relationship seems to exist with the stability of the financial sectors in foreign countries. The implication therefore is that complying with individual banking regulations, such as Basel, and corporate governance regulations promoting ethical behaviour, such as King III, may not be adequate. It is therefore proposed that banks should always have sufficient capital reserves in order to mitigate the effects of a financial crisis in a foreign country. The use of worst-case scenario analyses (such as those in this study) could aid in determining exactly how much capital banks could need in order to be considered sufficiently capitalised during a financial crisis, and therefore safe from systemic risk.

Owusu-Sekyere, E (2017). The impact of monetary policy on household consumption in South Africa: Evidence from vector autoregressive techniques. *SAJEMS* 20(1), 1660–85

BACKGROUND: This article adds to scarce sub-Saharan African and South African literature on monetary policy transmission mechanisms by looking into: (1) the Keynesian interest rate channel of monetary policy transmission in South Africa, focussing on the behaviour of household credit and household consumption; (2) using the time-varying parameter vector autoregressive (VAR) techniques with stochastic volatility to capture the time-varying nature of the underlying structure of the South African economy to see whether it performs better than the constant parameter VAR in so doing and (3) policy implications emerging from the findings of the study.

AIM: In testing the hypotheses of the interest rate channel of monetary policy transmission, the aim is to see how household credit and ultimately household consumption have evolved in South Africa: (1) before inflation targeting (1994–1999), (2) after inflation targeting (2000–2007) and (3) during the global financial crisis (2007–2012) in response to different monetary policy positioning.

SETTING: We focus on three periods: post transition from apartheid, during inflation targeting and during the global financial crisis, periods which saw changes in the monetary policy stance in South Africa.

METHODS: Quarterly data from 1994Q1 to 2012Q4, constant parameter VAR and time-varying parameter vector autoregressive (TVP-VAR) techniques are used in this study. The use of the TVP-VAR is to capture the time-varying nature of the underlying structure of the South African economy and also to investigate whether it performs better than the constant parameter VAR in so doing.

RESULTS: The results show that household credit and consumption declined and stayed negative post transition and after inflation targeting—periods of monetary tightening in South Africa—but increased during the global financial crisis, which saw expansionary monetary policy measures aimed at mitigating the negative output gap in South Africa.

CONCLUSION: These changes in household credit and consumption across the different time periods show evidence of the cost of credit effect of monetary policy on household consumption in South Africa. They further reflect the impact of different structural changes and exogenous shocks on monetary policy conduct in South Africa and its pass through effect on household consumption in South Africa. We further conclude that the time TVP-VAR with stochastic volatility performs better than the constant parameter VAR in capturing the time-varying nature of the underlying structure of the South African economy.

Louw, E, Van Schalkwyk, EH & Reyers, M (2017). Life-cycle versus balanced funds: An emerging market perspective. *SAJEMS* **20**(1), 1695–1701

BACKGROUND: Inadequate retirement savings is an international challenge. Additionally, individuals are not cognisant of how asset allocation choices ultimately impact retirement savings. Life cycle and balanced funds are popular asset allocation strategies to save towards retirement. However, recent research is questioning the efficacy of life cycle funds that switch to lower risk asset classes as retirement approaches.

AIM: The purpose of this study is to compare the performance of life cycle funds with balanced funds to determine whether either dominates the other. The study compares balanced and life cycle funds with similar starting asset allocations as well as those where the starting asset allocations differ.

SETTING: The study has a South African focus and constructs funds using historical data for the main local asset classes; that is, equity, fixed income and cash, as well as a proxy for foreign equity covering the period 1986–2013.

METHOD: The study makes use of Monte Carlo simulations and bootstrap with replacement, and compares the simulated outcomes using stochastic dominance as decision-making criteria.

RESULTS: The results indicate that life cycle funds fail to dominate balanced funds by first-order or almost stochastic dominance when funds have a similar starting asset allocation. It is noteworthy that there are instances where the opposite is true, that is, balanced funds dominate life cycle funds. These results highlight that while the life cycle funds provide more downside protection, they significantly suppress the upside potential compared to balanced funds. When the starting asset allocations of the balanced and life cycle funds differ, the stochastic dominance results are inconsistent as to the efficacy of the life cycle fund strategies considered.

