Abstracts of articles in other South African journals

DE JURE

Marumoagae, C (2019). The need to provide members of retirement funds which are not regulated by the Pension Funds Act access to a specialised dispute resolution forum. *De Jure* **52**(2), 115–37

This paper discusses the disparity in the manner in which retirement funds members regulated by the Pension Funds Act ('PFA') and those not covered by the PFA are treated in relation to the process they need to follow to resolve their retirement funds related complaints. In particular, this paper argues that there is no rational basis for not extending the services of the Office of the Pension Fund Adjudicator to members whose retirement funds are not regulated by the PFA. It is argued that the services of this office should be extended to all retirement funds in South Africa irrespective of whether they are regulated by the PFA. Once this office has been extended as proposed in this paper, it will be able to adjudicate disputes arising from all retirement funds in South Africa. This office should be made easily accessible to all retirement funds members. It is argued further that there is a need for the state to financially capacitate this office in order to make it available in all the provinces of the Republic. This will allow all retirement fund members irrespective of where they reside to be able to lodge complaints with a specialised tribunal dealing with retirement related disputes.

INVESTMENT ANALYSTS JOURNAL

Page, D & Auret, C (2019). Can non-momentum factor premiums explain the momentum anomaly on the JSE? An in-depth portfolio attribution analysis. *IAJ* **48**(1), 1–17

South African literature related to the momentum anomaly is generally limited to the exploration of momentum on a univariate and at most a bivariate basis, such as in combination with value (Fraser & Page, 2000) or liquidity (Page, Britten, & Auret, 2013). All of the literature thus far indicates that momentum is both present and significant on the cross-section

of shares listed on the JSE, yet is narrow in that the current paradigm only considers raw or gross returns (on a univariate or bivariate basis) or risk-adjusted returns applying minimal factors as explanatory variables. This study intends to broaden the existing body of knowledge by applying numerous potential explanatory factors within a multifactor linear framework, utilising market proxies, size and value as independent variables. The key research question to be evaluated is whether various combinations of the independent variables considered are able to explain and provide insight into the dynamics of the momentum premium on the JSE. The findings of the study are largely consistent with the international literature, as none of the non-momentum factor premiums is able to explain the momentum premium.

Chen, J, Ewald, C & Kutam AM (2019). Time-dependent volatility in futures contract options. *IAJ* **48**(1), 30–41

The Schwartz (1997) two-factor model is the benchmark model for pricing futures options, and the volatility is constant, which is similar to the Black–Scholes model. In this paper, we use a similar method which can make the Black–Scholes model be a time-dependent volatility model to show that the time-dependent volatility is also valid in the Schwartz (1997) two-factor model. The time-dependent spot volatility results can be obtained easily and quickly in Matlab. We also explain why the time-dependent spot volatility results need to be tested theoretically and show how to ensure their correctness in both theory and practice.

Van Rooyen, JH & Jones, DL (2019). The inflation-hedging ability of individual shares: evidence from the Johannesburg Stock Exchange (JSE). *IAJ* **48**(1), 58–73

The erosion of purchasing power due to inflation is a source of concern for investors who invest in stocks over long investment horizons. This study examines the inflation-hedging abilities of stocks for South Africa over three different investment periods for both individual stock and for different sectors based on their inflation betas. The results indicate that inflation-hedging betas did not produce conclusive evidence of hedging benefits. A 12-month rolling regression of three long-term portfolios with high, close to zero and low betas revealed that the zero beta portfolio yielded the best average geometric real return over the 2004 to 2015 period. Measuring the inflation-hedging benefits of individual stocks and sector portfolios based on performance measures such as real return, reliability and risk-adjusted return was more conclusive. The results also suggest that some sectors such as technology, consumer staples and healthcare sectors exhibited better inflation-hedging possibilities than other sectors during unstable inflationary conditions.

