C42

CHAPTER 42

INVESTMENT IN SOUTH AFRICA

CIARAN DRIVER AND LAURENCE HARRIS

C42.S1
1.1 INTRODUCTION

C42.P1   WHAT is the significance of investment for South Africa? One textbook response sees investment as a component of aggregate demand. Investment in that context is taken to include not just company machinery, equipment, and structures but any expansion of the residential housing stock, inventories, and government capital spending. This investment component of aggregate demand—or the balance between investment and saving—is relevant for studying the business cycle and for macroeconomic stabilization policy.

C42.P2   A different perspective—the one that most concerns us in this chapter—stems from the role of investment in supplying productive assets. An increased capital stock with or without a change in the capital-labour ratio generally increases the economy's capacity to supply future goods and services. Since new capital generally incorporates new production technology, this channel also raises total factor productivity which raises capacity output. For developing economies investment in manufacturing has generally been seen in this way as a driver of growth, though the proposition is contestable.

C42.P3   South Africa's economic strategies since 1994 have attempted to promote GDP growth while reducing poverty and inequality. Public sector investment to meet those objectives has been an important government lever. While private business investment in manufacturing and other sectors is indispensable for sustained growth, it has proved less amenable to promotion by policy interventions.

C42.P4   In section 42.2 we review the evolution of South Africa's investment, gross fixed capital formation, since 1994. Notable features of the country's experience since 1994 have been low average annual GDP growth and low levels of gross fixed capital formation in most sectors of the economy including manufacturing. The reasons for the latter have been much studied and we review the academic evidence in section 42.3 focusing

particularly on relationships between investment, the user cost of capital, and uncertainty. In section 42.4 we consider aspects of private firms' investment in manufacturing within the broader economic system. In section 42.5, we address issues of economic policy for investment and section 42.6 concludes with a brief review of the current state of knowledge.

42.2 SOUTH AFRICA'S INVESTMENT RECORD

In economies that experienced rapid growth and industrialization in the twentieth century—'economic miracles'—high GDP growth was associated with high rates of investment as a share of GDP. Post-1994 South Africa has not experienced similar levels of investment. The last five years of the data up to 2019 show that investment as a share of GDP in nominal terms averaged about 19 per cent, barely higher than the 17 per cent for the first five years after 1994. The comparable real ratios show a marginally better improvement from under 15 per cent to nearly 20 per cent due to the fall in the relative price of capital goods over the period.

The estimated growth of South Africa's capital stock (Figure 42.1) suggests three phases. Following the establishment of democracy, marked by a brief small upturn in investment, the capital stock grew at a low average annual rate of less than 1 per cent between 1994 and 2003. In the second phase, from 2003 to 2008, South Africa experienced relatively high GDP growth rate during the global commodity boom with the annual rate of real growth of the capital stock rising to over 4 per cent in 2008. The boom years preceding the 'great financial crash' prompted government hopes that even higher
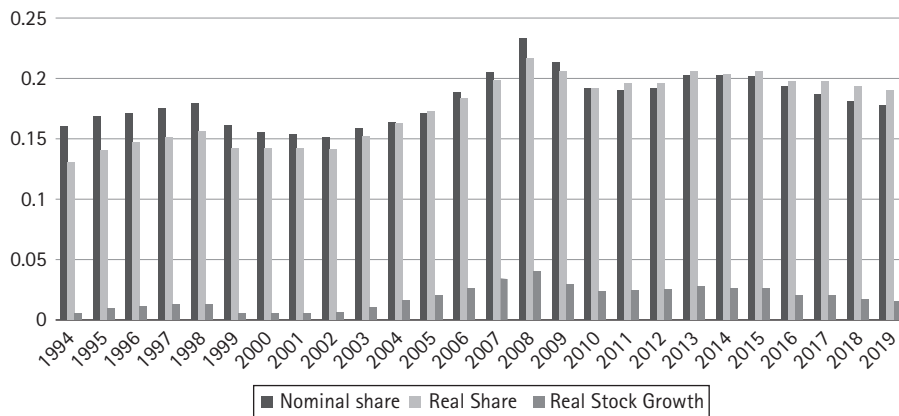
FIGURE 42.1 Gross fixed capital formation as a percentage of GDP (nominal and real ratios) and growth of the real capital stock

Source: SARB. Nominal share given by the ratio of KBP6009J/KBP6006J; Real share given by KBP6009Y/KBP6006Y. Real capital stock growth given by year-on-year growth of KBP6149Y.

growth rates could be achieved and sustained. In the third phase, the decade after 2008, the higher investment rates that were expected did not materialize. Annual real fixed capital growth rarely exceeded 3 per cent and declined towards an average of 2 per cent in the run-up to 2020. The proportion of South Africa's spending allocated to fixed investment has continued to be low, having shrunk from 23.5 per cent in 2008 to less than 18 per cent in 2019.

C42.P7   The five years of solid investment growth up to 2008 that characterized South Africa has parallels in many other developing countries and is unlikely to reflect simply domestic policies. As shown in Table 42.1, major Asian countries such as India and China were also experiencing an investment boom. Developments after 2008 show a lot of cross-country variation with some countries maintaining or even increasing their investment share, while for others, including South Africa, it decreased. Brazil and Chile, two comparable developing countries had similarly low and declining (after 2008) investment ratios, while India, having invested as much as 35 per cent of GDP in 2008, also reduced its investment rate thereafter, though it remained at 1.5 times South Africa's in 2019.

C42.P8   Subsequent to the period of relatively strong GDP and investment growth in South Africa from 2003 to 2008, there has been a marked shift in the private–public composition of investment. Public-sector investment, particularly in electricity and transport infrastructure, has grown somewhat faster than investment by private businesses.

C42.P9   Figure 42.2 charts the evolution of both private-sector investment and public investment (both general government and public corporations), showing that the gap widened in the final stage of the commodities boom and remained elevated after 2008. Despite some reduction in public investment towards the end of the period, the public-sector ratio of the total still averaged about 34 per cent in the decade up to 2019, compared with a figure of about 29 per cent for the 1990s.

C42.P10   Figures 42.3 shows the shifting asset composition of investment within the private and public sectors. In parallel with the relative shift from private to public investment, capital expenditure on construction works grew while expenditure on machinery and equipment stagnated. This is mainly due to the fact that the public sector is more construction-intensive than the private sector but it is also the case that even within the private sector, expenditure on construction grew relative to machinery after 2008, possibly reflecting the contracting-out of public works. Data on residential construction that appear in the private-sector graph also reveal the importance of this type of expenditure in propelling the pre-2008 surge in investment.

