



public works

Department:
Public Works
REPUBLIC OF SOUTH AFRICA



DEVELOPMENT THROUGH PARTNERSHIP

THE DRIVERS OF THE COST OF PUBLIC SECTOR CONSTRUCTION

ASSESSMENT AND RECOMMENDATIONS

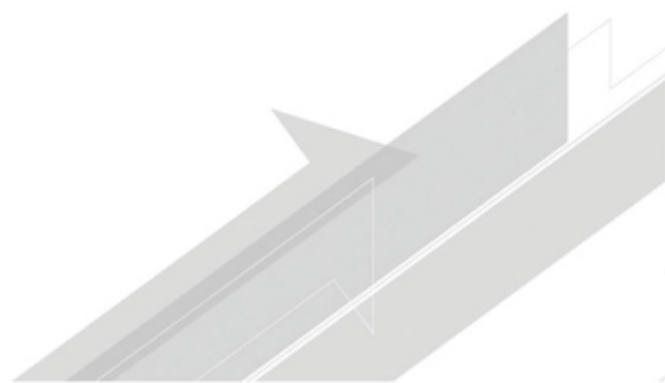


THE DRIVERS OF THE COST OF PUBLIC SECTOR CONSTRUCTION;

ASSESSMENT AND RECOMMENDATIONS

Draft for Discussion

March 2017



THE DRIVERS OF THE COST OF PUBLIC SECTOR CONSTRUCTION;

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EXECUTIVE SUMMARY

Construction procurement of construction works by the public sector, including State owned Entities, national, provincial and local government, amounts to around R220 billion per year, which provides the backbone for the economic infrastructure that is necessary for economic growth and for the delivery of public services. Construction procurement also provides for around 1.4million jobs in the construction sector.

In order to derive the maximum benefit from the available budget for infrastructure spend, it is important to contain the costs of infrastructure and to reduce any pressure on the available financial resources to fund government's infrastructure programme. Cost increases also place pressure on the sustainability of contractors that provide the necessary infrastructure, but who may not be well equipped to deal with such escalations.

Against this background, the Department of Public Works and the cidb undertook this investigation into the trends in infrastructure costs and to quantify the main cost drivers in construction.

From an assessment of historic construction related data, notwithstanding volatility amongst individual materials components, the study has shown the Contract Price Adjustment Provisions (CPAP) for lump-sum domestic buildings and for commercial and industrial buildings (Working Groups 180 and 181 respectively) have escalated at rates very closely to that of CPI or inflation. It is reasonable to assume therefore that input material costs will overall continue to increase at the rate of inflation into the near future.

A better indicator of project costs is the BER/MFA Building Cost Index (BCI), which includes profit margins of building contractors and also reflects market conditions. An analysis of historic data reflects that the BCI has increased at around 1% per year on average above CPI over the period 2010 to 2015. Somewhat higher escalations in project costs are however predicted using the Industry Insight Output Building Cost Index (Output BCI). The Output BCI is a measure of the cost to the client, including the cost to contractor plus allowances for profit, risk and other market influences, and reflects cost escalations of around 4,5% per year on average higher than CPI over the period 2010 to 2015.

The BER/MFA BCI and the Industry Insight Output BCI clearly suggest building costs escalating at between 1% and 4,5% per year on average in the near future. Noting that CPAP and other building input costs are escalating at around CPI, this suggests that this increase in building costs is likely to be due to increasing allowances for profit by contractors, increases in finance costs, and risk factors, as well as factors influenced by the depreciating Rand.

The study has also shown that construction projects that are more plant and material intensive are more sensitive to cost increases, while projects which are more labour intensive are less sensitive to cost increases. The case studies also suggest that construction projects with a utilisation of specialist subcontractors of

greater than around 30% are less sensitive to cost increases, while the utilisation of specialist subcontractors of less than around 30% will result higher construction costs.

The study has highlighted that, overall, introduction of the PPPFA to drive transformation has resulted on an overall premium in the cost of construction of around 2% - although actual premiums of around 11% have been observed on individual projects. It is noted that the recent change of the PPPFA to adopt the 80/20 preference point system on projects of up to R50 million will result in further cost increases.

The study also notes that anecdotal evidence suggests that the application of developmental and targeted procurement have in exceptional cases increased the cost of construction by up to 15%. However developmental procurement objectives can be achieved at a marginal or no increase to the cost of delivering projects, and the cidb recommends that the additional cost premium for developmental objectives on construction works contracts should not exceed 2% (over and above the preference point system).

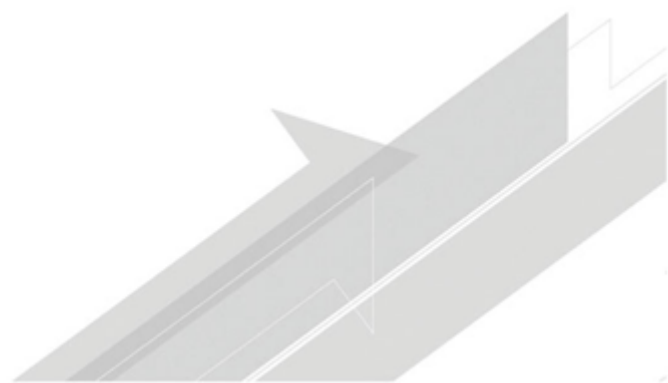
The study concludes with the recommendations, including that:

- i) It is recommended that the cidb plays an increasing role in monitoring the cost of public sector construction, and investigates the establishment of a public sector construction costs index, in partnership with existing role-players. The construction costs index could link to the cidb Register of Projects and to the cidb Project Assessment Scheme.
- ii) It is recommended that the cidb investigates the feasibility of regularly reporting on public sector construction cost trends (possibly a bi-annual or annual assessment) drawing on the proposed public sector construction costs index and other available information.
- iii) It is recommended that the cidb expedites the recommendations of the study on Reducing Red Tape in Construction which, amongst others, could impact on cost increases in construction.
- iv) It is recommended that the cidb monitors the impact of the increase in the tender value limit from R10 million to R50 million for application of the 80/20 preference point system on construction procurement.

THE DRIVERS OF THE COST OF PUBLIC SECTOR CONSTRUCTION;

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THE DRIVERS OF THE COST OF PUBLIC SECTOR CONSTRUCTION;

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1. BACKGROUND AND INTRODUCTION

1.1 Objectives

Major infrastructure programmes over the next three years include over R300 billion in transport and logistics projects, R240 billion in the energy sector and R137 billion in water and sanitation.

*Minister Pravin Gordhan
Medium Term Budget Policy Statement 2016
26 Oct 2016*

Government infrastructure spend (including machinery and equipment) currently amounts to around R220 billion per year, or around 5,5% of GDP, and plays a key role in service delivery and in the development of South Africa. In order to derive the maximum benefit from the available budget for infrastructure spend, it is important to contain the costs of infrastructure and to reduce any pressure on the available financial resources to fund government's infrastructure programme. Cost increases also place pressure on the sustainability of contractors that provide the necessary infrastructure, but who may not be well equipped to deal with such escalations.

Table 1. Public-sector infrastructure expenditure and estimates¹, 2012/13 – 2018/19

R billion	2012/13	2013/14 Outcomes	2014/15	2015/16	2016/17	2017/18 Estimates	2018/19	MTEF Total
National departments	11,4	11,9	13,5	17,3	19,6	16,4	18,3	54,3
Provincial departments	50,3	55,2	56,4	62,7	63,6	69,8	72,9	206,3
Local government	41,7	47,1	53,2	56,6	58,2	57,5	59,9	175,6
Public entities ²	16,1	15,4	19,2	28,7	26,2	29,4	30,4	86,0
Public-private partnerships	2,6	3,0	1,8	1,7	1,9	2,0	2,1	6,1
State-owned companies ²	111,3	111,2	115,8	123,4	105,2	109,7	122,2	337,0
Total	233,3	243,9	259,9	290,4	274,8	284,9	305,8	865,4

1. Including machinery and equipment

2. Public entities are financed by capital transfers from the fiscus and state-owned companies are financed from a combination of own revenue, borrowings and private funding

Source: National Treasury

Against this background, the Department of Public Works and the cidb undertook this investigation into the trends in infrastructure costs and to quantify the main cost drivers in construction. The study investigates the drivers of construction cost over the five year period 2010 to 2015, and then examines the increase in construction cost over the next five year period 2016 to 2020.

1.2 Study Methodology

The study uses the following methodology:

- a) Historical cost information was obtained from a range of institutional and government databases, including Statistics South Africa (Stats SA), the South African Reserve Bank, the Bureau of Economic Research (BER)/Medium-Term Forecasting Associates (MFA), and Industry Insight. The historic cost information includes:
 - the Contract Price Adjustment Provisions (CPAP);
 - the BER / MFA Building Cost Index (BCI);
 - the Industry Insight Output Building Cost Index (Output BCI);
 - the Labour Cost Index (LI);
 - the Building Material Price Index (MI);
 - the Equipment and Plant Cost Index (EI); and
 - the Consumer Price Index (CPI).

Note that the BER / MFA BCI and the Industry Insight Output BCI are proprietary data sources, and the use of their data here is gratefully acknowledged.

- b) Using the bills of quantities for case studies of Grades 5 to 9 General Building (GB) and Civil Engineering (CE) public sector construction works, the historic cost information was then used to determine the effective historic costs. A predictive modelling tool was then developed to establish the determinants of building construction costs, and the key drivers of the construction costs.
- c) The predictive modelling tool was then model the increases in construction costs over the next five years for the case studies considered.

1.3 Structure of Report

The structure of the report is as follows:

- a) Section 2 presents a general overview of the cost of construction, including locating the cost of South African construction within the international context;
- b) Section 3 investigates historical construction cost information;
- c) Section 4 uses the historical construction cost information to determine effective historic costs for case studies of Grades 5 to 9 General Building (GB) and Civil Engineering (CE) construction works case studies, and to determine the key drivers of construction costs.
- d) Section 5 presents a brief assessment of the impact of the cost of construction on contractors.
- e) Section 6 then presents a summary on the investigation together with recommendations on the way forward.

1.4 Acknowledgements

The investigation was undertaken by the Department of Construction Economics and Management, University of Cape Town for the DPW/cidb, and their input is gratefully acknowledged.

The support of the Bureau of Economic Research (BER)/Medium-Term Forecasting Associates (MFA), and Industry Insight is also gratefully acknowledged.

The cidb also acknowledges the respondents to cidb survey that was undertaken for this study.

2. AN OVERVIEW OF THE COST OF CONSTRUCTION

An overview of the cost of construction and cost increases is given in the sections to follow.

2.1 An International Comparison

Table 2 below provides a comparison of the construction cost per square meter (m²), Gross Domestic Product (GDP), skilled labour cost per hour, inflation and labour productivity between BRICS countries (Brazil, Russia, India, China and South Africa), and selected African Union (AU) countries and the Group of Eight (G8) countries¹.

Table 2: Comparison of construction cost/m², GDP and labour costs

Country	Construction cost - \$/m ² (office/ Admin Building - Low)	GDP-\$Bn (2016)	Skilled Labour \$/hr (High)	Inflation (%) 2015	Labour Productivity
BRICS					
South Africa	741	412	25,50	5,8	1,45
Brazil	592	2 830	22,50	6,4	2,25
Russia	1 000	2 395	25,00	7,5	1,75
India	678	2 400	9,00	8,5	2,40
China	502	16 500	12,00	3,2	2,30
AU Countries					
Nigeria	757	319	13,50	8,5	2,25
Ghana	377	71	12,00	10	2,25
Kenya	856	55	12,00	5,0	2,50
Morocco	423	123	14,00	2,9	2,30
Angola	367	147	11,00	7,0	2,50
Egypt	636	368	10,00	8,5	2,50
Equatorial Guinea	389	19	10,00	3,5	2,50
G8					
USA	1 716	17 960	86,54	1,2	1,00
Canada	1 688	2 150	88,50	1,8	1,15
Great Britain	1 954	2 590	65,00	1,9	1,20
Germany	1 925	3 970	42,50	1,1	1,15
France	1 921	2 886	41,50	0,9	1,10
Japan	1 919	6 185	66,50	2,5	1,20
Australia	1 651	1 635	55,00	2,3	1,20
Average	1 057,5	3 317	32,63	4,7	1,84

Source: Compass International: *Global Construction Costs* (2016)

Figures 1 to 3 provide a further comparison of construction costs, labour costs and labour productivity, for the various countries considered.

¹ Compass International (2016). *Global Construction Costs* (2016), Compass International, www.compassinternational.net

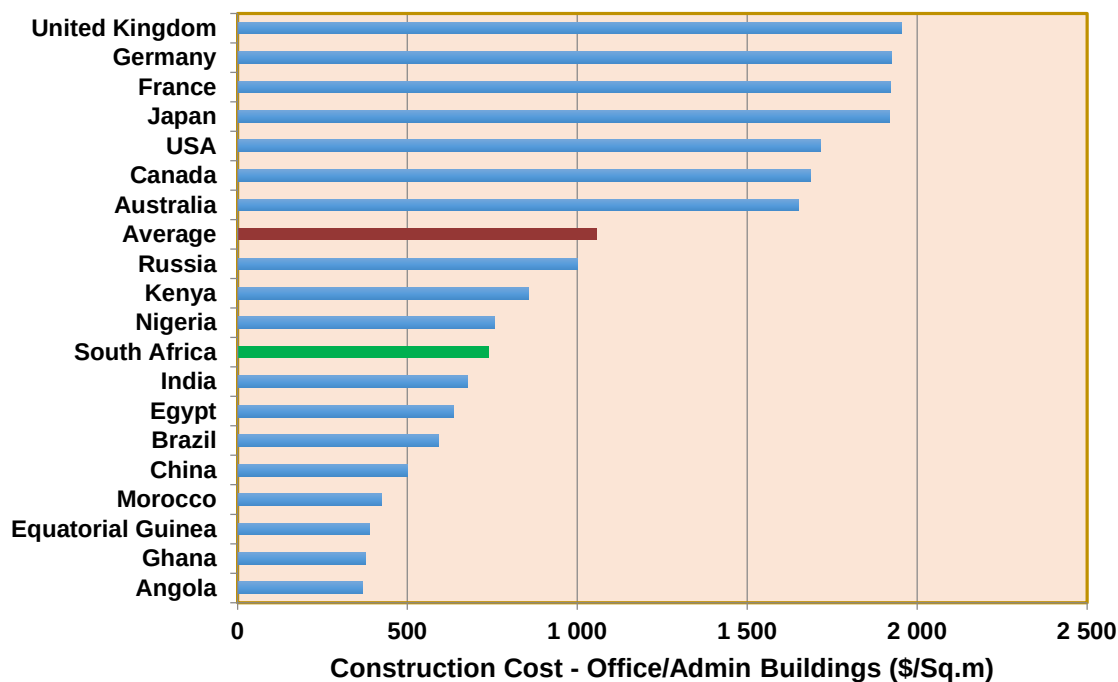


Figure 1: Comparative Cost of Construction Cost (\$/Sq.m)

Table 1 and Figure 1 show that construction cost (\$/m²) of Office/Administration buildings in South Africa (\$741/m²) is well below the average cost (\$1 057/m²) and that the cost of construction is higher within the G8 countries followed by BRICS countries and least within African states. Among the BRICS countries, the construction cost in Russia (\$1 000/m²) is the highest, while within African states, construction cost is highest in Kenya (\$856/m²), followed by Nigeria (\$757/m²).