Page, D & Auret, C (2019). A panel-data analysis of the explanatory power of factor premiums on the Johannesburg Stock Exchange (JSE). *IAJ* **48**(2), 102–13

A large portion of South African asset pricing literature considers the identification of investment styles present on the Johannesburg Stock Exchange (JSE). Unfortunately, the identification of an 'investment style' does not necessarily entail that the said style is an 'explanatory factor' where 'explanatory' implies that the said factor is able independently to explain a portion of the cross-sectional variation in share returns. This study considers

a number of popularised investment styles which have been documented in local and international literature, namely size, value, momentum, low beta, currency risk, low volatility and liquidity. As opposed to applying portfolio sorts based on styles and estimating factor premiums via Fama–Macbeth regressions, this study applies panel data methods on a share-by-share basis. The benefit of such an approach is the ability to test numerous styles in a multivariate parametric framework despite a limited investable universe of shares. The results of the study indicate that size, value, momentum and low market beta are priced factors that explain the average cross-sectional variation in share returns on the JSE.

Du Plooy, S (2019). On the financial interpretation of risk contributions: an analysis using Quantile Simulation. *IAJ* **48**(3), 188–204

This paper tests whether the financial interpretation of risk contributions (Qian, 2006), as measured by marginal change in volatility, holds when accounting for fat tails in the asset return distributions. This important result is the theoretical foundation of risk-based portfolios, but relies on the assumption of normality. If the result does not hold, more sophisticated techniques are required to estimate risk-based portfolios. ,p>A simulation study is conducted to replicate the stressed environment required by Qian (2006). The Quantile Simulation method (Alexander, 2013) is used to simulate asset return distributions that are reasonable replicates of the empirical samples. Given the relative novelty of the simulation method, this paper also reports the extent to which the simulated samples can approximate the empirical sample of each asset.

Stefan, D & Van Rensburg, P (2019). The inflation hedging properties of South African and international asset classes. *IAJ* **48**(3), 205–22

Within the period 1965 to 2015 all domestic asset class returns (except cash) are found to exhibit negative correlations with the contemporaneous inflation rate. Cash has hedging qualities due to Reserve Bank inflation targeting policy action but has a low real yield. Furthermore, Engle–Granger co-integration tests show that none of the asset class prices displays a long-term equilibrium relationship with the CPI. Using local growth assets as 'inflation hedges' in a 'CPI plus' mandate is more of an attempt to outperform inflation than to actually hedge against it.

In contrast, it was found that 'rand-hedge' asset classes could offer inflation protection. Offshore bond returns exhibited a significant positive contemporaneous relationship with inflation over a one- to three-year horizon and was the only asset class to do so. Looking at non-contemporaneous relationships, the prior 12-month rand returns on all foreign asset classes (and the local RESI) were found to be positively correlated with current inflation due to the return enhancement of rand weakening later feeding through into future imported inflation. Thus, rand hedges offer an 'up-front' compensation for future inflation and, understood as such, can provide effective inflation protection for locally based investors.

Gilbert, E & Meiklejohn, L (2019). A comparative analysis of risk measures: a portfolio optimisation approach. *IAJ* **48**(3), 223–39

Investment portfolios are typically created to minimise the level of risk for a required level of return. This paper highlights the importance of the choice of risk metric in this process. The theoretical nature of volatility as a risk measure is reviewed, as are those of three commonly used alternatives: Conditional Value at Risk (CVaR), Omega Ratio and the Wang Transform Risk Measure. The Wang measure is a new measure in a multi-asset portfolio management context. The practical implications of the application of these four different risk metrics are then reviewed in the context of a South African multi-asset class portfolio targeting CPI + five per cent. The results illustrate that the choice of risk measure results in significantly different asset allocation (both strategically and tactically) and related performance outcomes. This highlights the importance for investment managers of the selection of risk measures in a multi-asset portfolio construction context.

Cox, S & Britten, J (2019). The Fama–French five-factor model: evidence from the Johannesburg Stock Exchange. *IAJ* **48**(3), 240–61

This study tests the effectiveness of the Fama and French (2015) five-factor model in explaining returns on the Johannesburg Securities Exchange (JSE). The five-factor model is compared to the traditional Fama–French three-factor model as well as other factor combinations. The results show that the size-value and size-profitability three-factor models best describe time-series returns when comparing models. The five-factor model best explains the cross-section of returns and, overall, the results identify a significant inverse size premium and negative relationship between beta and returns but find a significant value premium. The additional factors of profitability and investment contribute to explaining the returns on the JSE; however, profitability is more consistent than investment.