C42.P11   While Figure 42.3 appears to show private-sector investment holding up better after 2008 than the public sector, it should be noted that these figures are for gross investment i.e. without taking account of depreciation. The effect on growth of the capital stock may be better captured by net investment. Normally net and gross investment do not diverge greatly but the big change in composition towards construction activity in South Africa does make a difference, given that construction works depreciate much slower than machinery and equipment. Figure 42.4 shows that net public investment, having been

Table 42.1 Gross fixed capital formation as a percentage of GDP

	1993	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015	2017	2019
South Africa	15.8	17.0	17.6	16.1	15.5	16.0	17.2	20.6	21.5	19.1	20.4	20.3	18.8	17.9
Indonesia	26.3	28.4	28.3	20.1	19.7	19.5	23.6	24.9	31.1	31.3	32.0	32.8	32.2	32.3
Malaysia	38.9	43.6	43.1	21.9	25.1	22.4	22.3	22.4	22.0	22.2	26.5	25.9	25.1	23.0
Mexico	20.8	16.4	19.8	21.1	19.9	19.8	20.7	21.9	22.1	22.3	21.3	22.5	22.1	20.9
Russian Federation	20.4	21.1	18.3	14.4	18.9	18.4	17.8	21.0	22.0	21.3	21.9	20.6	22.0	21.0
Brazil	19.3	20.3	19.1	17.0	18.4	16.6	17.1	18.0	19.1	20.6	20.9	17.8	14.6	15.4
Chile	26.6	25.8	27.7	21.4	21.6	21.2	22.2	20.7	22.5	23.1	24.8	23.8	21.0	22.4
China	37.1	32.3	31.0	32.5	33.5	38.3	39.4	37.9	43.8	43.9	44.5	42.1	41.9	–
India	23.7	25.1	25.4	27.5	29.9	28.3	32.8	35.8	34.0	34.3	31.3	28.7	28.1	27.5

Source: Created from World Development Indicators Series: Gross fixed capital formation (% of GDP).
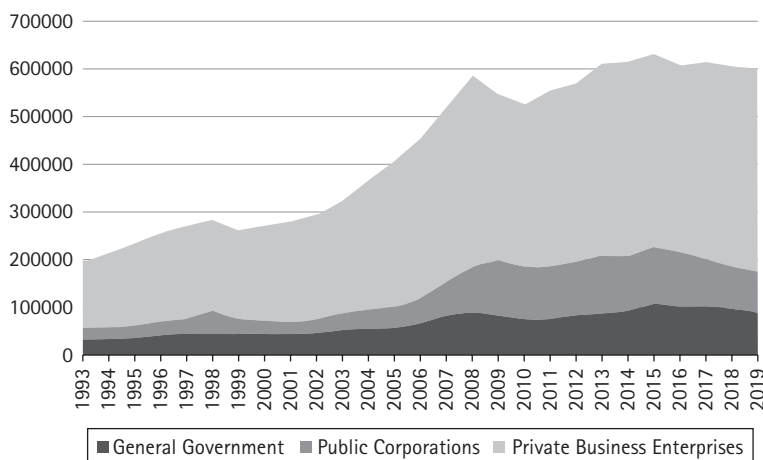
C42.F2   **FIGURE 42.2** Composition of real gross capital formation (R million at constant 2010 prices), private and public sectors
 *Source:* SARB general government KBP6100Y; public corporations KBP6106Y; private business enterprises KBP6109Y.

much lower than public investment up to the mid 2000s, is approximately equal to it after 2008.

C42.S3

42.3 Evidence on Firms' Investment Decisions and Public Policy Analyses

C42.P12   Existing public policy towards private investment in South Africa may be interpreted as a policy canon of three propositions with recommendations (shown in italics):

C42.P13   1. Traditional economic theory such as the cost of capital and proxies for profitability are supported. Credit constraints may exist but evidence is weak. *Fiscal prudence and low corporate taxation are required to reduce equilibrium real interest rates and permit lower exchange rates which support investment.*

C42.P14   2. Uncertainty, in relation to political economy or instability of driving variables, deters investment. *Macroeconomic stability is required to reduce the risk premium. Real exchange rate instability may also deter investment.*

C42.P15   3. Concentration inhibits investment and growth opportunities while increasing downstream costs; mark-ups are relatively high and not declining. *Continued trade liberalization needed to increase domestic competition, reduce input costs,*

Panel (a) Private Sector

Panel (b) Public Sector
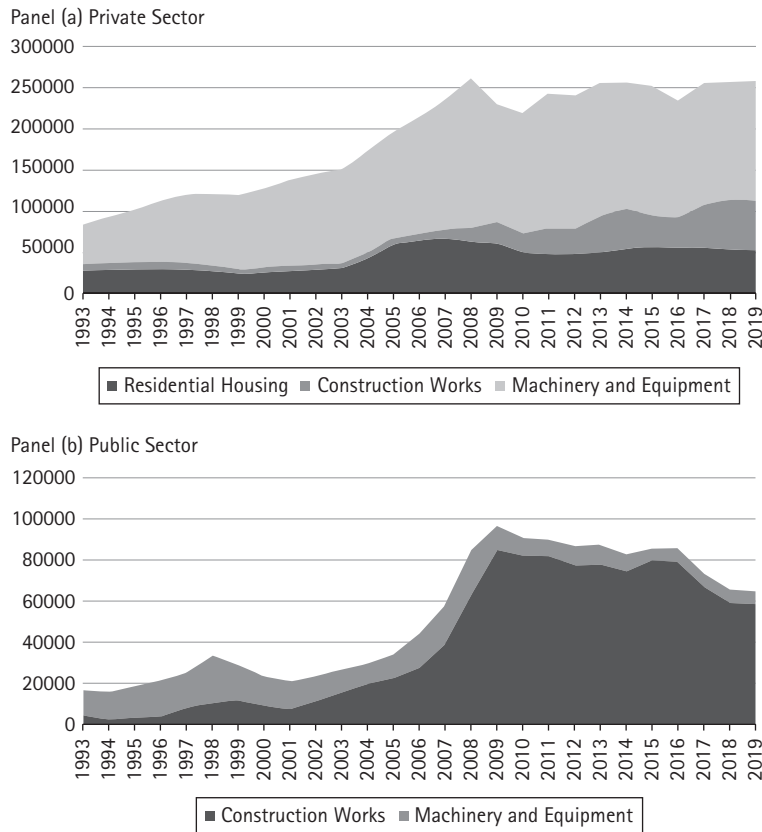
C42.F3   **FIGURE 42.3** Asset composition of private-sector and public-sector gross fixed capital formation (R million at constant 2010 prices)

Source: SARB. Private sector: residential housing KBP6113Y; construction works KBP6121Y; machinery and equipment KBP 6129Y. Public sector: construction work KBP6120Y; machinery and equipment KBP6128Y.