CONCLUSION: The study shows that whether one fund is likely to dominate the other is strongly dependent on the underlying asset allocation strategies of the funds. Additionally, the length of the glide path and the risk and return characteristics of the investable universe are also likely to influence the findings.

SOUTH AFRICAN JOURNAL OF ECONOMICS

Gomex-Gonzalez, JE, Ojeda-Joya, JN, Franco, JP & Torres, JE. (2017). Asset price bubbles: Existence, persistence and migration. *SAJE* **85**(1), 52–67

Econometric tests are performed for the detection and migration of asset-price bubbles in the housing, currency and stock markets of seven countries. This set of countries includes both developed and emerging economies that have good historical data on housing prices. Our empirical results suggest that this type of exuberant behaviour in prices occurs more frequently in the housing market than in the currency and stock markets. Additionally, we find significant evidence of bubble migration across markets within some of the studied countries.

Fanta, AB & Makina, D. (2017). Equity, bonds, institutional debt and economic growth: Evidence from South Africa. *SAJE* **85**(1), 86–97

We examine the finance-growth nexus in South Africa accounting for the role of bond markets, stock markets, and bank and non-bank financial intermediaries using a vector autoregressive technique. Extant empirical literature has largely accounted for only banks and stock markets, ignoring bond market and non-bank financial intermediaries. We find that bond market development affects economic growth in South Africa, and no similar effect is observed for the bank and non-bank financial intermediaries and the stock market. Our finding shows that examination of individual elements of the financial system is important in understanding the unique effect of each on growth. The observation that the bond market rather than stock market, bank and non-bank institutions promotes economic growth in South Africa induces an intriguing question as to what unique roles bond markets play that the intermediaries and equity market are unable to play.

Maserumule, T & Alagidede, P (2017). Impact of macroeconomic announcements on foreign exchange volatility: Evidence from South Africa. *SAJE* **85**(3), 405–29

This study focuses on scheduled macroeconomic news announcements and evaluates their impact on the volatility of the South African rand (ZAR) and US dollar (USD) exchange rate using high frequency data. The following asymmetries are studied: news items by geographical location, no-news vs. surprise news announcements and positive vs. negative news announcements. We make the following findings in our empirical study: (i) After the release of a news announcement, the level of foreign exchange volatility rises. This is independent of whether the news item surprised the market or not. (ii) Both South African and US news items significantly impact USD/ZAR volatility, suggesting that the news items are being used to formulate investor expectations regarding the future prospects of the currency

pair. (iii) Negative news appears to have a greater impact on exchange rate volatility relative to positive news. This result is also state dependent, as investors tend to behave differently to news depending on the economic climate at that point in time. Investor cognitive biases give rise to the asymmetric news effects on exchange rate volatility. Finally, investors do not always act in rational manner, especially when faced with multiple news items that are contradictory to each other.

SOUTH AFRICAN JOURNAL OF HIV MEDICINE

Moorhouse, M, Conradie, F & Venter, F (2017). What is the role of CD4 count in a large public health anti-retroviral programme? *SAJHM* **18**(1), 446

No abstract available

Johnson, LF, Dorrington, RE & Haroon, M (2017). Progress towards the 2020 targets for HIV diagnosis and antiretroviral treatment in South Africa. *SAJHM* **18**(1), 694

BACKGROUND: The UNAIDS targets for 2020 are to achieve a 90% rate of diagnosis in HIV-positive individuals, to provide antiretroviral treatment (ART) to 90% of HIV-diagnosed individuals and to achieve virological suppression in 90% of ART patients.

OBJECTIVES: To assess South Africa's progress towards the 2020 targets and variations in performance by province.

METHODS: A mathematical model was fitted to HIV data for each of South Africa's provinces, and for the country as a whole. Numbers of HIV tests performed in each province were estimated from routine data over the 2002–2015 period, and numbers of patients receiving ART in each province were estimated by fitting models to reported public and private ART enrolment statistics.