MANAGEMENT DYNAMICS

Mabalane, MD, Van Schalkwyk, CH & Reyers, M (2019). National differences in the financial risk tolerance of financial planning clients. *MD* **28**(2), 28–41

This study provides policy makers and financial planners with key information to identify demographic traits that are associated with the financial risk tolerance (FRT) of financial planning clients in order to be able to target them appropriately. It explores international nationality differences and similarities in financial risk tolerance based on previously collected survey data, using logistic regression analysis. Data were obtained from 6 828 financial planning clients in Australia, the United Kingdom, the United States and South Africa. Each country's log-regression model contained seven independent variables (age, gender, education, income, marital status, number of dependants and net worth). The results revealed national differences in the financial risk tolerance, with a younger and predominantly male South African sample showing the highest financial risk tolerance. In all the countries, being young and male was associated with higher financial risk tolerance levels. In Australia

and the United Kingdom, higher income levels were associated with higher levels of financial risk tolerance, while in the United States and South Africa, those with higher levels of net worth demonstrated higher levels of financial risk tolerance. In addition, in the South African sample those with higher levels of education had higher financial risk tolerance scores. The full multivariate model (n = 3 981), which included all demographic variables, revealed that higher financial risk tolerance levels are associated with younger, more educated South African males with both higher levels of income and accumulated net worth.

Steyn, J (2019). The tracking efficiency of exchange-traded funds listed on the Johannesburg Stock Exchange. *MD* **28**(4), 2–14

Exchange-traded funds (ETFs) have grown in popularity amongst investors over the last decade, both globally and in South Africa. The purpose of this study was to investigate how efficiently Johannesburg Stock Exchange-listed ETFs track their benchmark indices. Three tracking error measures were calculated for a sample of ETFs that track both local and international equity indices for the period from 2002 to 2018. In addition, three correlation measures were used to evaluate the extent of the relationship between ETF returns and those of their reference benchmarks. The results show that weekly tracking errors are significantly different from zero for both local and international tracking ETFs. The results of the correlation analysis were also significantly different from perfectly linear relationships. The findings show that there is little evidence that ETFs tracking local equity indices track their benchmarks more efficiently than ETFs that follow international equity indices. This study contributes to the existing literature by highlighting the degree to which equity ETFs' performance deviates from the intended benchmark performance. In addition, the study offers evidence that contradicts empirical studies that have shown that ETFs tracking international equity indices have larger tracking errors than those of ETFs that track domestic benchmarks.

MEDITARI

Ram, AJ (2019). Bitcoin as a new asset class. *MEDAR* **27**(1), 147–68

Bitcoin is the best-known cryptocurrency which currently holds the largest market capitalisation and is regarded as a standard example of a cryptocurrency. There is, however, no consensus as to the nature of the Bitcoin. The purpose of this paper is to determine whether Bitcoin represents a new asset class by building on prior research. The prior literature on asset classes is explored in detail and then applied to the Bitcoin. Four key criteria of asset classes are discussed, namely, investability, politico-economic profile, correlation of returns and risk-reward profile. Statistical techniques are used to inform the conclusions for the third and fourth criteria. This research finds that the Bitcoin represents a distinct alternative investment and asset class. There are significant opportunities for investment. The politico-economic profile of the decentralised and consensus-based Bitcoin is dissimilar to other asset classes. The Bitcoin shares little or no correlation with other asset classes. Using Sharpe Ratios, it is shown that the Bitcoin provides risk-adjusted returns over and above most asset classes.

The aim of this research is to present a normative exploration into the asset class nature of the Bitcoin and, as a result, the aim is not to create positivist generalisable conclusions. This paper does not address cryptocurrencies, other than Bitcoin and does not constitute a detailed manual on modern portfolio theory.

This research adds to finance paradigm research on the Bitcoin by including a developing country perspective on Bitcoin as an asset class as prior studies have concentrated on developed country settings. Further, this research introduces recent economic data (2014 to 2017) in the form of daily observations to enhance prior understanding. It is important to understand if the Bitcoin represents an alternative investment and new asset class as this may affect investment decisions.