> *re-orient sales to export demand, improve total factor productivity through learning and upskilling, and diversify into new sectors including services. Anti-trust and sectoral policies are additional tools.*

C42.P16   These three components of the policy canon are reviewed and evaluated below.[1]

---

[1] To say that there was considerable consensus around these views is not to say that everyone agreed on the relative priority of each component. Some argued that the policies pursued were too timid, for example, in relation to trade liberalization (Federer 2009). Others regretted that stability was not prioritized enough so that interest and exchange rate volatility remained damaging to investment (Kaplan 2007). By contrast, others argued that competition effects dwarfed those of uncertainty in blocking re-allocation towards high TFP sectors (Viegi and Dadam 2018). A different—but not necessarily oppositional view—was that insufficient attention was given to the kind of growth, its sustainability and appropriateness for the political and social context (Black 2016).
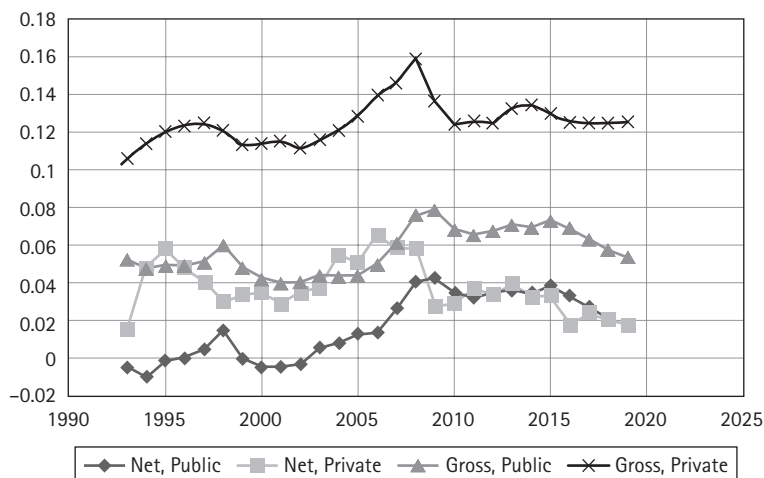
C42.S4   ## 42.3.1 User Cost of Capital

C42.P17   Much discussion of the causes of South Africa's low investment rate and policies to address it turns on the cost of capital.[2] The proposition that firms' desired capital stock, and, by extension, their rate of investment is an inverse function of an interest rate (acting as the user cost of capital) is widely accepted in South African policy debates, as it is elsewhere. However, the idea is not strongly supported by South African data.

C42.P18   One example of such a policy perspective is the recommendation from TIPS (2000): 'creating the appropriate conditions for rising investment rates through an alteration of the real user cost of capital' (2000: 3). The Treasury view was that 'from 2001, low interest rates, achieved via disinflation and a more sustainable fiscal policy, have contributed to a steady increase in investment growth rates' (Faulkner and Loewald 2008: 6). Similarly, a UNDP study (Kearney and Odusola 2011: 10) explains post-transition higher investment rates in South Africa up to 2008 as 'stimulated by lower user cost of capital'. And at various times since 2000 public debates over South Africa's inflation-targeting monetary policy have focused on the effects of high interest rates on aggregate investment and thereby employment and growth (Bold and Harris 2018).

---

[2] In a credit (debt) economy the user cost of capital is identified as 'the' interest rate which is the borrowing rate adjusted for firm-level taxation and depreciation. In an economy where firms have access to equity finance as well as credit (debt), the user cost of capital is determined by both interest and the cost of equity. The user cost of capital can include a premium to compensate the suppliers of finance for uncertainty, or risk that cannot be eliminated by diversification, and the firm itself can require capital projects to yield a higher rate to compensate for uncertainty about expected profitability.

C42.P19   By contrast, evidence is weak. Fedderke (2009) reports that in thirteen estimates of South African investment functions conducted by different authors, the user cost is only significant in five of these, none of which has an elasticity greater than 0.1. TIPS (2000), based on earlier work by Fedderke, reports that in disaggregated estimates, the user cost was significant only for the fabricated goods sector, while its elasticity was low in overall results. In another study from the World Bank Group (2017), estimation—comprising a million observations which normally implies very high t-values—found statistical significance for the long-run capital response to user cost in only nine out of eighteen sectors. Furthermore, in a comparative study of different investment models for South Africa, Van Eyden et al. (2012) found that the addition of a user cost variable to the standard accelerator model actually increased the mean square error for most of the forecast horizons.

C42.P20   Direct survey evidence for South Africa is available in the World Bank investment climate report (Clarke et al. 2007). This shows that the cost and availability of finance was rated as major or very severe by only one in five respondents and ranked no more than eighth in a list of constraints, contrasting with other countries in the continent. Furthermore, external finance was said to be demand, rather than supply, constrained (2007: 13).

C42.P21   The absence of evidence for a user-cost effect, or for anything other than a weak and partial effect, is in keeping with long-standing findings in advanced countries, where any user-cost effect in investment studies, if significant at all, appears with a low elasticity (Sharpe and Suarez 2014). Part of the explanation for this may be that the discount rates used by firms (hurdle rates) are often multiples of the user cost due to the allowances for irreversibility and various forms of uncertainty (Dixit 1992).

C42.S5   42.3.2 Uncertainty

C42.P22   South African policy papers regularly include uncertainty in any list of constraints on growth and, in particular, fixed investment.

C42.P23   Empirical estimates of the effect of uncertainty are difficult, partly because of the imprecision of any broad concept and the need to distinguish between types of uncertainty, and partly because of difficulties in measuring uncertainty however defined. Debates over the role of uncertainty in South African economic performance have focused on two main types. Attention to firms' uncertainty about future price movements such as future interest rates or exchange rates has been associated with discussions of whether macroeconomic policy should aim to stabilize them. A different type of uncertainty, uncertainty about government policy, has been widely seen as a disincentive to private investment. In most studies of price uncertainty past and current price volatility is used as a measure of uncertainty about future values, which requires implausible and often unstated assumptions. The measurement of policy uncertainty—over the regulatory regime or property rights, for example—remains problematic despite the construction

of measures based upon word frequency for uncertainty and other terms in newspaper coverage (Lesame 2021).[3]

C42.P24   Apart from conception and measurement there is the question of theory and what it predicts in terms of uncertainty effects. There are several approaches. Introducing uncertainty in an investment model involves complementing an expectations term with higher moments. As a result, any simple economic optimization involves non-linearities which may bias the result up or down. Nevertheless, there is little direct evidence that firm's decision-making captures such intricacies. Modern dynamic real option approaches deal with the timing of irreversible investment under uncertainty. These models generally argue that uncertainty leads to delay (with a higher hurdle rate) but they can predict the opposite effect if *ex post* upward adjustment is difficult. Furthermore, industrial specifics also matter; firms supplying monopsonistic suppliers such as supermarkets may need to increase capacity under uncertainty due to the risk of losing contracts through failure to supply. Finally, a simpler argument is that decision-makers are risk averse, thus explaining a negative effect of uncertainty on investment.

C42.P25   For the case of South Africa, there has been some limited work on investigating the investment response to uncertainty. Fedderke (2009: 186) reports that it 'exercises a statistically significant and strong effect [and] unambiguously lowers investment rates'. In particular, 'systematic uncertainty' was significant in seven of the eleven cases where it was entered in different studies. However, the index of systematic uncertainty used has been criticized by Du Plessis and Smit (2007) as more relevant to the apartheid period and only two of the eleven studies cover the post-transition period. Three studies for the three decades after 1970 (by Fedderke and co-authors) find support for sectoral uncertainty measured as a standard deviation of sectoral output, but two early studies by another author show user cost variability to be positive for investment. A further study (Kumo 2006) with annual data 1970–2003 uses Garch uncertainty measures in different macroeconomic series, finding a significant negative effect for GDP volatility and that of the real exchange rate.[4] Using quarterly data from 1989 to 2016, Pane and Pedro (2016) find no significant relation between private-sector investment and a narrow measure of uncertainty, volatility of the nominal rand exchange rate. A major difficulty with interpreting the estimated effect of uncertainty in econometric output is that 'perceptions of uncertainty vary counter-cyclically' (Bond et al. 2005: 14). On account of this any investment model has to be specified with all relevant cyclical factors included before uncertainty effects can be identified.