RESULTS: By the middle of 2015, 85.5% (95% CI: 84.5%–86.5%) of HIV-positive South African adults had been diagnosed, with little variation between provinces. However, only 56.9% (95% CI: 55.3%–58.7%) of HIV-diagnosed adults were on ART, with this proportion varying between 50.8% in North West and 72.7% in Northern Cape. In addition, 78.4% of adults on ART were virally suppressed, with rates ranging from 69.7% in Limpopo to 85.9% in Western Cape. Overall, 3.39 million (95% CI: 3.26–3.52 million) South Africans were on ART by mid- 2015, equivalent to 48.6% (95% CI: 46.0%–51.2%) of the HIV-positive population. ART coverage varied between 43.0% in Gauteng and 63.0% in Northern Cape.

CONCLUSION: Although South Africa is well on its way to reaching the 90% HIV diagnosis target, most provinces face challenges in reaching the remaining two 90% targets.

Johnson, LF, Dorrington, RE & Haroon, M (2017). HIV epidemic drivers in South Africa: A model-based evaluation of factors accounting for inter-provincial differences in HIV prevalence and incidence trends. *SAJHM* **18**(1), 695

BACKGROUND: HIV prevalence differs substantially between South Africa's provinces, but the factors accounting for this difference are poorly understood.

OBJECTIVES: To estimate HIV prevalence and incidence trends by province, and to identify the epidemiological factors that account for most of the variation between provinces.

METHODS: A mathematical model of the South African HIV epidemic was applied to each of the nine provinces, allowing for provincial differences in demography, sexual behaviour, male circumcision, interventions and epidemic timing. The model was calibrated to HIV prevalence data from antenatal and household surveys using a Bayesian approach. Parameters estimated for each province were substituted into the national model to assess sensitivity to provincial variations.

RESULTS: HIV incidence in 15–49-year-olds peaked between 1997 and 2003 and has since declined steadily. By mid-2013, HIV prevalence in 15–49-year-olds varied between 9.4% (95% CI: 8.5%–10.2%) in Western Cape and 26.8% (95% CI: 25.8%–27.6%) in KwaZulu-Natal. When standardising parameters across provinces, this prevalence was sensitive to provincial differences in the prevalence of male circumcision (range 12.3%–21.4%) and the level of non-marital sexual activity (range 9.5%–24.1%), but not to provincial differences in condom use (range 17.7%–21.2%), sexual mixing (range 15.9%–19.2%), marriage (range 18.2%–19.4%) or assumed HIV prevalence in 1985 (range 17.0%–19.1%).

CONCLUSION: The provinces of South Africa differ in the timing and magnitude of their HIV epidemics. Most of the heterogeneity in HIV prevalence between South Africa's provinces is attributable to differences in the prevalence of male circumcision and the frequency of non-marital sexual activity.

Geffen, N & Low, MO (2017). When to start antiretroviral treatment? A history and analysis of scientific controversy. *SAJHM* **18**(1), 734

BACKGROUND: Since 1987 HIV scientists and activists have debated the optimal point to start antiretroviral treatment. Positions have varied between treating people with HIV as soon as they are diagnosed, based on biological, modelling and observational evidence, versus delaying treatment until points in disease progression at which clinical trial evidence has shown unequivocally that treatment is beneficial.

OBJECTIVES: Examining the conduct and resolution of this debate may provide insight into how science works in practice. It also documents an important part of the history of the HIV epidemic.

METHOD: We describe clinical trials, observational studies, models and various documents that have advanced the debate from 1987 to 2015.

RESULTS AND CONCLUSION: Evidence accumulated over the past decade, especially from randomised controlled clinical trials, has shown that immediate treatment both reduces the mortality and the risk of HIV transmission; it benefits both public health and the individual patient. By mid-2015, the debate was resolved in favour of immediate treatment.