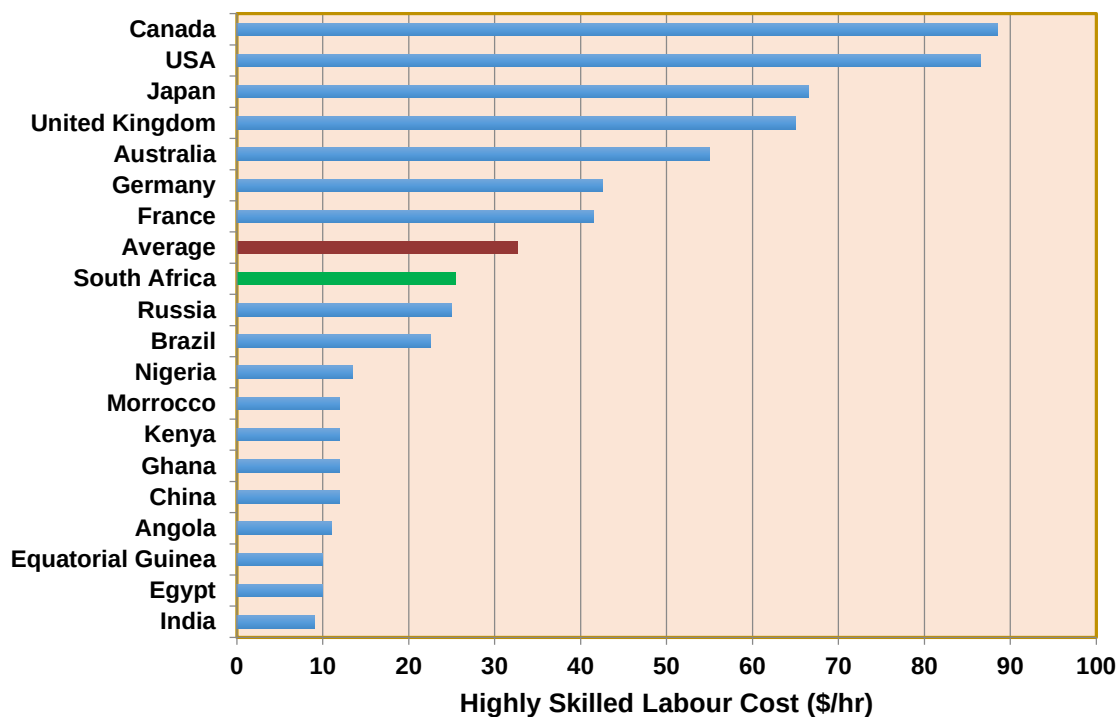


Figure 2: Highly Skilled Labour Cost (\$/Hour)

In terms of skilled labour cost, it can be seen from Table 1 and Figure 2, that South Africa's skilled labour cost of \$25,50/hour is just below the average of the countries considered (\$32,63/hour) and that labour cost is comparatively higher in South Africa than other BRICS states and AU countries. The highest labour wages are paid in Canada (\$88,50/hour), while the least is paid in India (\$9/hour).

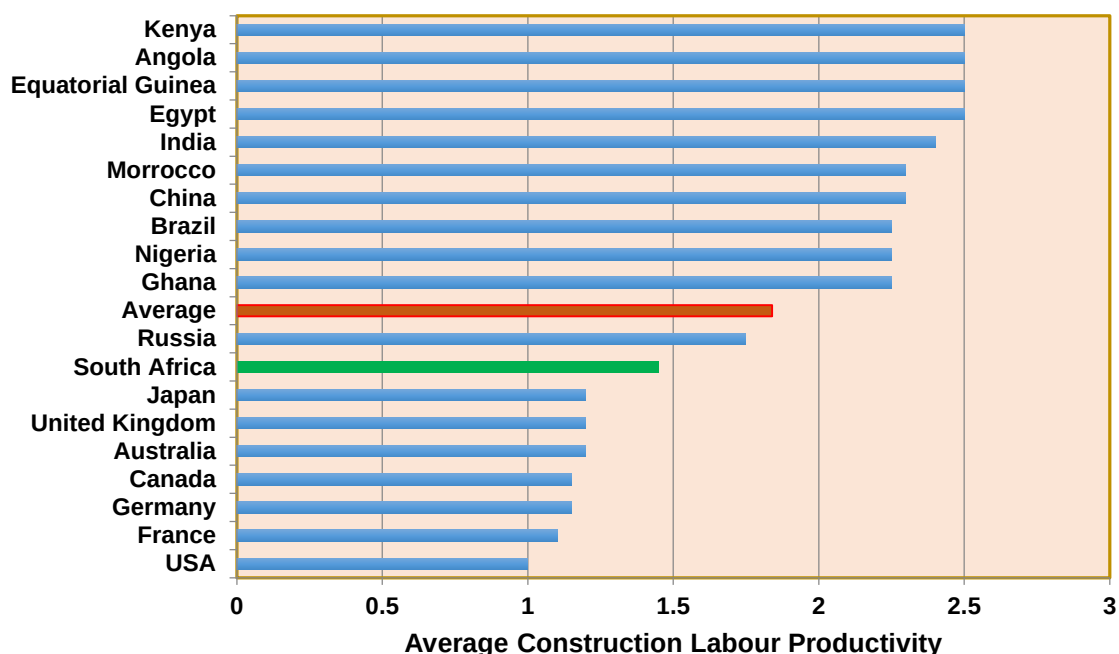


Figure 3: Average Construction Labour Productivity Index Distributed by Country

The Labour Productivity index presented in Table 2 and Figure 3 is a measure of the number of hours (in 1 000s) to produce a unit of work or task. Table 2 and Figure 3 shows that construction labour is more productive in South Africa (1,45) when compared to the overall average of (1,84). Furthermore, it shows that if it takes the average worker 1 000 hours to produce a unit of work/task in the USA, which has the best productivity constant, it would take an average worker 1 450 hours to produce the same work/complete the same task in South Africa, and 2 500 hours to produce the same unit of work in Angola, Egypt, Equatorial Guinea and Kenya. Amongst the BRICS and AU states, South Africa has the best productivity constant.

In summary, it can be inferred from the results presented in Table 2 and Figures 1 to 3 that South Africa has low construction costs. On the basis of the comparatively low labour costs and higher labour productivity, it is reasonable to conclude that South Africa would continue to have lower construction costs when compared to other BRICS and AU countries. However, persistent inflation rates may erode this advantage in the not too distant future if fiscal measures are not put in place to bring inflation under control.

2.2 Input and Output Building Costs

Various measures of input and output building costs are available, which are discussed briefly below:

- i) *Statistics SA*: Stats SA produces a wide range of construction related price and cost information, including:

- a) *Consumer Price Index (CPI)*: The Stats SA publication P0141 includes overall level of prices of goods and services bought by the average household, together with overall CPI inflation rates.
- b) *Producer Price Index (PPI)*: The PPI indicates changes in producer prices of locally produced commodities including exports, and is available in Stats SA publication P0142.1. Information is also aggregated into PPI for materials used in Building and Construction (PPI Building and Construction), materials used in the Building industries (PPI Building) and materials used in Civil engineering (PPI Civil).
- c) *Contract Price Adjustment Provisions (CPAP) Committee*: The CPAP are a publication of the Joint Building Contracts Committee (JBCC) published by Stats SA (P0151), and consists of indices derived from changes in the cost structures prevailing in 37 different sectors of the building and construction industry and is reported on by Stats SA on a monthly basis². The indices are mainly based on a weighted combination of PPI, SEIFSA and CPI indices for the particular month. The CPAP indices cover price escalations for a range of building input factors covering labour, materials and plant and equipment. Aggregated Labour, Material and Equipment Indices are then available – which for the basis of the Haylett Indices. These indices do not include the profit margins of contractors.

For later reference it should be noted that CPAP Working Group 180 refers to lump-sum domestic buildings and CPAP Working Group 181 refers to commercial and industrial buildings. CPAP Working Groups 180 and 181 therefore only apply to the building industry, and cost increases in the civil engineering sector can be derived by aggregating CPAP data for other Working Groups.

- ii) *Bureau for Economic Research (BER) / Medium-Term Forecasting Associates (MFA)*: The BER Building Cost Index (BCI) is a measure of the change in average building costs in South Africa, and is based on an analysis of the tariffs (rates) in accepted tenders supplied by quantity surveyors. The index is compiled by analysing current price movements of 22 representative cost components that are common to all buildings relative to the prevailing base prices. The index includes profit margins of contractors and reflects market conditions.
- iii) *Industry Insight*: Output Building Cost Index (Output BCI) by Industry Insight is disaggregated into an Offices Index, Industrial Index, Retail Index, Commercial Index (Weighted Office, Retail and Industrial) and a Housing Index. The Output BCI is a measure of the cost to the client, including the cost to contractor plus allowances for profit, risk and other market influences, and is based on tender data obtained from Databuild.

A comparison between the CPAP 181 for Domestic Buildings, the BER BCI, the Industry Insight Output BCI for Commercial Buildings and inflation rates is given in Figure 4, normalised to December 2010 = 100. The CPAP suggests that input building material costs are escalating at around the rate of inflation, while the

² CPAP. *CPAP Indices Application Manual, Work Groups Composition and Weightings of Sub-indices*. Issued by the CPAP Committee, distributed by the Association of South African Quantity Surveyors (ASAQS), www.asaqs.co.za/?page=CPAP

BER BCI and the Industry Insight Output BCI suggests that the building output costs (tender prices) are escalating at a higher rate than inflation.

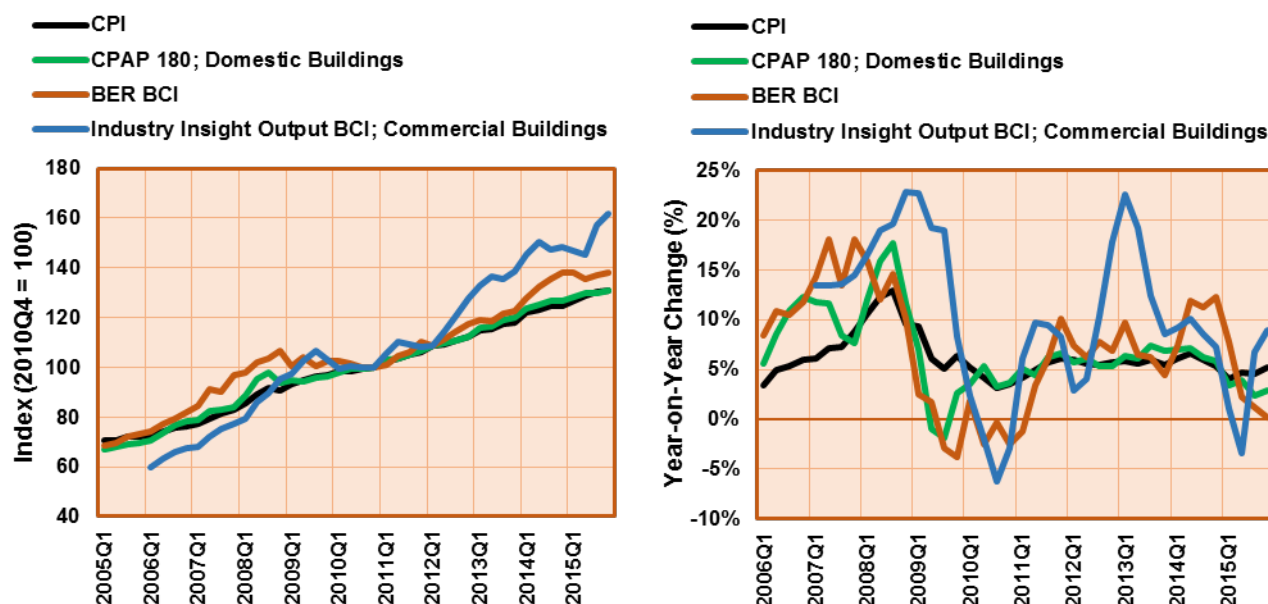


Figure 4. Input and Output Building Costs and Inflation

However, there are some noticeable discrepancies between the BER BCI, the Industry Insight Output BCI, and the year-on-year changes in inflation, as illustrated in Figure 4. Notably, the average annual increase in the BER BCI over the period 2005 to 2015 amounts to 6,7% while the average annual increase in the Industry Insight Output BCI over the period 2006 to 2015 amounts to 10,4%. The Industry Insight Output Building Costs Index does however include further allowances for profit, as well as risk and other market influences. Note that by comparison, the average annual inflation rate (CPI) over the same period amounted to 6,2%.

A more detailed analysis of input costs is given in Section 3 to follow, while actual construction costs of selected public sector construction works projects are investigated in Section 4.