C42.P26   Some survey-based approaches do suggest that macro instability matters for investment in South Africa. Clarke et al. (2007) found that macro stability ranked in the top four constraints, ahead of labour regulation and crime but behind labour skills, with over 30 per cent registering it as a major constraint. This broke down as 28 per cent of non-exporters and 44 per cent of exporters, perhaps not surprising in view of the wild

---

[3] Baker, Bloom, and Davis (2016).

[4] The fact that these two variables are the only significant dynamic terms in the estimation may suggest some misspecification.

swings of the nominal exchange rate in the early 2000s. Nevertheless, Clarke et al. 2007 also found that relative to peer countries, no reported constraint on investment was particularly strong. Furthermore, in the (unpublished) 2008 update survey, the comparable figure for macro stability was only 7 per cent, possibly because electricity prices had become a major focus by then. Reviewing the survey evidence Kaplan (2007) argues that 'macroeconomic policies have not brought stability in key prices that matter for investors and particularly for exporters—the interest rate and especially the exchange rate … this has stifled investment—more particularly on the part of new entrants who tend to rely more heavily on borrowing." He does not however provide any independent evidence for this, relying on observations in Clarke et al. (2007).

C42.P27   Uncertainty may have different effects in different contexts. One important aspect of this for South Africa is whether uncertainty deters investment in industries or firms differentiated by market power or level of concentration. Theoretical work suggests no simple answer as to which type of firm would react positively to uncertainty. On the one hand it is argued that firms with pricing power (generally large firms) may fear pre-emption more, resulting in over-investment. Other studies suggest that firms facing monopsonistic demand (generally small firms) tend to install higher capacity under uncertainty so as to ensure continuity of supply and maintain recognized preferred status (Driver and Whelan 2001). For South Africa, Chortareas et al. (2020) finds a positive effect (5 per cent significance for a sample of 177 firms) on investment of uncertainty (measured by firm-level daily inter-year stock price variation). It is also argued that market power attenuates that influence. However, their study records a median market share for the sample of only 0.2 per cent with an interquartile range between 0.1 per cent and 0.3 per cent. Thus, any attenuation of the uncertainty effect due to market power is relying on a small number of data points[5]

C42.P28   Relating all these findings to policy is clearly difficult. Most policy papers tend to assume that uncertainty is damaging, requiring interventions to address macroeconomic stability. It is not clear that this conclusion can be drawn from the complex results of academic studies, or even from survey-based studies. Even if uncertainty is a major constraint on investment—which it may well be—the pursuit of macro-level stability such as inflation targeting may result in increased micro-level uncertainty, depending on the instruments used. In general, uncertainty can be resolved by augmenting markets with coordination (industrial policy) or by allowing well-functioning markets to find an equilibrium; the best balance between these two is likely to be context specific.

C42.P29   Despite these difficulties, clearly identifiable uncertainty about investment conditions in specific major South African industries can safely be said to have hindered major

---

[5] Chortareas et al. (2020) follow closely the model in Baum et al. (2008) for the United States where, however, a *negative* sign was found for firm-level stock market volatility in their US sample. The positive sign might reflect that the measure does not just capture uncertainty; for example, firms that are known to be takeover targets may experience turbulent returns with the recorded firm investment affected by acquired assets.

investment projects. For example, at various times uncertainty about regulatory change or government's energy strategy has undoubtedly hindered fixed capital formation in electricity generation by Eskom and, in recent years, hindered the opening of the sector to investment in clean energy generation by independent power producers.[6] Similarly, several years of uncertainty about the contested regulatory provisions of a third Mining Charter, obtaining until its publication in 2018 and implementation in 2019, undoubtedly restricted miners' investment plans. Notwithstanding the difficulty of estimating links between various types of uncertainty and investment by firms throughout size deciles and across diverse sectors, policy uncertainty's effect on such major industries has undoubtedly interrupted and slowed their investment.

C42.S6

42.3.3 Concentration and Market Power

C42.P30

South African industry is highly concentrated. A study by the Competition Commission (Buthelezi et al. 2018) finds that most 2-digit industrial sectors in South Africa have defined markets with dominant firms. Specifically, agribusiness and intermediate industrials each have more than a fifth of product markets in which dominant market firms record more than 45 per cent share. More than 7 per cent of product markets in each of ICT, transport, pharmaceuticals, and financial services have dominant firms defined similarly.

C42.P31

The policy canon has tended to argue that this situation deters investment, justifying a focus on increased trade competition and anti-trust policy. A representative view has been that the 'highly concentrated nature of output markets and associated pricing power … represent … a constraint both to investment and to growth prospects' (Fedderke 2009: 195). Similar views are expressed in Hausmann (2008), World Bank (2014), Viegi and Dadam (2018), and World Bank Group (2018). Nevertheless, there is some controversy over the absolute and relative (to comparator countries) size of profit mark-ups in South Africa. Some claim that despite high domestic concentration, profit mark-ups have not been comparatively high nor did they rise after the transition (Du Plessis et al. 2015; Zalk 2014). This controversy may simply reflect sectoral differences. Black and Hasson (2016: 293) argue that upstream firms in concentrated sectors do not face effective competition from imports and can set prices to compete with imports: this ensures a margin over the export price and disadvantages domestic users of inputs such as metals and basic chemicals.[7] Domestic concentration is then more damaging,

---

[6] A survey of manufacturing firms in the Johannesburg area reveals the high weight they give to unstable electricity supply in preventing expansion (Kaziboni 2018).

[7] Presumably the absence of a serious foreign threat in some sectors is due to the relatively low level of FDI flows into South African industry that requires system-level explanation. Manufacturing inward annual FDI averaged $0.6 billion between 2017 and 2019 which is just about enough to buy two medium sized gas-powered plants.
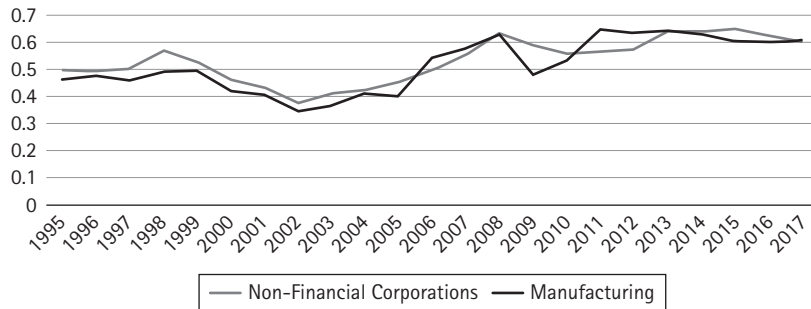
C42.F5   **FIGURE 42.5** Ratio of nominal gross capital formation to gross operating surplus

Source: SARB and, for manufacturing: statistical release P0441 Gross Domestic Product Annual estimates various editions and ceicdata.com.

particularly where entry barriers such as scale, sunk cost, or endogenous barriers such as heavy advertising, are effective.