SOUTH AFRICAN LAW JOURNAL

Madlela, V & Cassim, R (2017). Disclosure of directors' remuneration under South African company law: Is it adequate? *SALJ* **134**(2), 383–414

The remuneration of directors is a controversial issue in many jurisdictions in the light of the global financial crisis and the escalating remuneration packages of directors. One way of managing the escalating levels of directors' remuneration is to compel companies to disclose the details of directors' remuneration packages. Full disclosure of the remuneration of directors would increase transparency and accountability in the remuneration-setting process of directors. This article explores the adequacy of the Companies Act 71 of 2008 in relation to the disclosure of directors' remuneration. It further examines the disclosure requirements of directors' remuneration under the JSE Listings Requirements and the King Report on Governance for South Africa, 2016 ('King IV'). It compares South Africa's remuneration disclosure requirements with the legislative standards for remuneration disclosure under the Companies Act 2006 of the United Kingdom, and examines whether our disclosure requirements meet the standards of the UK Companies Act, 2006. This article concludes that the minimum standards of remuneration disclosure set by the Companies Act are too low to satisfy enhanced transparency, and suggests various proposals for strengthening the disclosure requirements of directors' remuneration under the Companies Act.

Godwin, A, Howse, T & Ramsey, I (2017). Twin peaks: South Africa's financial sector regulatory framework. *SALJ* **134**(3), 665–702

The National Assembly of South Africa has passed a Bill adopting the 'twin-peaks' model of financial regulation, which sees regulation split into two broad functions: market conduct regulation and prudential regulation. This article compares the structure of the twin-peaks model in South Africa with the structure in other jurisdictions. In doing so, it identifies the strengths and possible weaknesses of the model in South Africa, and the extent to which it reflects international experience. The evolution of the legislation reveals that South Africa has drawn increasingly on international experience, particularly the experience in the UK. However, it also reveals characteristics that might be regarded as unique to South Africa. Two areas are particularly noteworthy in this regard. First, the regulatory framework attempts to achieve a balance between the need to ensure operational independence on the part of the regulators, and the need to recognise the role and involvement of the executive government. Secondly, by comparison with international experience (even that in the UK) the design of the regulatory co-ordination framework appears to involve a high level of potential overlap between the co-ordinating bodies, and also a highly prescriptive approach to achieving effective co-ordination.

SOUTH AFRICAN MEDICAL JOURNAL

Wandai, M, Aagard-Hansen, J, Day, C, Sartorius, & Hofman, KJ (2017). Available data sources for monitoring non-communicable diseases and their risk factors in South Africa. *SAMJ* **107**(4), 327–30

BACKGROUND: Health information systems for monitoring chronic non-communicable diseases (NCDs) in South Africa (SA) are relatively less advanced than those for infectious diseases (particularly tuberculosis and HIV) and for maternal and child health. NCDs are now the largest cause of premature mortality owing to exposure to risk factors arising from obesity that include physical inactivity and accessible, cheap but unhealthy diets. The National Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2013–17 developed by the SA National Department of Health outlines targets and monitoring priorities.

OBJECTIVES: To assess data sources relevant for monitoring NCDs and their risk factors by identifying the strengths and weaknesses, including usability and availability, of surveys and routine systems focusing at national and certain sub-national levels.

METHODS: Publicly available survey and routine data sources were assessed for variables collected, their characteristics, frequency of data collection, geographical coverage and data availability.

RESULTS: Survey data sources were found to be quite different in the way data variables are collected, their geographical coverage and also availability, while the main weakness of routine data sources was poor quality of data.

CONCLUSIONS: To provide a sound basis for monitoring progress of NCDs and related risk factors, we recommend harmonising and strengthening available SA data sources in terms of data quality, definitions, categories used, timeliness, disease coverage and biomarker measurement.

Coetzee, LM, Cassim, N & Glencross, DK (2017). Analysis of HIV disease burden by calculating the percentages of patients with CD4 counts <100 cells/ μ L across 52 districts reveals hot spots for intensified commitment to programmatic support. *SAMJ* **107**(6), 507–13

BACKGROUND: South Africa (SA)'s Comprehensive HIV and AIDS Care, Management and Treatment (CCMT) programme has reduced new HIV infections and HIV-related deaths. In spite of progress made, 11.2% of South Africans (4.02 million) were living with HIV in 2015.

OBJECTIVE: The National Health Laboratory Service (NHLS) in SA performs CD4 testing in support of the CCMT programme and collates data through the NHLS Corporate Data Warehouse. The objective of this study was to assess the distribution of CD4 counts <100 cells/ μ L (defining severely immunosuppressed HIV-positive patients) and >500 cells/ μ L (as an HIV-positive 'wellness' indicator).