3. THE DRIVERS OF CONSTRUCTION COSTS

3.1 Construction Cost Components

Construction costs are the portion of hard costs normally associated with the construction contract, including the cost of materials, labour and equipment costs necessary to put those materials in place (see Figure 5). Added to this are overhead costs, which include both job site management and the contractors' standard cost of doing business (office, staff, insurance, etc.)³

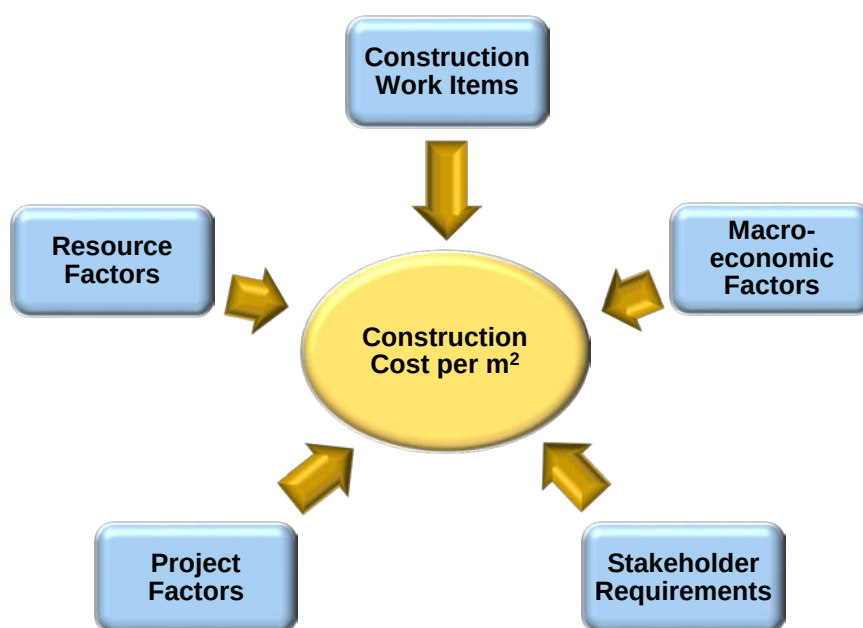


Figure 5: Conceptual Framework of Construction Cost Drivers

Based on various studies, the costs associated with the variables listed in Table 3 are considered in the costing of the projects.

Table 3. Construction cost items

Variables	Variables
Construction work items: a) Provisional sums b) Prime cost sums c) Preliminaries d) Contingencies e) Earthwork/Excavation cost f) Concrete work g) Formwork h) Reinforcement/metal work i) Masonry – external and internal walls j) Carpentry and joinery – external and internal doors	Resource factors: a) Building Material Price Index b) Material cost: • cement • sand • crushed stone • SA Pine/formwork • reinforcement steel • bricks stock/cement blocks • electrical fittings cables and accessories • bitumen/tar c) Labour cost index

3 AIA (2013). *Construction Costs*. American Institute of Architecture 2013, accessible at <http://www.aia.org>

k) Plastering and screeding l) Finishes – ceiling, floor and wall, m) Roof construction n) Staircase construction o) Mechanical, electrical and plumbing installation p) Fire protection installation and q) External work	d) Plant cost index
Macroeconomic factors: a) Building cost index b) Inflation/deflation/CPI – consumer price index c) Transportation costs d) Unemployment rate e) Interest/lending rate Exchange rate, f) Gross domestic product growth rate g) Construction output h) Petrol/Diesel/fuel cost i) Supply deficit j) Industrial production costs (PPI) k) Ratio of price to cost indices in manufacturing indicators of construction prices l) Energy costs	Project factors: a) Labour productivity b) Overheads c) Mark-ups/profits d) Business climate/competition intensity Stakeholders' requirements: a) Professional fees: design, supervision b) Contract documentation/Transaction costs – legal, financial etc. c) Financial requirements/ Performance bond costs, advance payment d) Procurement requirements: Preferential procurement (80/20, 90/10), Developmental procurement & Contract Participation Goals (CPGs), etc.

A detailed analysis of trends in the drivers of the cost of construction is given in the following sections.

3.2 Historical Data Analysis and Interpretation – Macro-Economic Indicators

Before assessing trends in materials costs, it is relevant to assess trends in macro-economic indicators as well as trends in other non-construction specific cost drivers. These indices are examined below.

3.2.1 Global Commodity Prices and Inflation

Although most construction costs are dependent on local materials and local labour, construction costs are influenced by imported fuel, materials and plant and equipment, as well as the cost of fuel, material and labour in the country of manufacture.

The world Metals Price Index and Fuel Index⁴ is shown in Figure 6. Also included in Figure 6 is the CPI for the Group of Twenty (G20) countries⁵, which is a reasonable indicator of labour wage trends. Figure 6 shows significant fluctuations in metals and fuel prices, but overall Figure 6 shows a decrease in metals and fuel prices from around 2010 onwards. Increases in CPI (and labour rates) in the G20 countries has averaged around 3,5% per year over the period 2005 to 2010.

4 IMF Primary Commodity Prices. International Monetary Fund, <http://www.imf.org/external/np/res/commmod/index.aspx>

5 OECD Data; Inflation (CPI). Organisation for Economic Co-operation and Development, <https://data.oecd.org/price/inflation-cpi.htm>

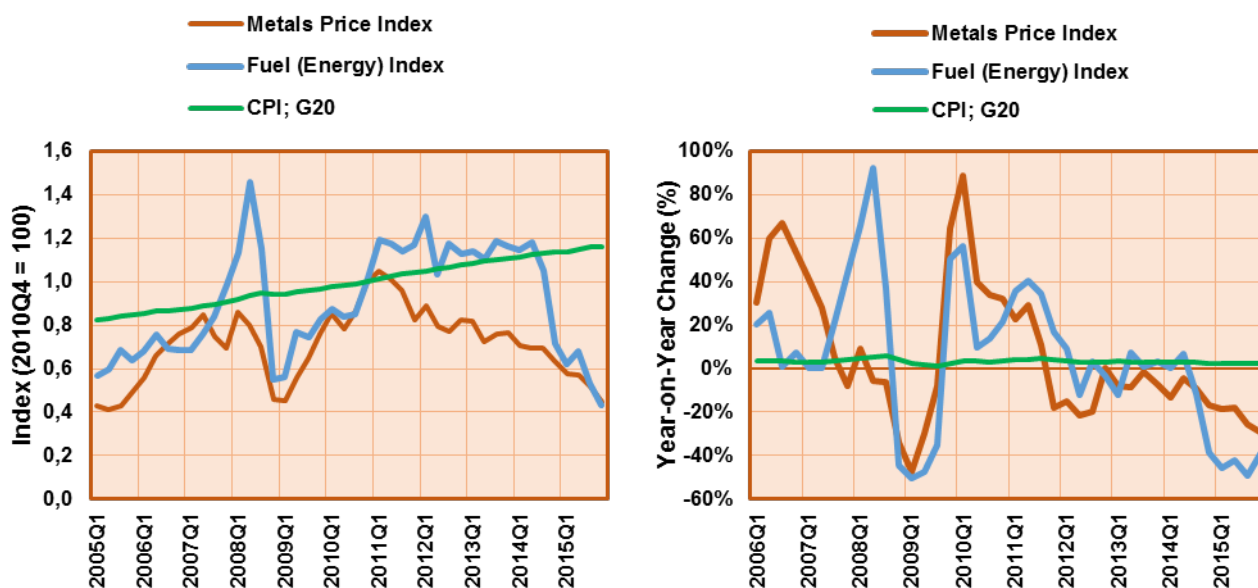


Figure 6: World Metals Price Index, Fuel Index and G20 CPI

3.2.2 Exchange Rate

Changes in the real effective exchange rate from 2005 to 2015 are shown in Figure 7 for South Africa (i.e. the weighted average of South Africa's currency relative to an index of other major currencies, adjusted for the effects of inflation)⁶. For construction, the exchange rate has an impact on the price of imported components, including petrol, diesel, imported materials and plant and equipment. A strong Rand means that contractors can pay a lower price for these variables and the opposite is true when the rand is weaker. Notwithstanding the stronger Rand during 2009 to 2011, overall, the Rand has depreciated close to 30% between 2005 and 2010.

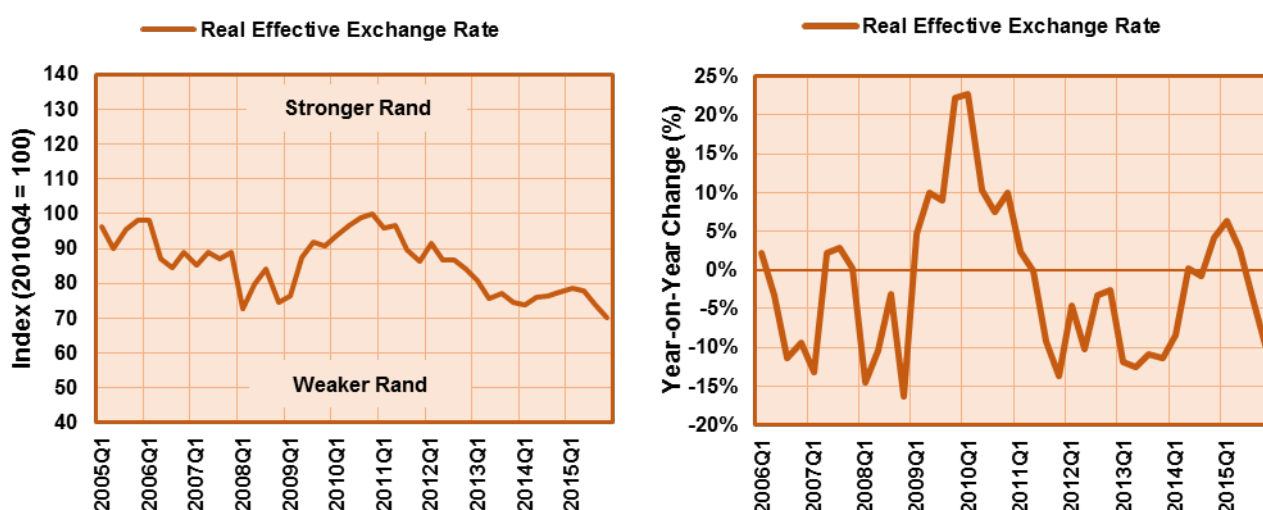


Figure 7: Real Effective Exchange Rate

6 World DataBank. The World Bank, <http://databank.worldbank.org/data/>

3.2.3 Finance Costs; Prime Lending Rate

Figure 8 shows trends in lending or finance costs measured in terms of the prime lending rate over the period of 2005 to 2015⁷. The data shows that finance costs were at the highest level in 2008. In 2009, finance costs started decreasing and were at their lowest level in 2013. Finance costs have an impact on the cost of doing business for contractors. Specifically, the prime lending rate has increased around 1,5 % points between 2011Q1 to 2015Q4.

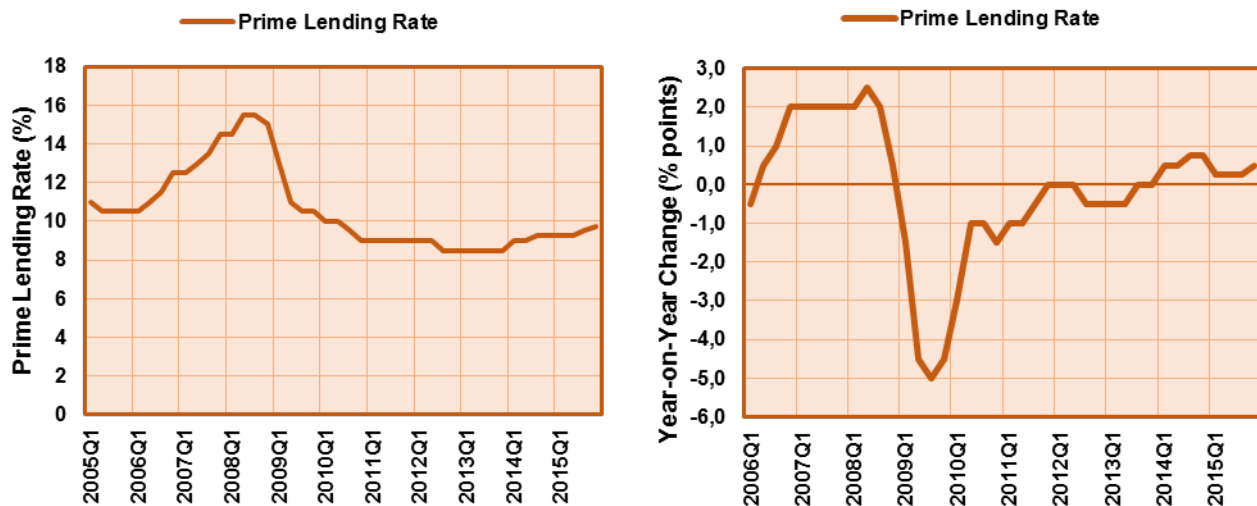


Figure 8: Prime Lending Rate

3.2.4 Producer Price Headline Index

The Producer Price Index (PPI) indicates changes in producer prices of locally produced commodities including exports. The PPI is defined as “A measure of the change in the prices of goods either as they leave their place of production or as they enter the production process (OECD)”, and is compiled by Stats SA⁸. Trends in the headline PPI are shown in Figure 9 for the period of 2005 to 2015, and shows that PPI has increased steadily over the period under review, experiencing the highest increases of around 14% in 2008. Of significance is that PPI in the Building Industries and PPI in Civil Engineering experienced a surge 2006 to 2008, which was due to the high market demand for materials that was being experienced at the time because the construction of the 2010 stadia and other infrastructure projects. From 2010Q4 to 2015Q4, the Headline PPI accelerated at 1,2% on average per year above CPI.