ORION

Visagie, IJH & Grobler, GL (2019). On the discrepancy between the objective and risk neutral densities in the pricing of European options. *ORION* **35**(1), 33–56

A technique known as calibration is often used when a given option pricing model is fitted to observed financial data. This entails choosing the parameters of the model so as to minimise some discrepancy measure between the observed option prices and the prices calculated under the model in question. This procedure does not take the historical values of the underlying asset into account. In this paper, the density function of the log-returns obtained using the calibration procedure is compared to a density estimate of the observed historical log-returns. Three models within the class of geometric Lévy process models are fitted to observed data; the Black–Scholes model as well as the geometric normal inverse Gaussian and Meixner process models. The numerical results obtained show a surprisingly large discrepancy between the resulting densities when using the latter two models. An adaptation of the calibration methodology is also proposed based on both option price data and the observed historical log-returns of the underlying asset. The implementation of this methodology limits the discrepancy between the densities in question.

SOUTH AFRICAN JOURNAL OF ACCOUNTING RESEARCH

Tu, T & Turner, M (2019). Tax as an option to fund the proposed National Health Insurance fund: What do knowledgeable individuals think? *SAJAR* **33**(1), 1–20

This research paper seeks to answer the question: What tax or combination of taxes knowledgeable individuals think the South African government can use as a potential source of revenue to fund the proposed National Health Insurance?

The research methodology adopted is of an exploratory interpretive nature as it deals with the opinions of respondents. This methodology is well suited to the research process as the goal is to obtain and explore knowledgeable individuals' opinions on what they perceive to be the best tax or combination of taxes which can be used as a potential source of revenue

to finance the National Health Insurance fund. The method initially comprised a normative study, focusing on a literature review, the results of which were then used to create a self-developed questionnaire.

This research aims to contribute to the body of knowledge which the South African government can consider when making a decision on a tax or combination of taxes as a possible method of financing. A sample of 91 people consisting of 40 tax practitioners (44%), 33 academics (36.2%) and 18 economists (19.8%) were asked to complete the questionnaire. The resultant data were subjected to various statistical analysis methods, including factor analysis, Kruskal–Wallis tests and Cluster analysis.

The results reveal that (a) an increase in Value-Added tax is perceived as being justifiable, fair and efficient, while (b) an increase in taxes on individuals or an introduction of payroll taxes is not. The respondents suggest that funds be ring-fenced for National Health Insurance as this will increase accountability and prevent the funds from being expropriated during the budgetary process.

SOUTH AFRICAN JOURNAL OF BUSINESS MANAGEMENT

Nyere, L & Wesson, N (2019). Factors influencing dividend payout decisions: evidence from South Africa. *SAJBM* **50**(1), 1–16

Dividend payout is one of the most debated contemporary corporate finance issues. No universal theoretical model describes the factors that corporate managers consider in dividend payout decisions. This study extends previous South African empirical research on dividend payout trends and motivations for Johannesburg Stock Exchange (JSE)-listed industrial companies over the period 1999–2014. The study period coincides with the introduction of share repurchases as an alternative distribution method, covers multiple dividend distribution regulatory amendments and overlaps the global financial crisis of 2008.

The aim of this study was to ascertain whether the global financial crisis of 2008 affected dividend payouts and to identify factors that influenced dividend payout decisions of JSE-listed industrial companies over the period 1999–2014.

Descriptive statistics and a fixed-effects panel regression analysis were applied to dividend data extracted from published annual reports of JSE-listed industrial companies over the period 1999–2014.

Dividend distributions of JSE-listed industrial companies increased over the study period in contrast to declining global dividend distribution trends. A significant increase in dividend payout was found when comparing pre- and post-recession periods, in line with the positive impact of dividend distribution regulatory reforms. Company size (+), profitability (+), sales growth (-) and free cash flow (-) were identified as significant factors that influence dividend distributions of JSE-listed industrial companies.

The results offer support for the company life cycle hypothesis, the taxes and clientele hypothesis and corporate managers' preference for stable dividend policies.

SOUTH AFRICAN JOURNAL OF ECONOMIC AND MANAGEMENT SCIENCES

Verster, T, De Jongh, R, Greenberg, S, Fourie, E & De Wet, D (2019). A motivation for banks in emerging economies to adapt agency ratings when assessing corporate credit. *SAJEMS* **22**(1)

This article considers whether South African banks should utilise the credit ratings provided by US-based credit rating agencies when assessing the creditworthiness of corporate borrowers. A review is conducted of the relevant literature and specifically the methodologies used by the credit rating agencies for ranking corporates in emerging markets.

The three largest international credit rating agencies are Fitch Ratings, Moody's Investor Services, and Standard and Poor's. These agencies' credit ratings cover the global spectrum of corporate, sovereign, financial and other public entities and the securities and obligations they issue. The analytical frameworks used to produce these ratings are referred to as credit rating methodologies.