METHODS: CD4 data were extracted for the financial years 2010/11 and 2014/15, according to the district where the test was ordered, for predefined CD4 ranges. National and provincial averages of CD4 counts <100 and >500 cells/ μ L were calculated. Data were analysed using Stata 12 and mapping was done with ArcGIS software, reporting percentages of CD4 counts <100 and >500 cells/ μ L by district.

RESULTS: The national average percentage of patients with CD4 counts <100 cells/ μL showed a marked decrease (by 22%) over the 5-year study period, with a concurrent increase in CD4 counts >500 cells/ μL (by 57%). District-by-district analysis showed that in 2010/11, 44/52 districts had $>10\%$ of CD4 samples with counts <100 cells/ μL , decreasing to only 17/52 districts by 2014/15. Overall, districts in the Western Cape and KwaZulu-Natal had the lowest percentages of CD4 counts <100 cells/ μL , as well as the highest percentages of counts >500 cells/ μL . In contrast, in 2014/15, the highest percentages of CD4 counts <100 cells/ μL were noted in the West Rand (Gauteng), Vhembe (Limpopo) and Nelson Mandela Bay (Eastern Cape) districts, where the lowest percentages of counts >500 cells/ μL were also noted.

CONCLUSIONS: The percentages of CD4 counts <100 cells/ μL highlighted here reveal districts with positive change suggestive of programmatic improvements, and also highlight districts requiring local interventions to achieve the UNAIDS/SA National Department of Health 90-90-90 HIV treatment goals. The study further underscores the value of using NHLS laboratory data, an underutilised national resource, to leverage laboratory test data to enable a more comprehensive understanding of programme-specific health indicators.

Dyers, R, Ward, G, Du Plooy, S, Fourie, S, Evans, J & Mahomed, H (2017). Training and support to improve ICD coding quality: A controlled before-and-after impact evaluation. *SAMJ* **107**(7), 501–6

BACKGROUND: The proposed National Health Insurance policy for South Africa (SA) requires hospitals to maintain high-quality International Statistical Classification of Diseases (ICD) codes for patient records. While considerable strides had been made to improve ICD coding coverage by digitising the discharge process in the Western Cape Province, further intervention was required to improve data quality. The aim of this controlled before-and-after study was to evaluate the impact of a clinician training and support initiative to improve ICD coding quality.

OBJECTIVE: To compare ICD coding quality between two central hospitals in the Western Cape before and after the implementation of a training and support initiative for clinicians at one of the sites.

METHODS: The difference in differences in data quality between the intervention site and the control site was calculated. Multiple logistic regression was also used to determine the odds of data quality improvement after the intervention and to adjust for potential differences between the groups.

RESULTS. The intervention had a positive impact of 38.0% on ICD coding completeness over and above changes that occurred at the control site. Relative to the baseline, patient records at the intervention site had a 6.6 (95% confidence interval 3.5–16.2) adjusted odds ratio of having a complete set of ICD codes for an admission episode after the introduction of the training and support package. The findings on impact on ICD coding accuracy were not significant.

CONCLUSION: There is sufficient pragmatic evidence that a training and support package will have a considerable positive impact on ICD coding completeness in the SA setting.

Harling, G, Moyo, S, McGovern, ME, Mabaso, M, Marra, G, Bärnighausen, T & Rehle, T (2017). National South African HIV prevalence estimates robust despite substantial test non-participation. *SAMJ* **107**(7), 590–94

BACKGROUND: South African (SA) national HIV seroprevalence estimates are of crucial policy relevance in the country, and for the worldwide HIV response. However, the most recent nationally representative HIV test survey in 2012 had 22% test non-participation, leaving the potential for substantial bias in current seroprevalence estimates, even after controlling for selection on observed factors.

OBJECTIVE: To re-estimate national HIV prevalence in SA, controlling for bias due to selection on both observed and unobserved factors in the 2012 SA National HIV Prevalence, Incidence and Behaviour Survey.

METHODS: We jointly estimated regression models for consent to test and HIV status in a Heckman-type bivariate probit framework. As selection variable, we used assigned interviewer identity, a variable known to predict consent but highly unlikely to be associated with interviewees' HIV status. From these models, we estimated the HIV status of interviewed participants who did not test.