7 SARB. *SARB Rates*. South African Reserve Bank, www.resbank.co.za

8 STATS SA. *Producer Price Index P0142.1*, Statistics SA, <http://www.statssa.gov.za/>

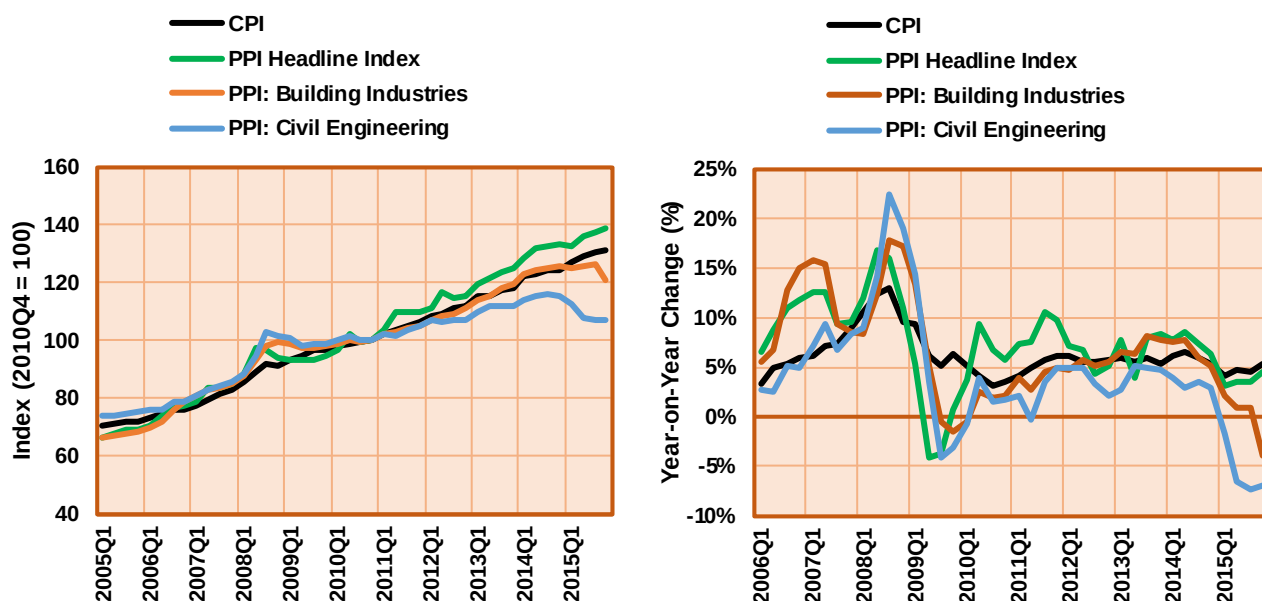


Figure 9: Producer Price Index

Figure 9 also includes PPI in the building industries and in civil engineering. PPI in the building industries is seen to be lower than the headline PPI and close to CPI up to mid-2015, while PPI in civil engineering is seen to be lower than headline PPI and CPI. These trends are however not necessarily reflective of the output costs discussed in Section 3.4 costs.

3.2.5 Discussion

This section has highlighted that, notwithstanding fluctuations in global commodity prices, global inflation, exchange rates and finance costs, the Headline PPI has escalated slightly above CPI – namely at 1,2% points above CPI on average per year. PPI for materials in the building industries has been lower than the headline PPI, while PPI for materials in civil engineering has been lower than headline PPI and CPI.

3.3 Historical Data Analysis and Interpretation – Construction Indicators

3.3.1 Construction Price Adjustment Provisions (CPAP)

A comparison between CPI and CPAP Working Groups 180 and 181 is given in Figure 10. It is seen that CPAP 180 and 181 have largely tracked CPI closely. Note that the CPAP 180 and 181 indices are derived from the PPI of selected materials.

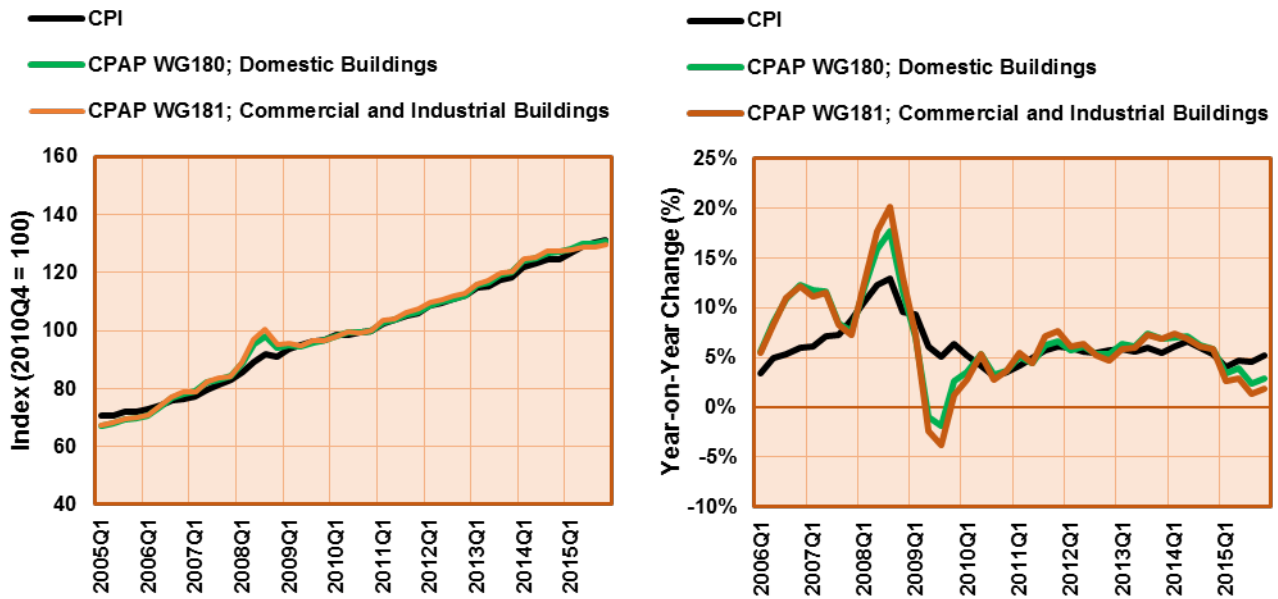


Figure 10: CPAP Working Groups 180 and 181

3.3.2 CPAP Labour, Materials and Plant and Equipment

A comparison is given in Figure 11 between CPI, as well as the CPAP Labour, Material and Plant and Equipment Indices for the period 2005 to 2015. Note that CPAP assumes that the Labour Index is equal to CPI. Again it is note that the Material Index is based on PPI for materials, and the Plant and Equipment Index, on PPI for plant and equipment. It is seen that the Material Index has largely tracked CPI in recent years, while the Plant and Equipment Index has been escalating lower that CPI (or the rate of inflation).

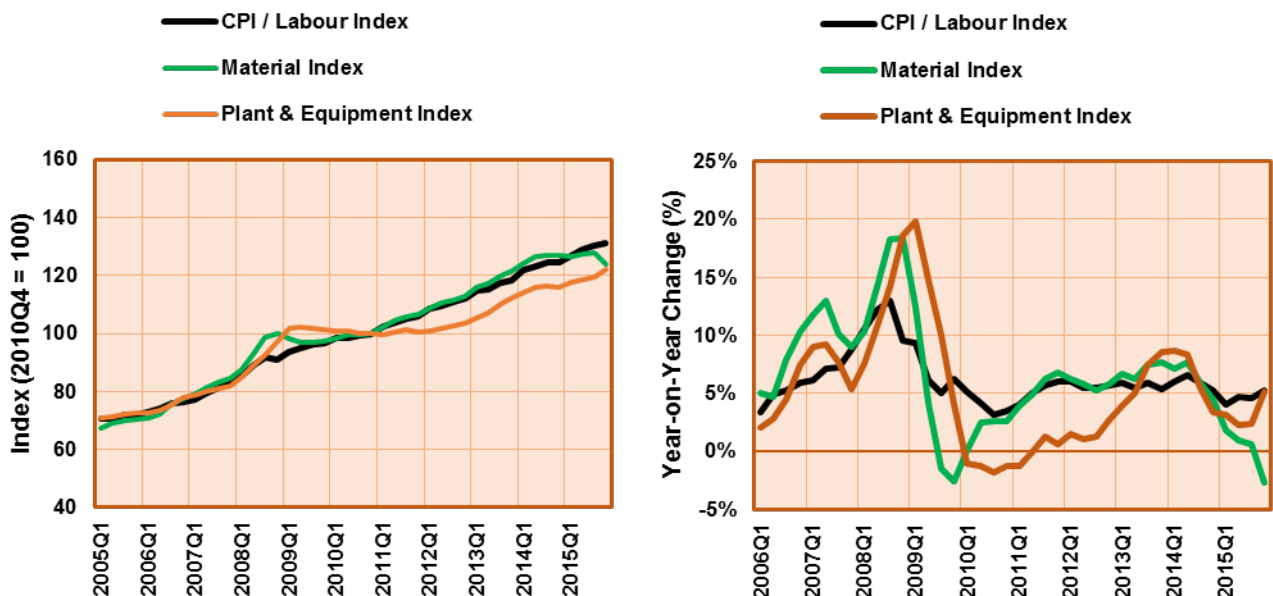


Figure 11: CPI, Labour, Material and Plant and Equipment

3.3.3 BER Building Cost Index and Industry Insight Output Building Cost Index

A comparison between the BER BCI and the Industry Insight Output BCI is given in Figure 12. It should be noted that the BER BCI and the Industry Insight Output BCI both use output information, but use different methods of evaluation (namely tender rates and tender costs respectively). Also included in Figure 12 is the CPAP Working Group 180 index (which is an input price index and excludes the building contractor's profits) and CPI.

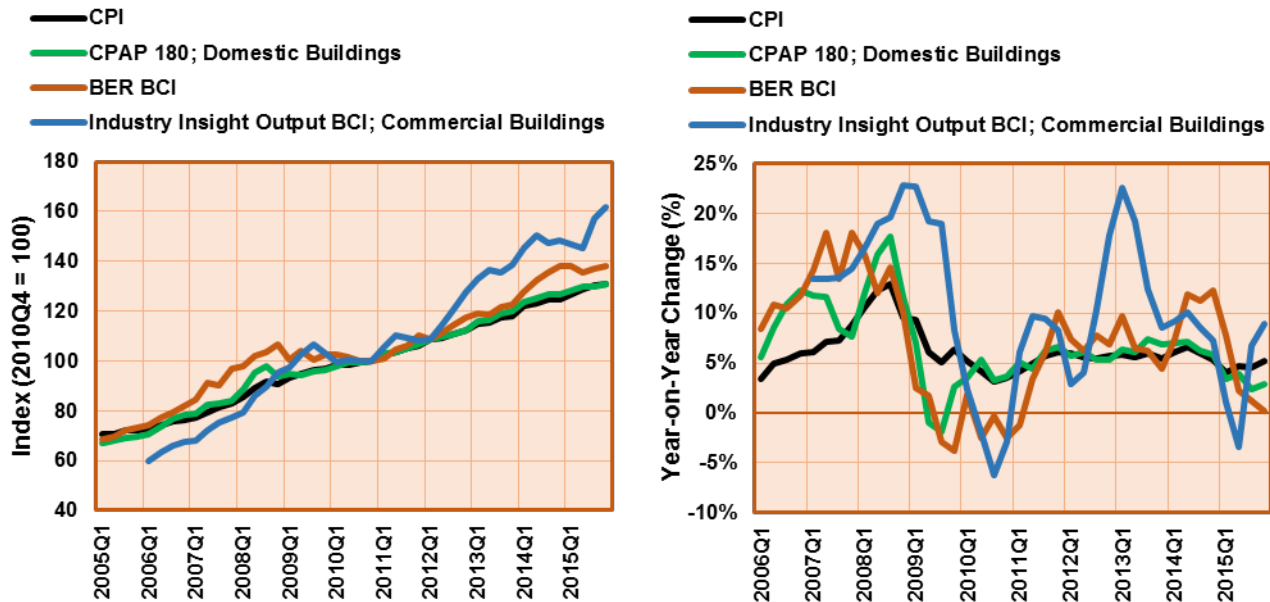


Figure 12: CPAP Working Groups 180 and 181

It is seen from Figure 12 that the Industry Insight Output BCI (which is based on actual tender prices) is escalating at a rate of around 4,5% per year higher than CPI over the period 2010Q4 to 2015Q4. By comparison, the BER BCI is escalating at a rate of around 1% higher than CPI over the same period – but showing significant volatility.

3.3.4 Discussion

Output costs (i.e. the cost of construction) have increased at a higher rate than inflation – with estimates varying between 1% to 4,5% per year on average over the period 2010 to 2015. These increases are largely attributable to increasing allowances for profit by contractors, increases in finance costs, and risk factors, as well as factors influenced by the depreciating Rand. There is no reason to expect that increases in the cost of construction of between 1% and 4,5% will not continue into the immediate future, although equilibrium will of necessity be achieved with other economic sectors over time.

3.4 Historical Data Analysis and Interpretation – Construction Materials

3.4.1 PPI for Materials; Overview

In preparation of the assessment of the drivers of the cost of construction to be evaluated for the case studies considered in Section 4, the average utilisation rate of materials (in terms of tender price) for the case studies for new and renovated buildings is given below. Note that material costs typically account for around 50% of total construction costs, and cost increases in these materials can therefore affect the cost of building and construction.