A review of Moody's ratings for South African corporate entities was undertaken to examine claims of a sovereign ceiling influencing the external ratings obtained by these institutions in emerging markets. Only 14 of the 200 global South African ratings pierced the sovereign ceiling.

The study concludes that the use of unmodified external ratings by banks to assess a corporate borrower should be discouraged. High-level suggestions are provided on how the methodologies and data used by the external agencies may rather be used to arrive at more suitable internal ratings.

Carstens, R & Wesson, N (2019). The impact of South African real estate investment trust legislation on firm growth and firm value. *SAJEMS* **22**(1)

Through the introduction of the South African real estate investment trust (SA REIT) structure, listed property investment firms are required to conform to international REIT standards, thereby making REITs more attractive to investors. Despite the exponential growth of the SA REIT industry over the past decade, SA REIT legislation—effective from 2013—has imposed regulations with regard to financial leverage and profit retention, which may affect these firms' sustainable growth rate and firm value. By deconstructing the sustainable growth rate, we investigated the potential impact of SA REIT legislation on growth rate components and considered the impact of each growth component on firm value.

The introduction of SA REIT legislation provides an opportunity to investigate how regulation has affected REIT growth and value. We investigated changes in the respective sustainable growth rate components using a mixed model analysis of variance. Additionally, we employed a panel regression to assess the impact of each component on firm value (proxied by Tobin Q).

We found empirical evidence of decreased leverage and profit retention, as well as increased profit margins, in the REIT period, which may be indicative of firms' reaction to regulation. In addition, we found that profit retention had a significant positive impact on firm value, while leverage showed a significant negative effect on firm value post-legislation.

This study confirmed a significant change in growth components, with higher average profitability and sustainable growth in the REIT period, suggesting that the REIT industry responded positively to the REIT regime introduction.

Johnson, R, Mans-Kemp, N & Erasmus, D (2019). Assessing the business case for environmental, social and corporate governance practices in South Africa. *SAJEMS* **22**(1)

By focusing on sustainable financial and environmental, social and corporate governance (ESG) returns, companies and investors can do well by doing good. Despite growing interest in sustainable corporate practices, limited ESG-related research has been conducted in South Africa. Previous researchers have mainly focused on corporate governance. All three ESG aspects should, however, be addressed to ensure corporate sustainability. It is possible that the consideration of a composite ESG measure can conceal varying levels of consistency in the individual aspects.

The main objective was to investigate the relationship between ESG and corporate financial performance (CFP) measures. Firms listed on the Johannesburg Stock Exchange between 2011 and 2016 were considered. A total of 66 firms were considered from six sectors. Data for the sample (359 firm-year observations) were analysed by conducting panel regressions. In line with international research, ESG was considered as the independent variable, while eight measures of CFP were individually considered as the dependent variables. Composite and individual ESG disclosure scores were obtained from Bloomberg. The respective accounting-based, market-based and value-based CFP measures were sourced from IRESS.

Two main trends emerged from this study. The majority of the significant relationships identified between variables were only observed: (1) once the composite ESG disclosure score was disaggregated and (2) when a distinction was made among sectors.

The empirical evidence suggests that ESG aspects are not homogeneous across sectors. Firm leaders should hence employ a differentiated approach to address the most important risks relevant to their operating environments.

SOUTH AFRICAN JOURNAL OF ECONOMICS

Alhassan, AL & Biekpe, N (2019). Why do property-liability insurers destroy liquidity? Evidence from South Africa. *SAJE* **87**(1), 22–45

This paper examines liquidity creation behaviour in the property-liability insurance market in South Africa. Using annual data on 76 insurers from 2007 to 2014, the paper employs the three-stage approach to estimate liquidity creation. The results suggest that property-liability insurers are characterised by liquidity destruction by transforming liquid assets in cash and investable securities into illiquid reserves liabilities. The findings also indicate that the R1.32 billion in liquid assets were transformed into illiquid reserves liabilities in 2014, an increase from the R700 million liquidity de-created in 2007. The increases were mainly driven by large insurers which accounted for about 70% liquidity de-created. The results of panel regression analysis provide evidence in support of the 'risk-absorption' hypothesis

which argues that high levels of capital increases liquidity creation. In addition, size, leverage and reinsurance were also identified as the firm-level factors that explain liquidity creation. The policy implications of the findings are discussed.