RESULTS: Of 26 710 interviewed participants who were invited to test for HIV, 21.3% of females and 24.3% of males declined. Interviewer identity was strongly correlated with consent to test for HIV; declining a test was weakly associated with HIV serostatus. Our HIV prevalence estimates were not significantly different from those using standard methods to control for bias due to selection on observed factors: 15.1% (95% confidence interval (CI) 12.1–18.6) v. 14.5% (95% CI 12.8–16.3) for 15–49-year-old males; 23.3% (95% CI 21.7–25.8) v. 23.2% (95% CI 21.3–25.1) for 15–49-year-old females.

CONCLUSION: The most recent SA HIV prevalence estimates are robust under the strongest available test for selection bias due to missing data. Our findings support the reliability of inferences drawn from such data.

Anderson, F & Thompson, SR (2017). Pancreatitis in a high HIV prevalence environment. *SAMJ* **107**(8), 706–9

BACKGROUND: Acute pancreatitis is common in HIV-positive individuals in reports from regions with a low incidence of HIV infection. This association has not been reported in areas with a high incidence of HIV infection.

OBJECTIVE: To examine the prevalence and outcomes of HIV-associated acute pancreatitis in a high HIV prevalence environment, and trends over the period May 2001–November 2010.

METHODS: The records of patients admitted with acute pancreatitis from 2001 to 2010 were reviewed, looking for HIV status, CD4 counts and medications at presentation. The Glasgow criteria, organ failure, local complications and mortality were assessed.

RESULTS: One hundred and six (16.9%) of 627 patients admitted with acute pancreatitis during the study period were infected with HIV. Most were female (65.1%) and black African (91.5%). The serum amylase level was used to confirm acute pancreatitis in 50 patients, with a mean of 1 569 IU/L (range 375–5 769), and urinary amylase in 56 patients, with a mean of 4 083 IU/L (range 934–36 856). Alcohol was a less frequent cause of pancreatitis in the HIV-

positive group than in patients who were HIV-negative (24.5% v. 68.3%), and the prevalence of gallstones as a cause was similar (23.6% v. 17.9%). Antiretroviral therapy was associated with pancreatitis in 35.8%, and 6 (5.7%) had abdominal malignancies. Sixteen (15.1%) had pancreatic necrosis, 20 (18.9%) had septic complications, and 6 (5.7%) died.

CONCLUSIONS: HIV-associated acute pancreatitis was most frequent in females and black Africans and was associated with malignancy. Mortality was similar in HIV and non-HIV pancreatitis.

Mkoko, P & Raine, RI (2017). HIV-positive patients in the intensive care unit: A retrospective audit. *SAMJ* **107**(10), 877–81

BACKGROUND: The indications for and outcomes of intensive care unit (ICU) admission of HIV-positive patients in resource-poor settings such as sub-Saharan Africa are unknown.

OBJECTIVE: To identify indications for ICU admission and determine factors associated with high ICU and hospital mortality in HIV-positive patients.

METHODS: We reviewed case records of HIV-positive patients admitted to the medical and surgical ICUs at Groote Schuur Hospital, Cape Town, South Africa, from 1 January 2012 to 31 December 2012.

RESULTS: Seventy-seven HIV-positive patients were admitted to an ICU, of whom two were aged <18 years and were excluded from the final analysis. HIV infection was newly diagnosed in 37.3% of the patients admitted during the study period. HIV-positive patients had a median CD4 count of 232.5 (interquartile range 59–459) cells/ μ L. Respiratory illness, mainly community-acquired pneumonia, accounted for 30.7% of ICU admissions. ICU and hospital mortality rates were 25.3% and 34.7%, respectively. Predictors of ICU mortality included an Acute Physiology and Chronic Health Evaluation II (APACHE II) score >13 (odds ratio (OR) 1.4, 95% confidence interval (CI) 1.1–1.7; $p=0.015$), receipt of renal replacement therapy (RRT) (OR 2.2, 95% CI 1.2–4.1; $p=0.018$) and receipt of inotropes (OR 2.3, 95% CI 1.6–3.4; $p<0.001$). Predictors of hospital mortality were severe sepsis on admission (OR 2.8, 95% CI 0.9–9.1; $p=0.07$), receipt of RRT (OR 1.9, 95% CI 1.0–3.6; $p=0.056$) and receipt of inotropic support (OR 2.0, 95% CI 1.4–3.2; $p<0.001$). Use of highly active antiretroviral therapy (HAART), CD4 count, detectable HIV viral load and diagnosis at ICU admission did not predict ICU or hospital mortality.