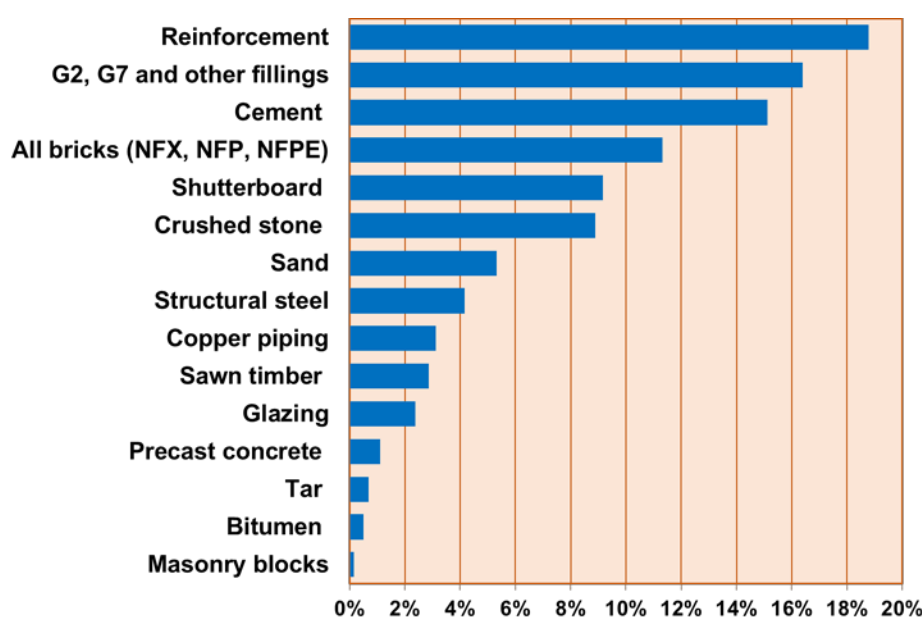


Figure 13: Average Utilisation of Materials; Case Studies

The PPI for selected materials is given in Figure 14a, while the year-on-year changes in PPI for the selected materials is given in Figure 14b. It is seen that reinforcing steel has shown significant volatility – due to the high market demand during the construction of the 2010 stadia and other infrastructure projects as well as international volatility in the period 2011 to 2015. It is seen in Figure 14 that the price of face and stock bricks have increased significantly higher since 2013.

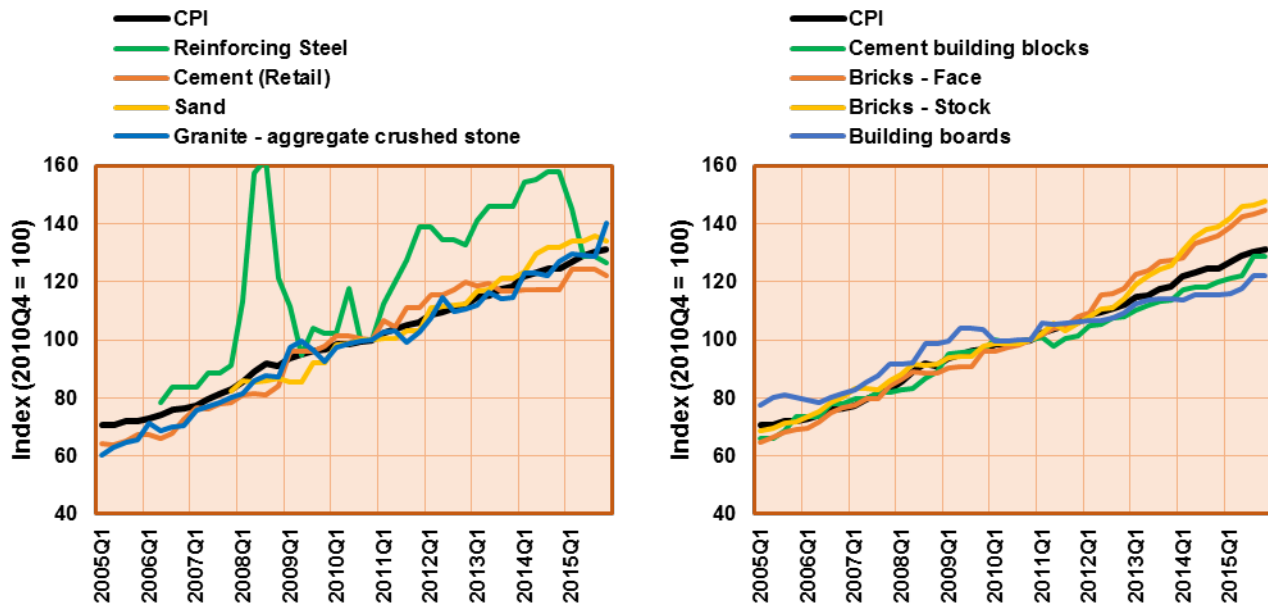


Figure 14a: PPI of Selected Materials

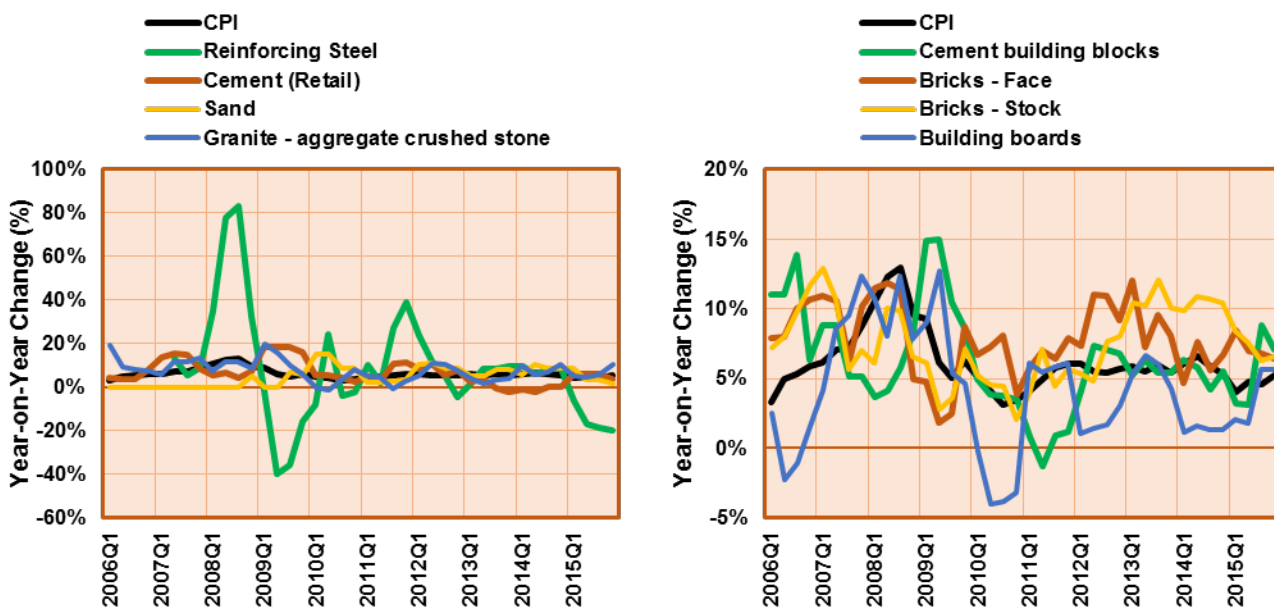


Figure 14b: Year-on-year Change in PPI of Selected Materials

3.4.3 Reinforcing Steel

The volatility in reinforcing steel over the period 2005 to 2015 is shown in Figure 15. As noted above, the volatility in the price of reinforcing steel in the period 2008 and 2009 was largely due to the high market demand during the construction of the 2010 stadia and other infrastructure projects, while the volatility in the period 2011 to 2015 has been due largely to the volatility in international prices of steel as well as international fuel prices (see Section 3.3.1).

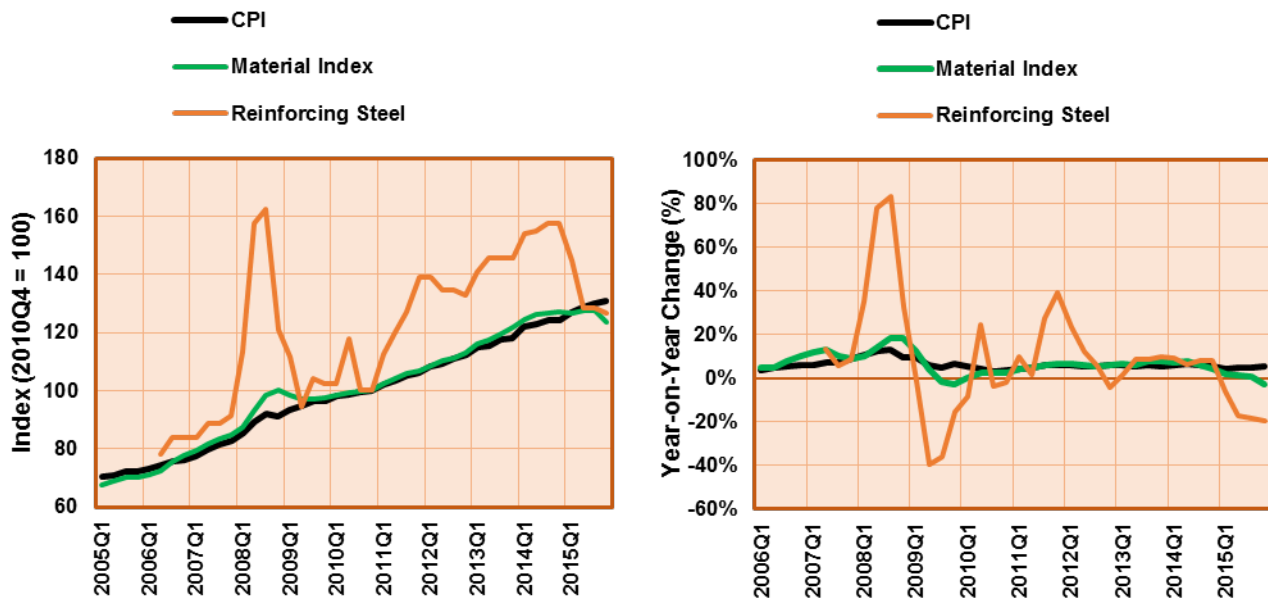


Figure 15: CPI, PPI Material Index and PPI Reinforcing Steel

3.4.3 Cement

The changes in price of cement and the volatility is shown in Figure 16. It is seen that the annual increase in the price of cement peaked in 2007 (16%) and in 2009 (19%). During the period 2010 to 2015, the average annual increase has levelled off to an average of around 4%. Overall, during for the period 2005 to 2015, the average annual increase in cement has been 0,6% above CPI.

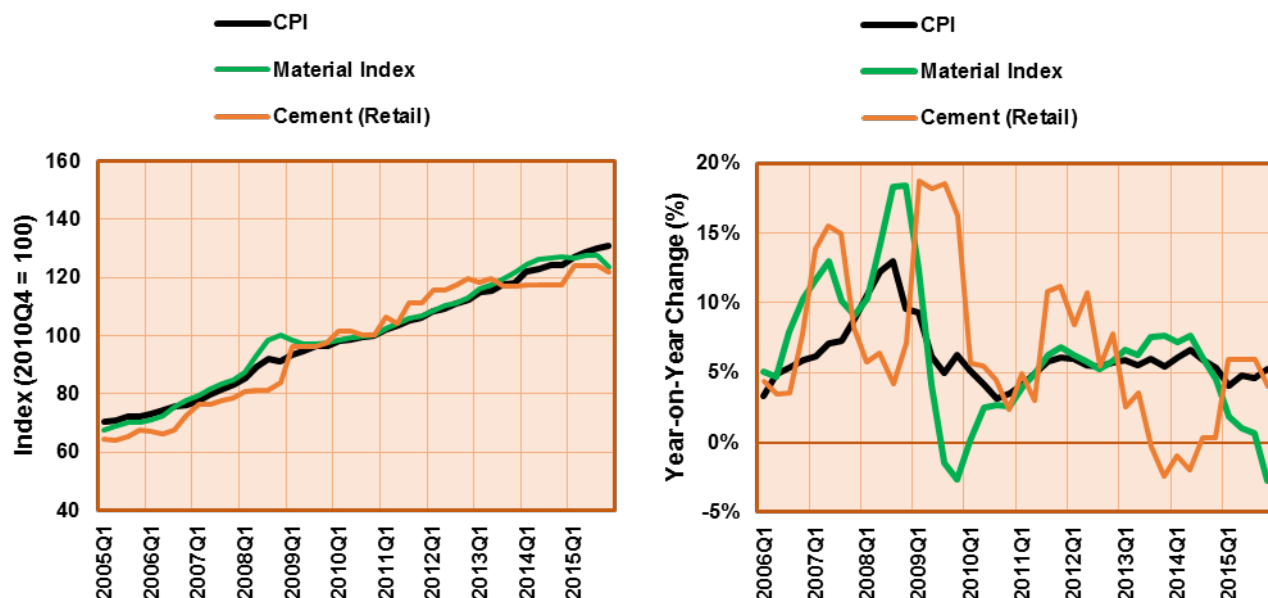


Figure 16: CPI, PPI Material Index and PPI Cement

3.4.4 Sand

The PPI for building sand is only available for 2008 onwards, and is shown in Figure 17. Although price volatility is seen over the period 2009 to 2015 (with annual increases as high as 15%), the annual increase in building sand has averaged at around 6,6% - which is slightly higher than the average increase in CPI.

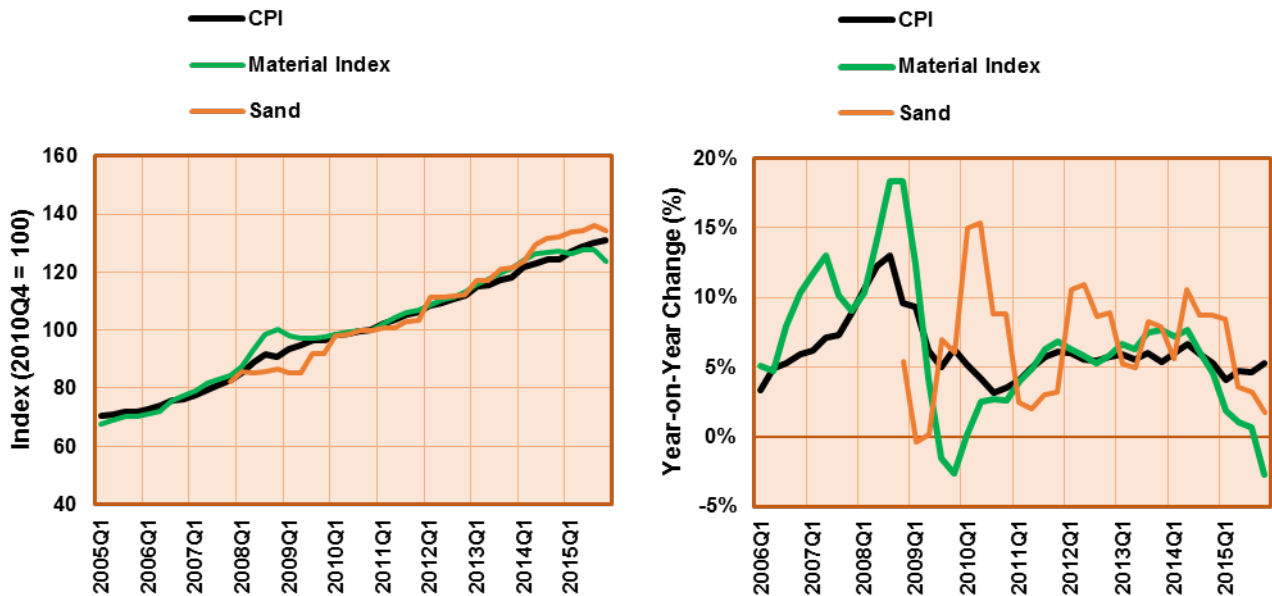


Figure 17: CPI, PPI Material Index and PPI Sand

3.4.4 Crushed Stone

The PPI for granite: aggregate crushed stone is shown in Figure 18 for the period 2005 to 2015. The highest annual increases in the price of crushed stone was experienced during the period 2005 to 2010, at around an annual increase of 10%. From 2011 to 2015, the average increase in the price of crushed stone has been around 6% - which is comparable to CPI.