SOUTH AFRICAN MEDICAL JOURNAL

Mahomed, S & Mahomed, OH (2019). Cost of intensive care services at a central hospital in South Africa. *SAMJ* **109**(1), 35–9

Background Intensive care services are one of the largest cost drivers in a hospital. Increasing life expectancy and comorbidities have resulted in an increased need for intensive care beds.

Objectives To conduct a cost analysis of intensive care services at a central hospital in the public sector in South Africa (SA).

Methods A retrospective cost analysis for the 2015/16 financial year was conducted across two intensive care units (ICUs), a trauma ICU (10 beds) and a combined ICU for neurosurgery, medicine and surgery (18 beds). A mixed-methods costing approach was used based on the availability of data. The bottom-up approach was used to calculate the cost of clinical support, pharmaceuticals, consumables and human resources. The top-down approach was used to allocate the cost of equipment and goods and services.

Results There were 544 admissions resulting in 4 987 inpatient days during the study period. The total estimated inpatient cost across the two ICUs was ZAR114 055 104, with a cost per patient day of ZAR22 870. The combined ICU cost per patient day was 58% higher than the cost per patient day in the trauma ICU (ZAR26 954 v. ZAR17 021). The mean cost per admission was ZAR157 883 in the trauma ICU and ZAR245 087 in the combined ICU. Human resources costs were the highest ICU cost driver (55%), followed by direct patient activity costs (medical consumables, pharmaceuticals, laboratory tests, radiology and blood products), which contributed 24%.

Conclusions This is the first reported cost analysis of intensive care services in SA. Our cost per patient day was higher than that reported in other lower-income countries, but lower than that in high-income countries. These costs vary owing to the different types of ICUs, wide spectrum of disease presentation and availability of diagnostic and treatment options. This study provides useful data that could assist in the planning and provision of intensive care services.

Tod, BM, Kellett, PE, Singh, E, Visser, WI, Lombard, CJ & Wright, CY (2019). The incidence of melanoma in South Africa: An exploratory analysis of National Cancer Registry data from 2005 to 2013 with a specific focus on melanoma in black Africans. *SAMJ* **109**(4), 246–53

Background Melanoma is an aggressive skin cancer with poor survival when diagnosed late. There are important differences in clinical and histological features of melanoma and disease outcomes in people with darker skin types.

Methods A retrospective review of data captured by the National Cancer Registry (NCR) of South Africa (SA) was performed for 2005–2013. Data on patient numbers, demography,

location and biological features were analysed for all records. Closer analysis of melanoma of the limbs reported in black Africans was done after manually collecting this information from original reports.

Results With 11 784 invasive melanomas reported to the NCR, the overall incidence of melanoma for SA was 2.7 per 100 000. Males (51%), individuals aged ≥60 years (48%) and the anatomical sites of lower limb (36%) and trunk (27%) were most commonly affected. Melanoma incidences in the white and black populations were 23.2 and 0.5 per 100 000, respectively. Most cases were diagnosed at private pathology laboratories (73%). Superficial spreading melanoma (47%) and nodular melanoma (20%) predominated. Among 878 black Africans diagnosed in the public sector with melanoma of the limbs, females (68%) and individuals aged ≥60 years (61%) were most commonly affected. Lower-limb lesions (91%) and acral lentiginous melanoma (65%) predominated, with 74% of cases affecting the foot and 62% of cases presenting with a Breslow depth >4 mm.

Conclusions This study provides up-to-date NCR incidence and demographic data on melanoma and highlights the neglected research gaps in relation to melanoma in black Africans to provide evidence needed to address health disparities in overlooked population groups.

Nannan, NN, Groenewald, P, Pillay-Van Wyk, V, Nicol, E, Msemburi, W, Dorrington, RE & Bradshaw D (2019). Child mortality trends and causes of death in South Africa, 1997–2012, and the importance of a national burden of disease study. *SAMJ* 109(7), 480–85

Background The Rapid Mortality Surveillance System has reported reductions in child mortality rates in recent years in South Africa (SA). In this article, we present information about levels of mortality and causes of death from the second SA National Burden of Disease Study (SA NBD) to inform the response required to reduce child mortality further.