CONCLUSIONS: Respiratory illnesses remain the main indication for ICU in HIV-positive patients. HIV infection is often diagnosed late, with patients presenting with life-threatening illnesses. Severity of illness as indicated by a high APACHE II score, multiple organ dysfunction requiring inotropic support and RRT, rather than receipt of HAART, CD4 count and diagnosis at ICU admission, are predictors of ICU and hospital mortality.

Groenewald, P, Neethling, I, Evans, J, Azevedo, V, Naledi, T, Matzopoulos, R, Nannan, N, Daniels, J & Bradshaw, D (2017). Mortality trends in the City of Cape Town between 2001 and 2013: Reducing inequities in health. *SAMJ* **107**(12), 1091–98

BACKGROUND: The City of Cape Town (CoCT), South Africa, has collected cause-of-death data from death certificates for many years to monitor population health. In 2000, the CoCT

and collaborators set up a local mortality surveillance system to provide timeous mortality data at subdistrict level. Initial analyses revealed large disparities in health across subdistricts and directed the implementation of public health interventions aimed at reducing these disparities.

OBJECTIVES: To describe the changes in mortality between 2001 and 2013 in health sub-districts in the CoCT.

METHODS: Pooled mortality data for the periods 2001–2004 and 2010–2013, from a local mortality surveillance system in the CoCT, were analysed by age, gender, cause of death and health subdistrict. Age-specific mortality rates for each period were calculated and age-standardised using the world standard population, and then compared across subdistricts.

RESULTS: All-cause mortality in the CoCT declined by 8% from 938 to 863 per 100 000 between 2001–2004 and 2010–2013. Mortality in males declined more than in females owing to a large reduction in male injury mortality, particularly firearm-related homicide. HIV/AIDS and tuberculosis (TB) mortality dropped by ~10% in both males and females, but there was a marked shift to older ages. Mortality in children aged <5 years dropped markedly, mostly owing to reductions in HIV/AIDS and TB mortality. Health inequities between subdistricts were reduced, with the highest-burden subdistricts achieving the largest reductions in mortality.

CONCLUSIONS: Local mortality surveillance provides important data for planning, implementing and evaluating targeted health interventions at small-area level. Trends in mortality over the past decade indicate some gains in health and equity, but highlight the need for multisectoral interventions to focus on HIV and TB and homicide and the emerging epidemic of non-communicable diseases.

SOUTH AFRICAN STATISTICAL JOURNAL

Marimo, M & Chimedza, C (2017). Survival analysis of bank loans in the presence of long-term survivors. *SASJ* 51(1), 199–216

In this paper we model competing risks, default and early settlement events, in the presence of long term survivors and compare survival and logistic methodologies. Cause specific Cox regression models were fitted and adjustments were made to accommodate a proportion of long term survivors. Methodologies were compared using ROC curves and area under the curves. The results show that survival methods perform better than logistic regression methods when modelling lifetime data in the presence of competing risks and in the presence of long term survivors.

Marimo, M, Malwandla, MC & Breed, DG (2017). A cross-sectional survival analysis regression model with applications to consumer credit risk. *SASJ* 51(1), 217–34

When performing long-range survival estimations, longitudinal survival analysis methods such as Cox Proportional Hazards (PH) and accelerated lifetime models may produce estimates that are outdated. This paper introduces a cross-sectional survival analysis regression model for discrete-time survival analysis. The paper describes a number of variations to the model,

including how the model can be used to model competing risks. The model is applied to a portfolio of defaulted loans to estimate the probability of loss. The model's performance is benchmarked against the Cox PH model. Results show that cross-sectional survival analysis performs better than the conventional methods of survival. This is attributable to the fact that the cross-sectional survival method is able to use only the most recent survival information to inform predictions.