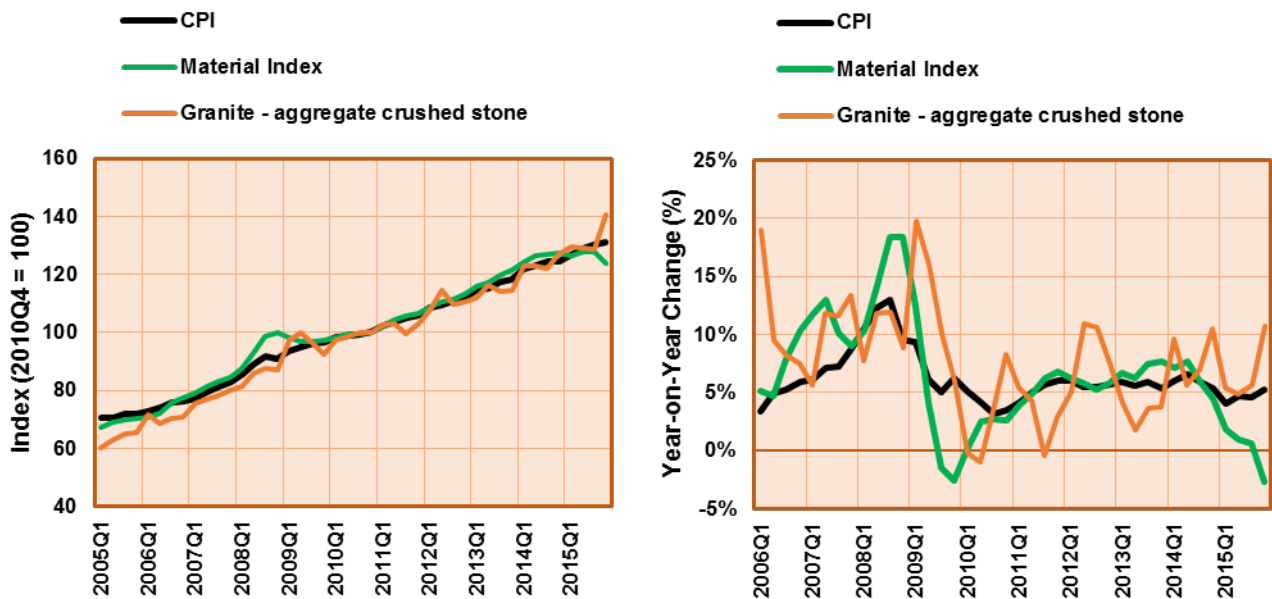


Figure 18: CPI, PPI Material Index and PPI Crushed Stone

3.4.4 Cement Building Blocks

The PPI for cement blocks is shown in Figure 19 for the period 2005 to 2015. A significant decrease in the annual increase in cement building blocks is seen from 2009 to 2011 – with annual increases which peaked at 15% in 2009Q1 falling to annual increases of -1% in 2011Q2. The overall annual increase in the price of cement building blocks for the period 2005 to 2015 has been 6,2%, or about 0,2% points above CPI.

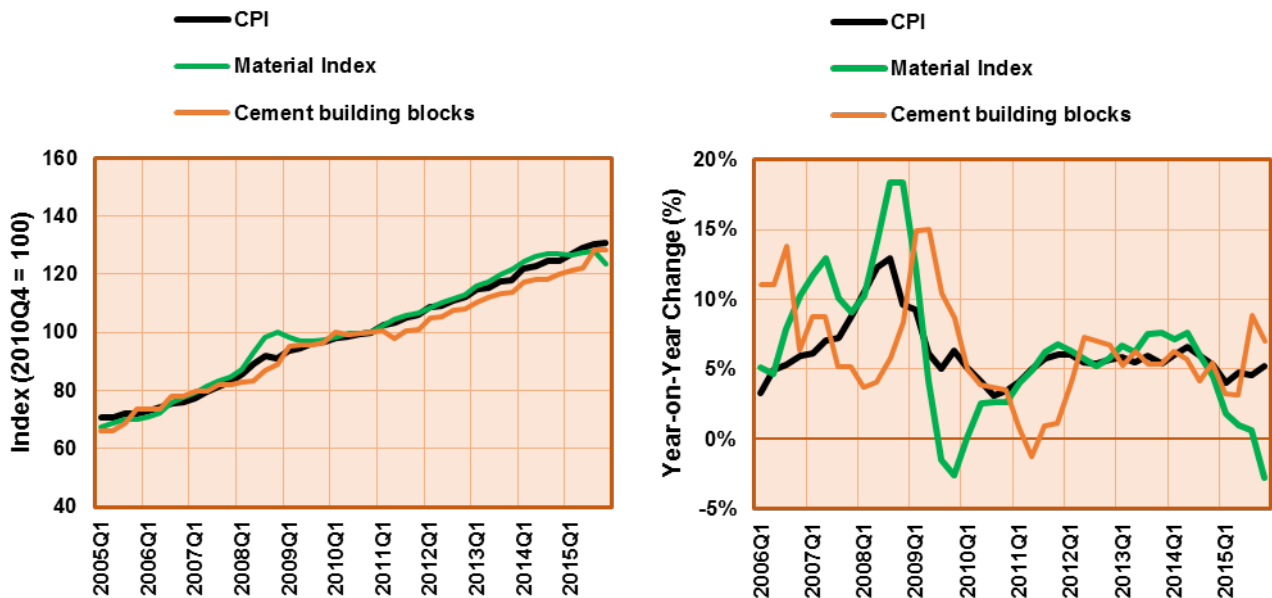


Figure 19: CPI, PPI Material Index and PPI Cement Building Blocks

3.4.5 Face and Stock Bricks

The PPI for face bricks and stock bricks is shown in Figure 20 for the period 2005 to 2015. Over this period, the average annual increase has been 7,8% and 7,6% respectively – which is significantly higher than CPI or the PPI Material Index.

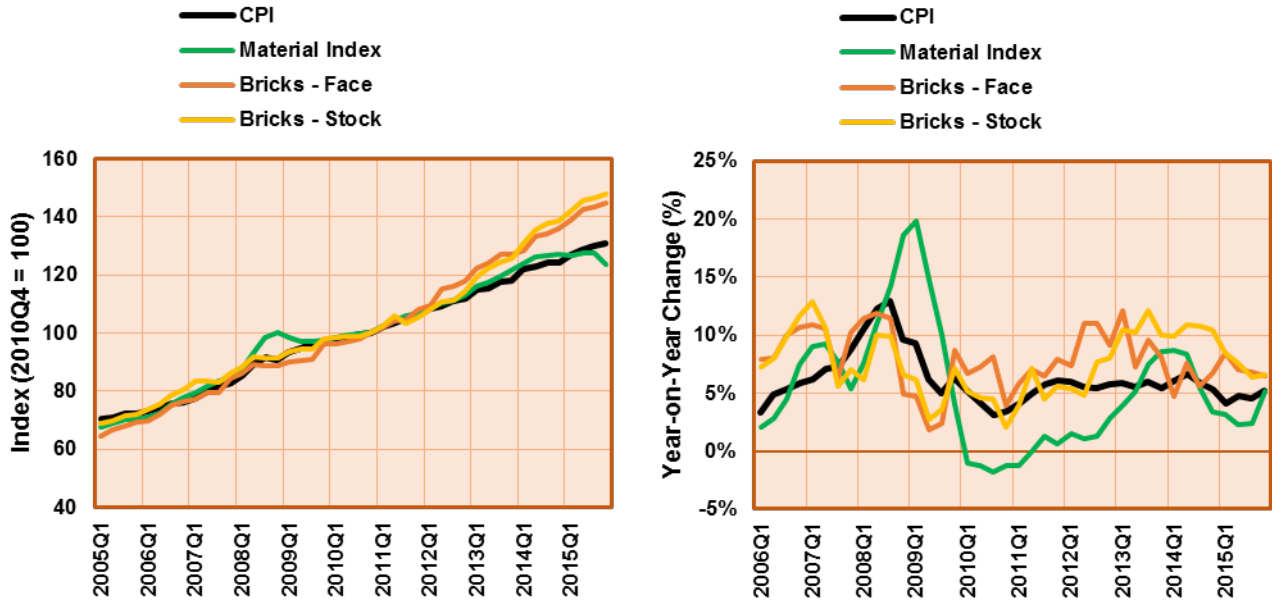


Figure 20: CPI, PPI Material Index and PPI Bricks (Face and Stock)

3.4.6 SA Pine

Figure 21 shows that the price of SA Pine has been highly volatile over the period 2005 to 2015, the highest price increases that were experienced in the price of SA Pine was in 2006 and 2008 (12% and 10% respectively). Since 2009 the price of SA Pine has only experienced minor increases, with price declines of -5% and -1% in 2010 and 2013. The PPI for SA Pine at 2015Q4 stood at 114, compared to CPI of 131.

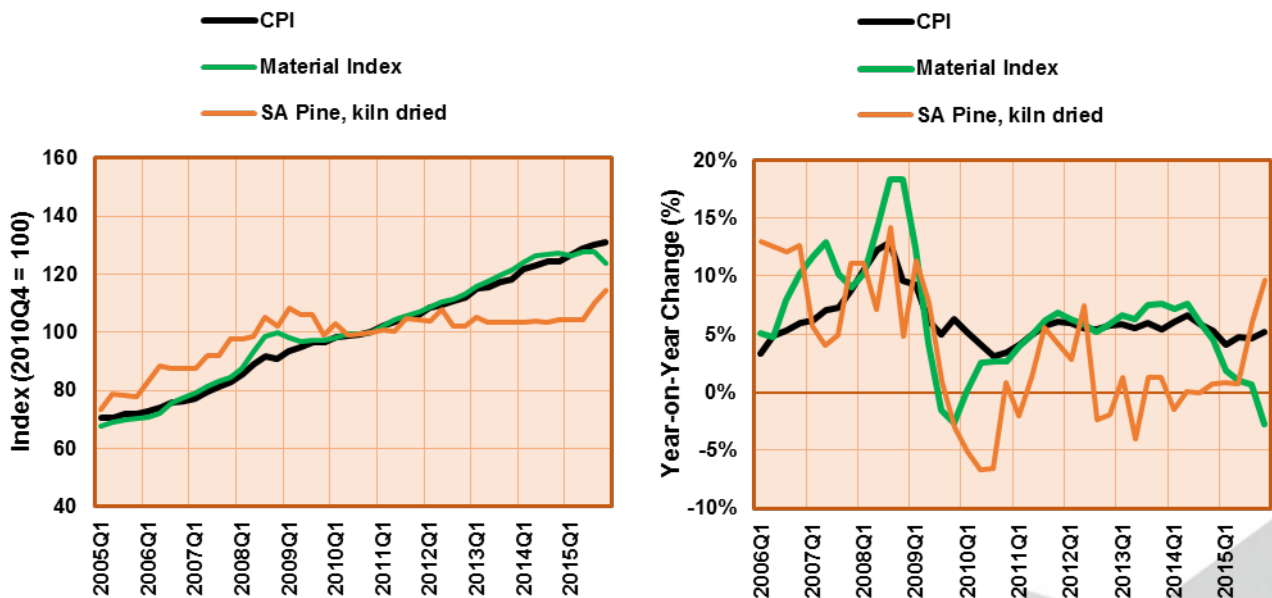


Figure 21: CPI, PPI Material Index and PPI SA Pine

3.4.6 Bitumen

Figure 22 shows that the price of bitumen has been highly volatile over the 10 year period (2005 to 2015). The PPI index increased from 44 in 2005Q1 to 120 in 2008Q3, but fell back to around 99 in 2010Q3. Between 2010Q4 and 2014Q4 the PPI Index for bitumen rose from 100 to 170, but fell back to 93 by 2015Q4.