C42.P32   Fedderke et al. (2018) report important findings on the joint effects of concentration and barriers to entry. While finding no direct correlation between mark-ups and concentration, sectors with high barriers to entry (high asset requirements) *and* high concentration tend to have higher mark-ups, though here also there are exceptions. That perspective is given added credence by findings that productivity gains in individual sectors of industry do not seem to have sector-wide effects as would be expected were the most profitable industries mobile enough to use their surplus funds in breaking into new technologies and markets or with the same effect occurring through stock market re-allocation to venture capital.[8] Such a scenario of a 'capital strike' has ~~recently~~ been argued to characterize some industrial sectors in the United States where the percentage of re-invested profits appears to have fallen since around 2000 for some concentrated sectors (Gutiérrez and Philippon 2017).

C42.P33   However, such a phenomenon does not appear to characterize the South African economy. As shown in Figure 42.5, the ratio of nominal expenditure on capital goods to the gross operating surplus increased after 2008 for both the whole non-financial corporate sector, and for the manufacturing sector. The ratios since 2008 also compare favourably to the 2018 EU27 non-financial ratio which is around 0.6. This may seem surprising but it may be that the South African ratios for this period reflect the squeeze in profit margins after 2008, with obligatory replacement investment soaking up much of retained earnings.

C42.P34   The effects of concentration on investment deserves further detailed study. In particular there is a need to distinguish good and bad concentration and to understand the mechanism of entry and mobility barriers on investment in firm and industry panel studies.

---

[8] It may also be that surplus funds are swallowed up in the creation of barriers to entry.

C42.S7

42.4 A System View
of South African Investment

C42.P35
The perspectives on investment discussed so far are rooted in economic theory that treats aggregate investment as the sum of investment decisions by individual firms acting independently in response to signals from the economy as a whole; signals encapsulated in the user cost of capital modified to account for uncertainty. At the same time, policy discussions of South Africa's low aggregate investment and low growth take a more holistic approach, seeing them as the outcome of systemic weaknesses in interrelated economic, political, and social spheres. In this section we review the necessity, but also the difficulties, of adopting a systems approach and give some examples of it in practice.

C42.P36
There is a long list of factors that have been seen as systematically constraining investment and growth. These include high crime rates, perceived corruption, low educational attainment, shortage of skilled labour, spatial disconnect between jobs and population, high degree of regulation measured by 'ease of doing business', public sector failures on policymaking and implementation, labour market institutions, and extreme income inequality. Private-sector investment has also been discouraged by failures of public corporations' management—interacting with government failures in planning and implementation—in the delivery of reliable electricity supplies, adequately educated labour-market entrants, or fast and cost-effective rail and port transit. A survey of manufacturing firms in the Johannesburg area reveals the high weight they give to unstable electricity supply and employees' low educational attainment in literacy and numeracy as problems preventing expansion (Kaziboni 2018).

C42.P37
While it is easy to list potential hindrances to investment it is harder to prioritize them. Casual inspection shows that some of the comparator countries listed in Table 42.1 do worse on several of these factors and yet have had better investment rates. For example, over the last quarter century, South Africa scores second or third best on political stability, rule of law, perception of corruption and scores best on cost of a business start-up as a percentage of average income. (TheGlobalEconomy.com). Clearly there must be complex interacting sets of forces that explain entrenched national economic patterns such as investment rates.

C42.P38
Such complexity is captured in conceptual frameworks that adopt a systems view to explaining regularities in a national economy. Many such regularities remain persistent even under globalization and indeed it is their time-invariant property that makes some econometric sets of analysis uninformative. The type of systems framework that is needed here is exemplified in the 'systems of innovation' literature. This emphasizes the role of institutions, and the interaction of social, political, organizational, and economic forces that explain constancy and change (Edquest 2005). An early pioneer of the National Systems of Innovation (NSI) approach, Freeman (1987), defined it as 'the network of institutions in the public and private sectors whose activities and

interactions initiate, import, modify and diffuse new technologies' (quoted in Oughton et al. 2021). These authors also note that firms' innovation 'depends not just on their own internal resources and capabilities, but also on the wider institutional environment including: the systems of finance, corporate governance, education and research; and government policies such as public investment in R&D, the setting of standards and legislation for intellectual property rights, as well as the degree of trust in political institutions.' Arguably these influences cannot be captured by partitioning the total variance of an economic series such as fixed capital formation to discover a set of causal factors; there is simply too little variation in any time-series for the full set of possibly non-linear, reciprocal, complementary, and interacting effects to be identified. Perhaps treating them as a complex system of relationships and applying multi-disciplinary approaches beyond econometrics (perhaps including case-studies, network analysis, sociological and political economy methods) can yield insights into particular countries' innovation systems.

C42.P39   The institutions and interrelations that make up a country's NSI imply that, instead of being the sum of independent decisions by individual firms the country's rate of innovation is a collective phenomenon. At one level it is promoted by collective (public) investment of resources and 'social capital' in education systems, justice systems, and other fields. More directly each firm's innovation is linked with others. Innovation in firms within a supply chain feeding final goods producers (suppliers of parts to automobile manufacturers, for example) is necessarily coordinated with that of enterprises further along the same chain; when the automobile manufacturer adopts new technology it does so in a manner coordinated with the suppliers of parts.

C42.P40   The NSI approach to understanding innovation is also applicable to a systems view of investment. Simply adding measures of selected systemic factors to South Africa's investment regressions yields limited insights. The individual firm model does not take into account the complementarities involved in the system, such as that between public-sector infrastructure investment and private-sector manufacturing investment.

C42.P41   There is thus a direct parallel between investment and innovation that explains the need for a systems approach to capital formation, particularly in technology-using sectors. Investment that incorporates new technology is the main form of fixed capital expansion in manufacturing; consequently the same type of systems as affect innovation are likely to affect such investment. For any consideration of investment as a driver of sustainable economic growth in South Africa, such innovation through capital-borne technology diffusion, is central. Even for investment expansion using unchanged technology, individual firms' investment is subject to very similar hindrances as innovation—sunk costs, irreversibility, uncertainty, and perhaps difficulty in appropriating the full economic gains under competitive conditions. This implies that a measure of central coordination is needed. A fully credible government-driven strategy for national growth can promote private firms' investment by, in effect, acting as a signal that overcomes the coordination failures of market mechanisms such as price signals or

strategy forums; by contrast, an economy with dysfunctional institutions hinders firms' ability to plan for fixed capital expansion.