Objectives To estimate trends in and causes of childhood mortality at national and provincial levels for the period 1997–2012, to highlight the importance of the SA NBD.

Methods Numbers of registered child deaths were adjusted for under-reporting. Adjustments were made for the misclassification of AIDS deaths and the proportion of ill-defined natural causes. Non-natural causes were estimated using results from the National Injury Mortality Surveillance System for 2000 and the National Injury Mortality Survey for 2009. Six neonatal conditions and 11 other causes were consolidated from the SA NBD and the Child Health Epidemiological Reference Group lists of causes of death for the analysis. The NBD cause-fractions were compared with those from Statistics South Africa, the United Nations Children's Fund (UNICEF) and the Institute for Health Metrics and Evaluation (IHME).

Results Under-5 mortality per 1 000 live births increased from 65 in 1997 to 79 in 2004 as a result of HIV/AIDS, before dropping to 40 by 2012. The neonatal mortality rate declined from 1997 to 2001, followed by small variations. The death rate from diarrhoeal diseases began to decrease in 2008 and the death rate from pneumonia from 2010. By 2012, neonatal deaths accounted for 27% of child deaths, with conditions associated with prematurity, birth asphyxia and severe infections being the main contributors. In 1997, KwaZulu-Natal, Free State, Mpumalanga and Eastern Cape provinces had the highest under-5 mortality, close to 80 per 1 000 live births. Mortality rates in North West were in the mid-range and then increased,

placing this province in the highest group in the later years. The Western Cape had the lowest mortality rate, declining throughout the period apart from a slight increase in the early 2000s. **Conclusions** The SA NBD identified the causes driving the trends, making it clear that prevention of mother-to-child transmission of HIV, the Expanded Programme on Immunisation and programmes aimed at preventing neonatal deaths need to be equitably implemented throughout the country to address persistent provincial inequalities in child deaths. The rapid reduction of childhood mortality since 2005 suggests that the 2030 Sustainable Development Goal target of 25 per 1 000 for under-5 mortality is achievable for SA. Comparison with alternative estimates highlights the need for cause-of-death data from civil registration to be adjusted using a burden-of-disease approach.

Mngadi, P, Wolvaardt, J & Thsehla E (2019). Agreeing on the minimum: An 11-year review of Prescribed Minimum Benefits appeals. *SAMJ* **109**(7), 498–502

Background Prescribed Minimum Benefits (PMBs) in South Africa (SA) are a set of minimum health services that all members of medical aid schemes have access to regardless of their benefit options or depleted funds. Medical aid schemes are liable to pay for these services. However, ~40% of all complaints received by the Council for Medical Schemes (CMS) are in relation to PMBs. Individuals/stakeholders who are unsatisfied with judgments on their complaints are allowed to appeal.

Objectives To determine and describe the pattern of PMB appeals from 1 January 2006 to 31 December 2016.

Methods This was a descriptive cross-sectional study that utilised the CMS Judgments on Appeals database. Data for PMBs, levels of appeal, judgments, appellants, respondents and medical scheme types were extracted. The CMS's lists of chronic conditions, PMBs and registered schemes were used to confirm PMBs and to categorise schemes as either open (i.e. to all South Africans) or restricted (i.e. only open to members of specific organisations). Data were extracted and frequencies were calculated using Stata software, version 14.

Results All eligible appeal reports (*N*=340) were retrieved and 123 PMB appeals were included in the study (36.2%). The median number of PMB appeals per year was 11 (interquartile range 9–27). Open schemes accounted for 82.1% of all the PMB appeals. Half of the total appeals (50.4%, 62/123) were by medical aid schemes appealing their liability to pay for PMBs, and of these 69.4% (43/62) were found in favour of members. The remaining half (49.6%, 61/123) were appeals by members appealing that schemes were liable to pay, and of these 80.3% (49/61) were found in favour of the medical aid schemes. Treatment options that were scheme exclusions constituted 34.4% (21/61) of reasons why schemes were found not liable to pay. Various types of cancers and emergency conditions constituted one-quarter of all PMB appeals.

Conclusions While the pattern is unclear and the extent of the problem is masked, this study shows that a quarter of the conflict resulting in PMB appeals was due to various types of cancers and emergency conditions. Medical schemes should revise their guidelines, policies and criteria for payment of these two services and improve their communication with healthcare providers and members.