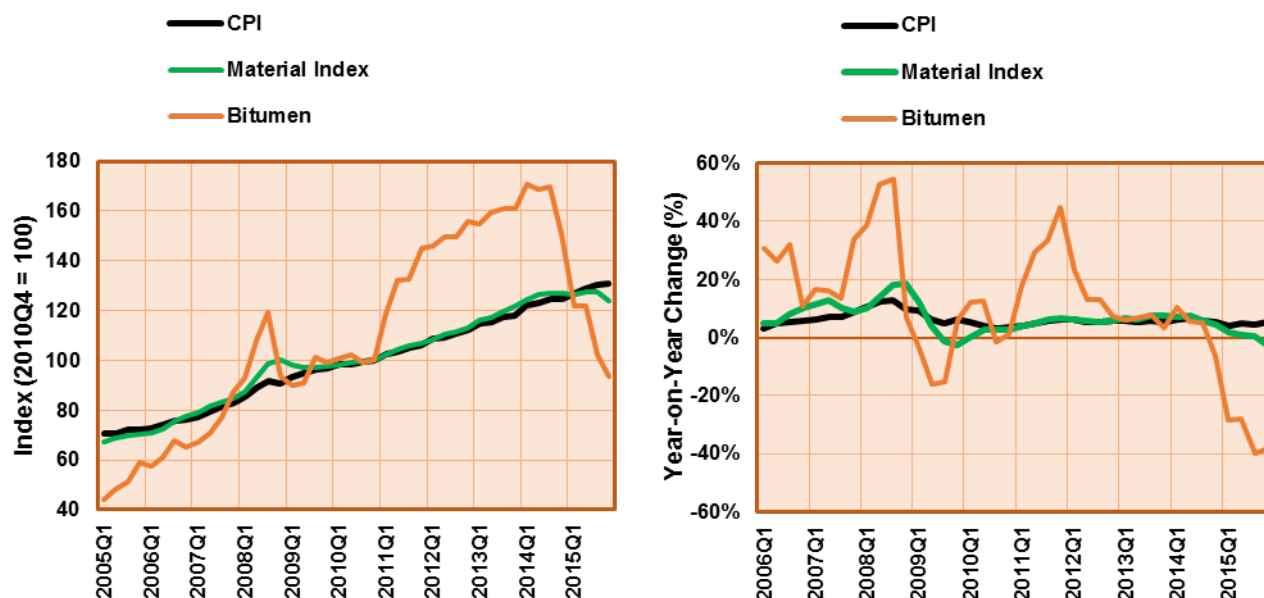


Figure 22: CPI, PPI Material Index and PPI Bitumen

3.4.7 Discussion

The previous sub-sections have illustrated significant price volatility in most building materials. However, as illustrated in Section 3.3, the overall volatility in the price of individual building materials is not translating in significant increases in the total cost of materials used in construction – as is illustrated by the relative stability in CPAP.

3.5 Preferential Procurement

In order to enhance and drive transformation in South Africa using public sector procurement, the Preferential Procurement Policy Framework Act (PPPFA) Regulations provides for a preference points system. Specifically, the 2011 version of the PPPFA⁹ provides for an 80/20 preference points system for goods or services up to R1 million, and a 90/10 preference points system for goods or services over R1 million. (Prior to 2011, the 80/20 preference points system applied to services and goods up to R500 000.) Under the 90/10 preference points, 90 points are evaluated for price and 10 points for B-BBEE status level. In theory, a 90/10 preference points system allows for an 11% (10/90) price premium to be paid for empowerment

⁹ Government of SA (2011). Preferential Procurement Policy Framework Act (5/2000), Preferential Procurement Regulations, 2011, Gazette No. 34350, 8 June 2011, Pretoria

objectives. In practice, the average premium is however much lower, and Letchmiah¹⁰ has shown that the overall premium at national and provincial government level for procurement of construction works contracts above R500 000 for the period 2006/07 to 2010/11 amounted to 1% to 2% of total procurement – although in some years the premium at the national level amounted to around 6,5% - see Tables 4 and 5.

Table 4: Analysis of Premiums Incurred over Five-year Period; National Government; Contracts > R500 000

Financial Year	Total value of all contracts (Rk)	Total premium incurred (Rk)	% Premium incurred	% of contracts incurring premiums	Value of contracts that incurred premiums (Rk)	Actual premium (%) incurred on contracts that incurred premiums
2006/07	1 088 417	10 805	1,0%	12,6%	72 057	17,6%
2007/08	2 271 317	17 972	0,8%	12,9%	204 719	9,6%
2008/09	13 987 421	179 805	1,3%	14,0%	2 533 437	7,6%
2009/10	1 351 488	12 960	1,0%	11,0%	258 328	5,3%
2010/11	3 384 472	211 651	6,7%	5,7%	1 247 455	20,4%
Total	22 083 115	433 193			4 315 996	
5-year Average			2,0%	10,9%		11,2%

Source: Treasury Data (2011); After Letchmiah (2012)

Table 5: Analysis of Premiums Incurred over Five-year Period; Provincial Government; Contracts > R500 000

Financial Year	Total value of all contracts (Rk)	Total premium incurred (Rk)	% Premium incurred	% of contracts incurring premiums	Value of contracts that incurred premiums (Rk)	Actual premium (%) incurred on contracts that incurred premiums
2006/07	4 399 621	60 622	1,4%	10,1%	613 019	11,0%
2007/08	6 131 517	22 211	0,4%	6,2%	330 201	7,2%
2008/09	8 522 992	84 573	1,0%	5,6%	714 174	13,4%
2009/10	2 926 438	43 053	1,5%	6,2%	394 314	12,3%
2010/11	6 320 098	62 326	1,0%	4,8%	700 588	9,8%
Total	28 300 666	272 785			2 752 296	
5-year Average			1,0%	6,9%		11,0%

Source: Treasury Data (2011); After Letchmiah (2012)

Note that 'premium' is defined as the percentage increase paid over and above the lowest priced responsive tender, and that if the tender is awarded to the lowest responsive tender the premium is therefore zero. Letchmiah also investigated the premium on contracts that attracted premiums, and established an average premium of around 11% on projects which incurred a premium – see Tables 4 and 5.

In summary, overall the premium paid by on public sector projects amounted to around 2%, while the price premium on projects that attracted premiums amounted to around 11%.

10 Letchmiah D.R. (2012). *An Examination of the Effectiveness of Preferential Procurement in the South African Construction Industry*. A thesis submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, in fulfilment of the requirements for the degree of Doctor of Philosophy. Johannesburg, 2012

It must however be noted that with effect of 1 April 2017, the 80/20 preference point system will apply to projects of up to R50 million (and not R1 million). This will result in higher premiums being paid on construction projects up to Grades 6 to 7.

3.6 Developmental and Targeted Procurement

A further cost driver that needs to be recognised is an increasing trend that is being observed due to requirements for developmental procurement and for contract participation goals (CPGs) in construction projects, as well as community demands and expectations related to construction works contracts.

Specifically, the cidb report on Labour and Work Conditions in the South African Construction Industry¹¹ identified that the most predominant type of strikes by number is unprotected strikes by non-unionised members, which can have a significant impact on the project profitability. Such unprotected work stoppages and labour issues are largely due to unrealistic community expectations or to other community based political issues, usually involving Community Liaison Officers (CLOs) and Ward Councillors, which often accompany requirements for CPGs.

Furthermore, anecdotal evidence collected during the development of the cidb report has highlighted that developmental and CPG requirements can increase the cost of construction by up to 15%. In response, the cidb aims to mandate the cidb *Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts* that is currently under development on public sector contracts. The objective of the Standard is to promote uniformity and standardisation in CPGs and to provide for conflict resolution mechanisms in respect of contract participation goals relating to a contract for the provision of construction works – thereby aiming to manage cost increases.

Furthermore, the cidb Practice Note 33 *Balancing Delivery and Development on Infrastructure Projects*¹² notes that while development is an imperative, it can be achieved at a marginal or no increase to the cost of delivering projects. The Practice Note recommends that the additional cost premium for developmental objectives on construction works contracts should not exceed 2% (over and above the preference point system).

11 cidb (2015). *Labour and Work Conditions in the South African Construction Industry; Status and Recommendations*. Construction Industry Development Board, www.cidb.org.za

12 cidb (2015). cidb Practice Note 33 *Balancing Delivery and Development on Infrastructure Projects*. Construction Industry Development Board, www.cidb.org.za

4. CASE STUDY INVESTIGATIONS

4.1 Overview

In order to understand the drivers of the cost of construction, research was undertaken into the project cost estimates of twelve representative public sector projects in Grades 5 to 9 General Building (GB) and Civil Engineering (CE) construction works and large refurbishment projects. Relevant priced Bills of Quantities were obtained from the relevant contractors that undertook the construction, from which materials, plant, and labour usage and rates are extracted. Details of the case studies are given in Table 6.

Table 6: Overview of Case Studies

No.	Building	Project Description	Tender Price (R million)	GFA (m ²) / No. of Floors	Tender submit date
Renovations					
R1	Admin Building	4 th Floor, 9 Dorp Street (DO)	7 380	1 900m ² /1	27/11/2012
R2	School Building	Additions to Parel Valei High School (G5)	45 134	5 336 m ² /2	2016
R3	Hospital	Vredenburg Hospital – Phase 2B Replacement Building (BTKM)	130 304	2 400 m ²	2015
R4	Road	Glentana - Rehabilitation of MR 348 (Km 3.02 to Km 11.0) (EA)	98 825 (+Upgrade)	7,98 Km	2013
R5	Court	Justicia Building - Refurbishment to accommodate Family and Regional Court (DPW/cidb)	Unknown	13 060m ² /4	2015
R6	Community Clinic	Medi-Clinic Paarl (G5)	45 506	1 950 m ²	2016
New Works					
N1	School Building	Garden Village Primary School (G5)	10 373	2 771m ² /1	2015
N2	Hospital	Melomed Hospital (G5)	171 786	3 691 m ²	2015
N3	Road (EA)	Glentana - Upgrade of DR1611 (Km 0.04 to 0.60) & DR 1599 (Km 9.45 to 11.06)	98 825 (+Upgrade)	2,17 km Long & 9,8m wide two way road	2013
N4	Administration Building	Khayelitsha: (Construction of Shared Service Centre)	56 386	1 194 m ²	2015
N5	Municipal waste water treatment plant	Civil, Building, Mechanical & Electrical Work for Bellville Waste Mgt Facility (BTKM)	180 923	11 300 m ²	2015
N6	Community Clinic	District Six Community Clinic (G5)	45 506	1 549 m ²	2015

A model for each case study was then developed for identifying direct and indirect cost components usage of the construction project case studies, including preliminaries, overhead costs, profits, material costs, formwork, plant and equipment.

4.2 Utilisation of Building Materials

To establish the impact of building materials as a driver of the cost of construction, the study first sought to establish the key building materials by value used on the renovation and new works projects, for which the key building materials are shown in Tables 7 and 8.

Table 7: Distribution of Value of Building Materials used In Renovation Projects by Type

Materials	R 1	R 2	R 3	R 4	R 5	R 6	Average Utilisation
Reinforcement	18,8%	0,0%	11,3%	16,9%	73,3%	6,3%	21,1%
G2, G7 and other fillings	3,4%	0,0%	10,0%	5,1%	2,4%	91,9%	18,8%
Cement	18,1%	17,0%	20,6%	22,2%	9,2%	0,0%	14,5%
All bricks (NFX, NFP, NFPE)	5,6%	41,2%	13,7%	12,0%	6,2%	0,0%	13,1%
Shutterboard	22,4%	0,0%	9,9%	15,6%	0,0%	0,0%	8,0%
Crushed stone	12,8%	0,0%	11,4%	10,7%	4,0%	0,0%	6,5%
Sawn timber	0,2%	25,9%	6,2%	0,2%	0,5%	0,0%	5,5%

Table 7 shows that on average and across the six renovation projects examined, reinforcement, filling, cement and bricks are used more by value, while masonry blocks and sand are used less. There are however notable variations in the utilisation by project type, with shutterboard and crushed stone being high on some projects.

Table 8: Distribution of Value of Building Materials used In New Works by Type

Materials	N1	N2	N3	N4	N5	N6	Average Utilisation
Reinforcement	26,0%	26,7%	17,9%	14,5%	12,6%	1,2%	16,5%
Cement	19,4%	18,2%	23,6%	2,5%	19,4%	11,3%	15,7%
G2, G7 and other fillings	0,0%	2,5%	2,9%	13,6%	12,1%	53,0%	14,0%
Crushed stone	12,6%	12,6%	11,5%	12,6%	9,1%	9,5%	11,3%
Shutterboard	16,0%	23,5%	12,0%	1,4%	7,9%	1,4%	10,4%
All bricks (NFX, NFP, NFPE)	10,3%	7,7%	17,5%	0,1%	21,7%	0,0%	9,5%
Sand	4,6%	4,1%	6,0%	19,0%	4,3%	3,6%	6,9%
Structural steel	0,0%	0,7%	3,7%	31,2%	3,3%	0,0%	6,5%

Table 8 shows that on average and across the six new projects examined, reinforcement, cement, filling, crushed stone and shutterboards are used more by value, while masonry blocks and sand are used less. There are however notable variations in the utilisation by project type, with sand and structural steel being high on some projects.

4.3 Utilisation of Specialist Subcontractors

The study also sought to know the key specialists subcontractors by value that are engaged on the Renovation and New Building projects, for which the key specialist subcontractors are shown in Tables 9 and 10.

Table 9: Distribution of Value of Specialist Work used in Renovation Projects by Type

Specialist Subcontractor	R 1	R 2	R 3	R 4	R 5	R 6	Average Utilisation
Electrical Installation	36,1%	42,7%	50,3%	0,0%	0,0%	32,5%	40,4%
Ceilings And Partitions	10,8%	23,6%	15,2%	0,0%	11,9%	7,5%	17,2%
Mechanical	53,2%	0,0%	0,0%	0,0%	0,0%	2,1%	13,8%
HVAC	0,0%	0,0%	14,0%	0,0%	0,0%	33,1%	11,8%
Drainage	0,0%	22,9%	1,7%	0,0%	15,9%	4,3%	11,2%
Fire Protection	0,0%	0,0%	2,8%	0,0%	24,5%	0,9%	7,1%
Landscaping	0,0%	10,8%	1,6%	0,0%	10,8%	0,7%	6,0%
Gas And Gas Conduiting	0,0%	0,0%	3,6%	0,0%	0,0%	11,9%	3,9%
Roller Shutter Blinds	0,0%	0,0%	0,0%	0,0%	14,0%	0,0%	3,5%
Core Drilling	0,0%	0,0%	0,1%	0,0%	12,2%	0,0%	3,1%
Signage	0,0%	0,0%	0,0%	0,0%	10,8%	0,0%	2,7%

Table 9 shows that on average and across the six renovation projects examined, electrical installation, ceilings/partitions and mechanical/HVAC systems and drainage are installed more by value of total installation. There are however notable variations in the utilisation by project type, with fire protection and landscaping being high on one project.