C42.S8

42.5 Implications for Policy

C42.P42   What lessons can policymakers draw from theory and empirical studies of investment? It is useful to pose the issue in terms of targets and instruments. What is needed is (i) an exercise in judgement with respect to targets and (ii) recognizing a freedom to experiment with non-traditional instruments.[9] In effect the activities of (i) and (ii) are what constitutes any creative public policy but such policy is better carried out in full and conscious recognition of what the process involves. Otherwise different parts of policy—industrial policy say—will be separated from the remainder without the cohesion that an overall planning process can achieve.[10]

C42.S9   ## 42.5.3 Illustrative Targets

C42.S10   ### 42.5.3.1 *Should Investment Be employment Intensive?*

C42.P43   One example of target-setting is the judgement call on whether investment policy should focus on employment objectives in addition to productivity. The fact that the employment- growth elasticity is of the order of 0.5 means that growth has to be sustained at historically high levels to make a serious impact on unemployment. Private-sector jobs have been added since 2005 in large numbers but at a rate only one fifth the rate of population growth. Without faster employment growth, even if political stability is maintained, there is a continual risk of distributional strife. As a corollary of this, inward FDI sentiment for South Africa fails to reflect the national reputational advantage for law and stability; no doubt this poor sentiment carries over to domestic investment as well.[11] Policy that correctly identifies this constraint then has to make further judgements in respect of targets for structural change in the capital stock and prioritization of sectors.

---

[9] Blanchard et al. (2010: 10) did us service with the comment that: 'The bad news is that the crisis has made clear that macroeconomic policy must have many targets; the good news is that it has also reminded us that we have in fact many instruments.' We need to extend that understanding to industrial policy.

[10] In South Africa important *policy* initiatives have been based on a system view with foundations consistent with a 'National System of Investment' approach. The National Development Plan 2030, adopted in 2012, is a foundation document of that type as is the Industrial Policy Action Plan in support of coordination—across government institutions and along industry supply chains (IPAP 2018/19–2020/21).

[11] For indicators on FDI sentiment see TheGlobalEconomy.com.

C42.S11   42.5.3.2 *Should Investment Be Directed towards Labour-intensive*
Manufacturing?

C42.P44   Figure 42.6 shows that while many sectoral capital shares remained fairly constant
over the full period—both finance and other services being the most important with a
combined share in excess of 50 per cent—there were marked increases in the combined
share of construction and energy which almost doubled to over 11 per cent by the end of
the period. By contrast the share of manufacturing which was maintained until 2008,
fell thereafter by 3 percentage points to little over 7 per cent by the end of the period.
Along with agriculture, this was the only industry to show virtually no growth in abso-
lute value of the capital stock over the entire period.

C42.P45   An investment-induced increase in aggregate employment can result from a redistri-
bution of capital from sectors that have a low elasticity of employment with respect to
investment to those with a high elasticity but the situation is complicated because the in-
direct employment effects need to be included. Agriculture and six other manufacturing
sectors are among the top ten sectors in respect of total (direct plus indirect) employ-
ment multipliers (Tregenna 2016); yet all of these apart from food are static or in decline.

C42.P46   In South Africa, manufacturing is the only sector located in the high productivity but
shrinking employment share quadrant (Bhorat et al. 2018). Countries with a highly dy-
namic manufacturing sector tend to show growing productivity and employment for
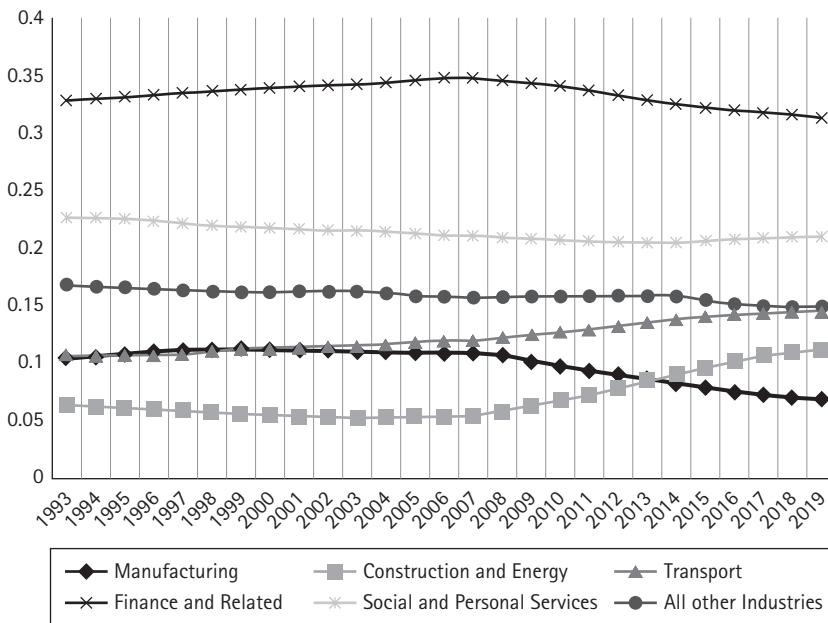
C42.F6   **FIGURE 42.6** Broad sectoral shares of the real capital stock

Source: SARB: manufacturing KBP6142Y; construction and energy KBP6144Y + KBP6143Y; transport KBP6146Y;
finance and related KBP6147Y; social and personal KBP6148Y; all other industries KBP6140 + KBP6141Y + KBP6145Y.
All series expressed as shares of total.

manufacturing. Policymakers may be tempted to view the shrinking manufacturing sector as an indication that capital allocation away from manufacturing and to-wards services is inevitable, in line with the deindustrialization that has characterized most economies as they transition from the development stage. Nevertheless, some caution is needed here for two reasons. First, the re-allocation of resources away from manufacturing has not followed a pattern of re-allocation from low to high productivity and has not raised overall productivity much if at all. One analysis suggests that between 2000 and 2014, 97 per cent of labour productivity growth occurred within sectors, i.e. across firms. The same analysis shows that there is no correlation between sectoral prod-uctivity and change in employment shares in South Africa (Bhorat et al. 2018). A second reason for caution is that much of the decline in employment share in manufacturing may simply reflect outsourcing and reorganization with previous functions such as fleet management, maintenance, or accountancy services provided in-house. This transfers the value-added and capital expenditure to the services sector (Tregenna 2016). Such a change is likely to have been rapid as manufacturing firms inserted themselves in global value chains. One study has shown that manufacturing exports support in-direct manufacturing jobs, accounting for an effect over four times greater than direct manufacturing employment with a shift in the labour content of global-value-chain-intensive manufacturing sectors away from direct manufacturing to indirect services (Cali and Hollweg 2017; World Bank Group 2017).

C42.P47   These considerations suggest that the manufacturing sector and its capital allocation should be a continuing and perhaps renewed focus of interest. Within that broad sector there will be subsectors that provide different benefits; some with high productivity but perhaps not generating employment while other have the prospect of increased prod-uctivity and employment. Certainly, some sectors, such as metal fabrication, plastics, transport, and agro-processing, show co-movement of employment and capital invest-ment (Zalk 2014). Productivity does need to be a key consideration of industrial policy since that is a requirement for sustainability, but forward-looking policy cannot re-peat the mistakes of the trade policy that led to the permanent erosion of some labour-intensive sectors in the 1990s. Serious consideration should be given to plans to build a large light manufacturing sector as a pillar of industrial strategy (Black 2016).

C42.S12   42.5.4 Illustrative Instruments

C42.S13   ### 42.5.4.1 *Can Private Investment Be Targeted with the Instrument of Public Investment?*

C42.P48   Does an increase in public investment 'crowd out' private sector investment? Or does it stimulate the latter, 'crowding in' private investment? Crowding out may occur if government borrowing for public projects raises interest rates generally, reducing the net present value of private firms' potential projects; or if it creates a shortage of real resources, particularly labour with appropriate skills such as engineering and project

management skills. But *crowding in* can occur if public investment in projects such as those that reduce transport costs stimulates private firms to invest in projects that would otherwise have been unviable.

C42.P49   A recurring theme in South Africa's national growth strategies since 1994 has been the promotion of public-sector investment, with the implicit justification that it would promote growth both directly and through crowding in private investment. The effect of public-sector gross fixed capital formation is likely to depend on the type of public investment.

C42.P50   Establishing the existence of a crowding-in effect is difficult in principle and there is a paucity of studies testing for its presence in post 1994 South Africa. However, research using long-run data finds historical support for positive impacts of public-sector infrastructure capital and investment on GDP, growth, total capital, and productivity (Perkins et al. 2005; Fedderke and Bogetic 2006). In data spanning 1875 to 2001 Fedderke et al. (2006) find that the public-sector stock of infrastructure assets has a positive effect on the level of GDP, arising indirectly from a positive effect on the total capital stock, with a capital–infrastructure elasticity of 1.37.

C42.P51   Fedderke and Bogetic (2006) also find a positive relationship between economic infrastructure, particularly transport and electricity infrastructure, and labour productivity in manufacturing, using both stock and flow measures of capital. The estimates are obtained from a panel of twenty-four manufacturing sectors between 1975 and 2000 after controlling for endogeneity of infrastructure. The positive relation may reflect either a direct effect of improved transport and energy supplies on manufacturing productivity, and/or a crowding-in effect in stimulating private firm's productivity-enhancing investment, but the paper does not investigate these channels separately. In a VAR model, Kumo (2012) obtains results for productivity consistent with those, but yields no information on a crowding-in effect on private investment.

C42.P52   Understanding the effectiveness of public investment on private incentives may turn out to rest on the specifics of the programme—the technical capacity, the organization of its installation, or the management of its operation. Underlying this question is a broader one of the relationship of the state to private industry. Failures of the former may be attributed to insufficient capacity to deal with so many wide-ranging policy issues. Failures of private industry may stem from a reluctance of the state to partner with it or, from a shareholder-centric form of governance that does not require directors to take account of costs and benefits external to the firm.

C42.S14   ### 42.5.4.2 *Tax Subsidies as Instruments?*

C42.P53   A type of investment-promoting instrument that has been used extensively in South Africa and elsewhere is subsidizing the user cost of capital through tax allowances for investment costs (through accelerated depreciation tax rules for example, or capital allowances). In South Africa such subsidies have been sector specific as shown by the World Bank Group (2017: Table 22) in a study that considers their potential effect

in determining the allocation of capital to sectors with high employment multipliers. Empirical estimates in that study and the studies conducted for the Davis Tax Committee indicate that such effects vary by sector but are not strong in general (Davis Tax Committee 2018: 6). Such findings of weak effects of the existing system of targeted investment subsidies conform with the conclusions reached above in section 42.2, about the weakness of evidence for the user-cost-of-capital effect on investment that underpins the individual firm approach to investment studies.

42.6 State of Knowledge

Gross fixed capital formation in South Africa has been on a rising trend since 1994 but the investment to GDP ratio has not reached levels historically experienced by developing countries in 'economic miracle' periods of rapid growth. The comparison does not yield simple conclusions because, whereas the latter countries had started from positions of low industrialization or wartime destruction, South Africa already had established, but distorted, industrial sectors at the start of the democratic period. But to achieve its economic and social goals post-1994 governments needed sustainable significant increases in GDP per capita, linked to industrial restructuring. It implied a high rate of aggregate investment and investment in industries including manufacturing. Within the rising trend of investment over the period, business investment in manufacturing has stagnated relative to other sectors. Why, and what can be done?

Explanations of low investment that rely upon the theories underpinning the policy canon do not have adequate empirical support, partly because the amount of published research on them using South African data is small and partly because published results do not consistently show strong relationships between firms' investment, user cost of capital, uncertainty, or measures related to the degree of monopoly.

More fundamentally the theories are limited by modelling the behaviour of individual firms acting independently in response to market signals. An alternative perspective sees aggregate and sectoral investment as the outcome of interactions within a system of firms, institutions, and markets with both complementary relations (such as are assumed to exist between public investment in infrastructure) and competing interests. A system perspective may implicitly underlie the government's recent programmes for growth as well as the policy perspectives of business organizations and other civil-society bodies. But fuller understanding of South Africa's 'national system of investment' is needed if it is to lead to an effective strategy. In particular, while South Africa's institutions appear consistent with a system that can support high investment, the complex and 'soft' links between them and the effective implementation of policies warrant interdisciplinary study.

C42.S16 REFERENCES

C42.P57   Baker, Scott R., Nicholas Bloom, and Steven J. Davis. 2016. 'Measuring economic policy uncertainty', *The Quarterly Journal of Economics*, 131(4): 1593–636.

C42.P58   Baum, Christopher F. and Mustafa Caglayan, and Oleksandr Talavera. 2008. 'Uncertainty determinants of firm investment', *Economics Letters*, 98(3):

C42.P59   Bhorat Horaan, Chris Rooney, and François Steenkamp. 2018. 'Understanding and characterizing the services sector in South Africa', in R Newfarmer, John Page and Finn Tarp (eds) *Industries without Smokestacks: Industrialization in Africa Reconsidered*. Oxford: Oxford University Press.

C42.P60   Black, Anthony (ed.). 2016. *Towards Employment-intensive Growth in South Africa*. Cape Town: University of Cape Town Press.

C42.P61   Black, Anthony and Reviva Hasson. 2016. 'Capital-intensive industrialisation, comparative advantage and industrial policy', in Anthony Black (ed.) *Towards Employment-intensive Growth in South Africa*. Cape Town: University of Cape Town Press.

C42.P62   Blanchard, Olivier J. and Giovanni Dell'Ariccia, and Paolo Mauro. 2010. 'Rethinking macroeconomic policy', January [online] https://ssrn.com/abstract=1555117 or http://dx.doi.org/10.2139/ssrn.1555117.

C42.P63   Bold, S. and L Harris. 2018. 'Identifying monetary policy rules in South Africa with inflation expectations and unemployment.' UNU-WIDER Working Paper no. 2018/43, Helsinki.

C42.P64   Bond, Stephen R., Richhild Moessner, Haroon Mumtaz, and Murtaza Syed. 2005. 'Microeconometric evidence on uncertainty and investment' [online] https://www.ifs.org.uk/publications/3278.

C42.P65   Buthelezi, T, T Mtani, and L Mncube. 2018. 'The extent of market concentration in South Africa's product markets.' Competition Commission Working Paper no. CC2018/05, South Africa.

C42.P66   Cali, M and C H. Hollweg. 2017. 'How much labour do South African exports contain?' Policy Research Working Paper no. 8037, World Bank, Washington, DC [online] https://openknowledge.worldbank.org/handle/10986/26474.