Table 10: Distribution of Value of Specialist Work Used in New Works by Type

Specialist Subcontractor	N1	N2	N3	N4	N5	N6	Average Utilisation
Electrical installation	73,1%	23,0%	0,0%	30,9%	17,9%	41,0%	38,7%
Drainage	0,0%	3,4%	99,5%	10,0%	6,4%	12,1%	30,3%
HVAC	0,0%	22,0%	0,0%	25,1%	57,9%	0,0%	20,0%
Ceilings and partitions	25,3%	4,8%	0,0%	3,2%	1,0%	7,0%	9,5%
Mechanical	0,0%	0,0%	0,0%	0,0%	0,0%	25,5%	6,4%
Cathode lab	0,0%	15,0%	0,0%	0,0%	0,0%	0,0%	3,8%
Gas and gas conduiting	0,0%	11,6%	0,0%	0,0%	0,0%	0,0%	2,9%

Table 10 shows that on the average and across the six new projects examined, electrical installation, drainage and HVAC systems are installed more by value of total installation. There are however notable variations in the utilisation by project type, with ceilings and partitions and mechanical being high on some projects.

4.4 Overall Utilisation of Resources

The overall utilisation by value of labour, material, plant, preliminary items and specialist subcontractors for the case studies investigated is given in Tables 11 and 12.

Table 11: Utilisation of Resources in Renovation Projects by Type

Case Study	Labour	Material	Plant	Preliminary Items	Specialist Subcontractors
R1	5,2%	9,2%	0,4%	15,6%	69,6%
R2	19,7%	52,2%	10,5%	7,5%	10,1%
R3	28,8%	13,0%	2,8%	14,0%	41,5%
R4	7,1%	54,3%	16,9%	21,8%	0,0%
R5	34,3%	42,9%	5,2%	3,9%	13,8%
R6	13,9%	31,0%	3,0%	7,4%	44,7%
Average	18,2%	33,8%	6,5%	11,7%	29,9%

Table 12: Utilisation of Resources in New Works by Type

Case Study	Labour	Material	Plant	Preliminary Items	Specialist Subcontractors
N1	23,8%	49,8%	3,8%	6,2%	16,4%
N2	8,9%	25,0%	1,1%	10,2%	54,9%
N3	5,7%	56,8%	14,2%	15,2%	8,1%
N4	11,2%	25,2%	2,4%	11,2%	50,1%
N5	7,8%	30,6%	3,8%	4,2%	53,7%
Average	11,5%	37,5%	5,1%	9,4%	36,6%

As illustrated in Figure 23, overall, on average, it is seen that materials accounts for around 36% of the cost of construction, specialist subcontractors around 33%, followed by labour at 15% and preliminary items at 11%. Plant, on average accounts for around 6% of the cost of construction of the case studies investigated.

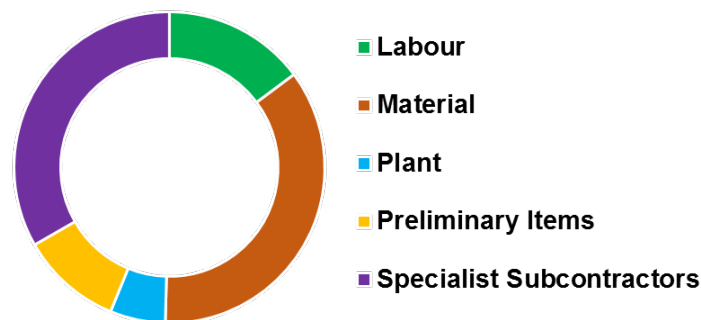


Figure 23: Utilisation of Resources by Type; Renovation Projects and New Works

4.5 Drivers of the Cost of Construction

A regression analysis was undertaken to assess the impact of changes in the price of labour, material, plant, preliminary items and specialist subcontractors. The regression analysis shows that, overall, the cost of

construction is positively correlated with material and plant. In other words, a higher utilisation of plant and material results in increases in the cost of construction.

However, in all but one of the case studies (R5; refurbishment of court building), the cost of labour was negatively correlated to the overall cost of construction. From this it can be inferred that projects with a higher utilisation of labour will yield lower increases in cost of construction due to increase in labour costs.

The regression analysis also identified that the cost of specialist subcontractors could be negatively or positively correlated with the cost of construction – as illustrated in Table 13. Case R1, R3, R6, N2, N4, N5 and N6 have negative correlation to the construction cost of projects, while Case R2, R5, N1 and N3 have positive correlation to the construction cost of projects. A further assessment of the participation of specialist subcontractors shows that the shows:

- i) negative correlation for utilisation values of above around 30%; and
- ii) positive correlation for utilisation values of below around 30%.

This suggest that the utilisation of specialist subcontractors of greater than 30% will result in lower construction costs, while the utilisation of specialist subcontractors of less than 30% will result higher construction costs.

Table 13: Percentage Value of Work Undertaken by Specialist Subcontractors and its influence on project cost

Case	Specialist subcontractors influence on cost	Utilisation
R1	Negative	70%
R3	Negative	41%
R6	Negative	45%
N2	Negative	55%
N4	Negative	47%
N5	Negative	54%
N6	Negative	42%
R4	N/A	0%
R2	Positive	10%
R5	Positive	27%
N1	Positive	15%
N3	Positive	8%

5. IMPACT OF INCREASES IN THE COST OF CONSTRUCTION ON CONTRACTORS

Although the focus of this study is on the drivers of the cost of construction, the study also sought to understand the impact of increases in the cost of construction on contractors, and a small-scale survey was undertaken amongst Grades 5 to 9 General Building (GB) and Civil Engineering (CE) contractors. 62% of the contractors surveyed were in cidb Grades 5 and 6 and 34% were in cidb Grades 7 to 9. 64% of the respondents were CEOs or company Directors, and 18% were general managers and assistant managers. 73% of the respondents had more than 11 years of experience.

The respondents were asked to rate on a scale of 1 to 10 (where 1 = very low and 10 = very high) the extent to which construction cost increases impact on Grade 5 to Grade 9 General Building and Civil Engineering works. The results of the survey are illustrated in Figure 24.

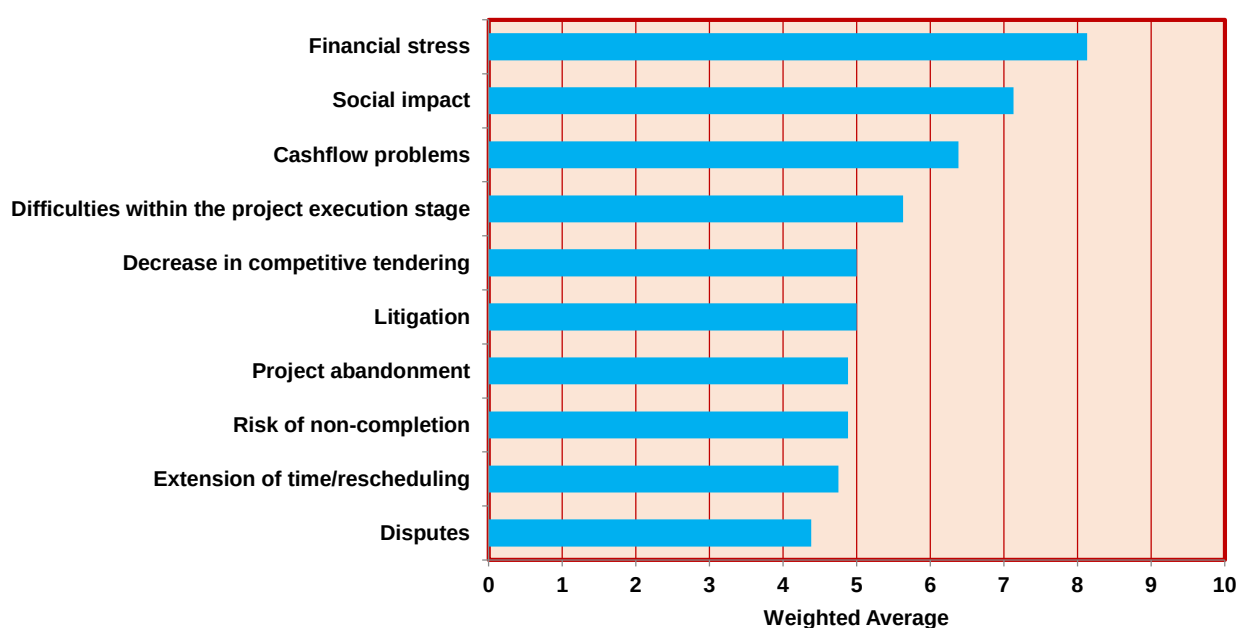


Figure 24: Impact of cost increases on the construction industry in Grades 5 to 9 GB and CE construction works

Figure 24 shows that the respondents perceive that from a ranked perspective, cost escalations lead to:

- i) financial stress of construction companies; followed by
- ii) social impact;
- iii) cash flow difficulties; and
- iv) difficulties during the project execution stage.

Of importance to note is the view expressed by one of the respondents with regard to increases in the cost of construction and the financial stress of construction companies:

“Construction cost increase doesn’t affect risk of non-completion or cash flow or decrease in competitive tendering because when you tender, your rate includes your mark up on top of whatever high price the cost of material maybe. The problem is the system in place of tendering. These system has not been revised and it is so poor, our specifications are good but when a client takes too long to pay e.g. 90 days after submitting

an invoice and you are expected to carry on working that (on) its own is (at) the heart of failure that cause disputes, litigation, risk of non-completion/decrease in competitive tendering in the public sector and result in extension of time, as a contractor you have difficulties with the project."

Social impact in this context is the effect of infrastructure projects and other development interventions on the social fabric of the community and the wellbeing of the individuals and families. The respondents perceive that construction cost increases will impact on the ability of government to provide communities with much needed infrastructure and other development interventions and this will affect the wellbeing of individuals and families in impoverished communities in South Africa.

The respondents viewed that disputes are less likely to be impacted on as a result of cost increases.

6. DISCUSSION AND RECOMMENDATIONS

Construction procurement of construction works by the public sector, including State owned Entities, national, provincial and local government, amounts to around R220 billion per year, which provides the backbone for the economic infrastructure that is necessary for economic growth and for the delivery of public services. Construction procurement also provides for around 1.4 million jobs in the construction sector.

This study has sought to understand the main drivers of the cost of construction, with a particular focus on public sector procurement, and to develop recommendations in this regard.

The study has noted that while the input prices of selected construction materials, fuel prices and plant and equipment as well as the Rand exchange rate has been volatile over the past 10 years or so, overall the input prices of construction have largely been in line with increases in inflation. Output costs (i.e. the cost of construction) has however increased at a higher rate than inflation – with estimates varying between 1% to 4,5% per year on average over the period 2010 to 2015. These increases are largely attributable to increasing allowances for profit by contractors, increases in finance costs, and risk factors, as well as factors influenced by the depreciating Rand.

There is no reason to expect that increases in the cost of construction of between 1% and 4,5% will not continue into the immediate future, although equilibrium will of necessity be achieved with other economic sectors over time. Cost increases in excess of the inflation and the economic growth rate in South Africa will however place increasing pressure on government's ability to provide economic and social infrastructure.

The study has also shown that a construction projects that are more plant and material intensive are more sensitive to cost increases, while projects which are more labour intensive are less sensitive to cost increases. The case studies also suggest that construction projects with an utilisation of specialist subcontractors of greater than around 30% are less sensitive to cost increases, while the utilisation of specialist subcontractors of less than around 30% will result higher construction costs.

The study has highlighted that, overall, introduction of the PPPFA to drive transformation has resulted on an overall premium in the cost of construction of around 2% - although actual premiums of around 11% have been observed on individual projects. It is noted that the recent change of the PPPFA to adopt the 80/20 preference point system on projects of up to R50 million will result in further cost increases.

The study also notes that anecdotal evidence suggests that the application of developmental and targeted procurement have in exceptional cases increased the cost of construction by up to 15%. However developmental procurement objectives can be achieved at a marginal or no increase to the cost of delivering projects, and the cidb recommends that the additional cost premium for developmental objectives on construction works contracts should not exceed 2% (over and above the preference point system).

Lastly, the study notes and acknowledges the role played by a wide range of stakeholders that input into monitoring the cost of construction, including Stats SA, the Contract Price Adjustment Provisions (CPAP) Committee, the Bureau for Economic Research (BER) and Medium-Term Forecasting Associates (MFA), Industry Insight, and several academic institutions. However, notwithstanding this, this study has highlighted

possible deficiencies in monitoring construction costs and possible discrepancies between some monitoring systems. A need therefore exists to address such deficiencies where they exist. Furthermore, a public sector output building cost index needs to be established (as part of a broader public and private sector cost index) that will allow the public sector to monitor cost increases that are specific to public sector procurement – such as developmental requirements and changes in the PPPFA.

The role of the public sector in addressing increases in the cost of construction is therefore:

- i) to continue to monitor possible increases in the cost of construction;
- ii) to put systems in place to make such increases visible within public sector authorities so that possible cost increases can be incorporated into the planning of public sector construction projects; and
- iii) on a regular basis, to review regulation, design specifications (including levels of service) and procurement practice to minimise any unintended consequences and to minimise increases in the cost of construction.

In alignment with the above, the following recommendations are presented:

Recommendation 1: It is recommended that the cidb plays an increasing role in monitoring the cost of public sector construction, and investigates the establishment of a public sector construction costs index, in partnership with existing role-players. The construction costs index could link to the cidb Register of Projects and to the cidb Project Assessment Scheme.

Recommendation 2: It is recommended that the cidb investigates the feasibility of regularly reporting on public sector construction cost trends (possibly a bi-annual or annual assessment) drawing on the proposed public sector construction costs index and other available information.

Recommendation 3: It is recommended that the cidb expedites the recommendations of the study on Reducing Red Tape in Construction which, amongst others, could impact on cost increases in construction.

Recommendation 4: It is recommended that the cidb monitors the impact of the increase in the tender value limit from R10 million to R50 million for application of the 80/20 preference point system on construction procurement.

Recommendation 5: It is recommended that the cidb expedites the adoption of the cidb Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Works Contracts across public sector entities, which aims to reduce cost increases in respect of contract participation goals.

Recommendation 6: It is recommended that the public sector must continually review its design norms and standards to ensure that they are applicable, relevant and do not result in unjustifiable cost increases.

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