C42.P67   Clarke et al. (2007) *An Investment Climate Assessment for South Africa*. Washington, DC: World Bank.

C42.P68   Chortareas, G, E Noikokyris,. and F R. Rakeeb. 2020. 'Investment, firm-specific uncertainty, and market power in South Africa', *Economic Modelling*. doi: 10.1016/j.econmod.2020.03.021

C42.P69   Davis Tax Committee. 2018. 'Report on the efficiency of South Africa's corporate income tax system' [online] https://www.taxcom.org.za/docs/20180411%20Final%20DTC%20CIT%20Report%20-%20to%20Minister.pdf.

C42.P70   Du Plessis, S, N Katze, E Gilbert, and C Hart. 2015. 'Mark-ups and competition: a comparison of the profitability of listed South African industrial companies.' Stellenbosch Economic Working Paper no. 02/15, Stellenbosch University.

C42.P71   Du Plessis, S and B Smit. 2007. 'South Africa's growth revival after 1994 (revised March 2007).' Stellenbosch Economic Working Paper no. 01/06, Stellenbosch University.

C42.P72   Dixit, A. 1992. 'Investment and hysteresis', *Journal of Economic Perspective*, 6: 107–32.

C42.P73   Driver, Ciaran and B Whelan. 2001. 'The effect of business risk on manufacturing investment: sectoral survey evidence from Ireland', *Journal of Economic Behavior and Organization*, 44(4): 403–12.

C42.P74 Edquist, Charles. 2005. 'Systems of innovation: Perspectives and challenges', in J Fagerberg, D C. Mowery, and R Nelson (eds) *The Oxford Handbook of Innovation*. Oxford: Oxford University Press.

C42.P75 Faulkner D and C Loewald. 2008. 'Policy change and economic growth: A case study of South Africa.' Policy Paper no. 14, National Treasury RSA.

C42.P76 Fedderke, J W. 2004. 'Investment in fixed capital stock: Testing for the impact of sectoral and systematic uncertainty', *Oxford Bulletin of Economics and Statistics*, 66(2): 165–88.

C42.P77 Fedderke, J W. 2009. 'Capital formation in South Africa', in J Aron, B Kahn, and G Kingdon (eds) *South African Economic Policy under Democracy*. Oxford: Oxford University Press.

C42.P78 Fedderke, J. W. and Z Bogetic. 2006. Infrastructure and Growth in South Africa: Direct and Indirect Productivity Impacts of 19. Infrastructure Measures, University of Cape Town Working Paper Number 39.

C42.P79 Fedderke, J W, N Obikili and N Viegi. 2018. 'Markups and concentration in South African manufacturing sectors: An analysis with administrative data', *South African Journal of Economics*, 86(S1): 120–40.

C42.P80 Fedderke, J. W., Perkins, P., and Luiz, J. M. 2006. Infrastructural investment in long-run economic growth: South Africa 1875-2001. *World Development*, 34(6): 1037–59.

C42.P81 Freeman, C. 1987. *Technology policy and economic performance: lessons from Japan*. Pinter Publishers.

C42.P82 Gutiérrez, G and Thomas Philippon. 2017. 'Declining competition and investment in the U.S.' NBER Working Paper no. 23583, Cambridge, MA.

C42.P83 Hausmann, R. 2008. 'Final recommendations of the International Panel on ASGISA.' CID Working Paper no. 161, Harvard University Center for International Development.

C42.P84 Kaplan, D. 2007. 'The constraints and institutional challenges facing industrial policy in South Africa: A way forward', *Transformation*, 64: 91–111.

C42.P85 Kaziboni, L. 2018. 'The economic performance and competitiveness of manufacturing firms in Johannesburg, South Africa.' UNU-WIDER, SA-TIED Working Paper no. 14, Helsinki.

C42.P86 Kearney, M and A Odusola. 2011. 'Country study: Assessing development strategies to achieve the MDGs in the Republic of South Africa.' Development Policy Analysis Division of the United Nations Department of Economic and Social Affairs (DPAD/UN-DESA), New York, New York.

C42.P87 Kumo, W L. 2006. 'Macroeconomic uncertainty and aggregate private investment in South Africa', *South African Journal of Economics*, 74(2): 191–204.

C42.P88 Kumo, W L. 2012. 'Infrastructure investment and economic growth in South Africa: A granger causality analysis.' African Development Bank Group Working Paper no. 160, Abidjan, Côte d'Ivoire.

C42.P89 Oughton, Christine, Désiré Kanga, Laurence Harris, and Victor Murinde. 2021. The Role of Finance, Capabilities and Institutions in Enterprise Innovation in Low and Middle Income Countries. Unpublished paper

C42.P90 Pane, L and R Pedro. 2016. 'Macroeconomic drivers of the investment in South Africa: The role of the exchange rate and its volatility.' RSA National Treasury.

C42.P91 Perkins, P., Fedderke, J. W., and Luiz, J. M., 2005. An Analysis of Economic Infrastructure Investment in South Africa, *South African Journal of Economics*, 73(2): 211–28.

C42.P92 Sharpe, S A. and G A. Suarez. 2014. 'The insensitivity of investment to interest rates: Evidence from a survey of CFOs.' Finance and Economics Discussion Series Divisions of Research and Statistics and Monetary Affairs Federal Reserve Board, Washington, DC.

C42.P93   TIPS. 2000. 'Determinants of investment in South Africa: A sectoral approach.' Trade and Industrial Policy Secretariat (TIPS), Pretoria.

C42.P94   Tregenna, Fiona. 2016. 'Sectoral dimensions of employment intensity', in Anthony Black (ed.) *Towards Employment-intensive Growth in South Africa*. Cape Town: University of Cape Town Press.

C42.P95   Van Eyden, R, G C. Aye, and R Gupta. 2012. 'Predictive ability of competing models for South Africa's fixed business non-residential investment spending.' University of Pretoria [online] https://www.semanticscholar.org/paper/Predictive-Ability-of-Competing-Models-for-South-Eyden-Aye/83a968fd0c7196530d9404bc7fe73695cb9149e7.

C42.P96   Viegi, N and V Dadam. 2018. 'Investment in South Africa: Opening the economy to transform the society', *The Journal of the Helen Suzman Foundation*, 82: 21–6.

C42.P97   World Bank. 2014. 'South Africa economic update: Focus on export competitiveness, World Bank Africa Region Poverty Reduction and Economic Management. South Africa economic update, issue no. 5. Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/17578 License: CC BY 3.0 IGO." http://hdl.handle.net/10986/17578.

C42.P98   World Bank Group. 2017. 'South Africa economic update: Private investment for jobs.' Washington, DC.

C42.P99   World Bank Group. 2018. 'Systematic country diagnostic: An incomplete transition: Overcoming the legacy of exclusion in South Africa.' Report no: 125838-ZA, Washington, DC.

C42.P100   Zalk, N. 2014. 'Markups in South African manufacturing: Are they high and what can they tell us?' Conference Paper for Trade and Industrial Policy Strategies, TIPS, Pretoria May.