Contract Price Adjustment in Ethiopian Construction Industry: Challenges, Misconceptions and Antidotes.

Abstract

From MoWUD1994 to PPA 2011 conditions of contract, price adjustmentissue has been dealt differently. Price adjustment methods have their own inherent limitations. Besides, contractprovisions addtheir own problems. The problem becomes even worse when price adjustment is put in practice. These have left their footprints in the sands of many construction projects and have been a bone of contention on which the main stakeholders cut their teeth. This paper not only tries to pinpoint the odds but also tries to expound the theoretical and practical grounds in exegetical manner and attempt to propose plausible and practical solutions.

Keywords: FIDIC, MDB, PPA, price adjustment, index, weighing coefficient, contract price



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Introduction

The underpinning idea behind contract price adjustment is to compensate the contractor or the employer in case of rise and fall of labor and/or materials or any change in legislations (1). This enables the contractor or the owner to be protected against price fluctuation that may occur between the contract signing and execution of thecontract (2). Costs in a construction industry may vary for one or more of the following reasons (3).

- Widening or narrowing of the profit margins(market effect)
- Decrease or increase in cost of direct inputs (material, labor, energy, etc.)
- Changes in productivity
- Change in monitory value(inflation or deflation)

Whenever there is a price fluctuation due to the aforementioned or other factors such as legislation change, the contract prices need to be adjusted if the contract has the provision. Though the concept mightseem simple, price adjustment is not a simple amenable issue. FIDIC,through its guide, suggests the following different ways of making price adjustment (4).

1. No Price Adjustment

   Due to project nature and/or duration, it is not uncommon to omit price adjustment issue altogether.

2. Adjustment Based on Rates

   In this method, adjustment of prices is based on the difference of current rate and base rate and it has two different forms.

   2.1. Specified Materials

$$PA = (C - B) * Q$$

   where

   C is current rate means prices for the specified materials prevailing at any date subsequent to the date 28 days prior to the latest date for submission of tenders

   B is basic rate means prices for the specified materials prevailing on the date 28 days prior to the latest date for submission of tenders

   Q is the amountused during particular interim payment application period

   PA is an adjusted price during a particular interim payment application period

   2.2. Labor

$$PA = (C - B) * T$$

   where

   T is total actual worked time for a given trade in a particular adjustment period and took account of overtimes.

   C&**B** are applicable minimum current and basic wage rate respectively.

In more detailed form, taking into account of Ethiopian labor law (5) it may be rewritten as:

$$PA = (C - B) * \sum_{i=1}^{N} (H_i + 1.25A_i + 1.5B_i + 2C_i + 2.5D_i)$$

where

H is normal work hours in a month

A is work hours between 10 pm to 6 am in a month

B is work hours between 6 am to 10 pm in a month

C is work hours during holiday in a month

D is work hours during weekly rest in a month

N is total number of workers in a particular month for same trade

A+B≤20 in a month for a worker

3. Adjustment based on Indices

The adjustment is effected by use of computed weighting factors and price indexes of items, which are usually given by statistical agent orby any other authorized body. This may be given by:

$$P_n = A + b\frac{B_c}{B_b} + c\frac{C_c}{C_b} + d\frac{D_c}{D_b} + etc$$

$$PA = P_n * BO\ Q_{ev}$$

where

- $\mathbf{P_n}$ is n[th] payment application adjustment factor
- **A** is non-adjustable weighing coefficient
- **b**, **c**, **d** are adjustable weighing coefficients
- $\mathbf{B_C}$, $\mathbf{C_C}$, $\mathbf{D_c}$ are current cost indices subsequent to the date 28 days prior to the latest submission of bid
- $\mathbf{B_b}$, $\mathbf{C_b}$, $\mathbf{D_b}$ are base cost indices prevailing on the date 28 days prior to the latest date set for the submission of tenders
- $\mathbf{BOQ_{ev}}$ is effective value of BOQ amounts in an interim payment due to the contractor less any amount for day works, variations, provisional sums, or any other items based on *actual costs and material and plant on site*

More succinctly, it may be rewritten as:

$$P_n = A_0 + \sum_{i=1}^{m}\left(B_i\frac{I_{ni}}{I_{oi}}\right)$$

$$A_o = 1 - \sum_{i=1}^{m} B_i$$

where

- **m** is total number of adjustable items
- $\mathbf{B_i}$ is i[th] adjustable weighting coefficient
- $\mathbf{A_o}$ is non-adjustable weighting coefficient
- $\mathbf{I_{ni}}$ is i[th] item current (or new) index
- $\mathbf{I_{oi}}$ is i[th] item base (or benchmark) index

The variation of this adjustment formula may also be used as:

$$Amt\ = \left(\frac{C - B}{B}\right) * (W_i\ * BO\ Q_{ev})$$

where

- **C** is current index
- **B** is base index
- $\mathbf{W_i}$ is weight an itemi

Amt is adjusted amount for an item i in the interim payment

It is imperative to note that, as long as there are applicable indexes for some or all of adjustable items, price adjustment using formula is quite a legitimate way of making price adjustment.Nonetheless, it is also possible combineboth price and index methods based on the availability of price indices and applicable rates. But what is price index or construction price index?

Basics of Construction Price Index

Construction price indexes are indicators, which show the trend of costs incurred by contractor in construction (6). They only track changes/trends and do not provide information on the current construction price (3).

Basically, there are three kinds of construction price indexes, namely: *input price index*(measures the change in prices of construction inputs); *Output price index* (measures the change in prices of what is produced by construction activities); and 3) *Seller price index* (measures the change in price of construction output as paid by purchaser or final owner). The relationship between the three may be depicted as in the following table (3).

Published price indexes contain important information viz. specified location, base period, application period, the class of index and source of indices.

Table 1: Relationship between the three types of indices

Input Price Index	**Output Price Index**	**Seller's Price Index**
Elements Paid by Contractor	**Elements Paid by Client**	**Elements Paid by Final Owner**
Labor	Labor	Labor
Materials	Materials	Materials
Plant & Equipment	Plant & Equipment	Plant & Equipment
Transport	Transport	Transport
Energy	Energy	Energy
Other Costs	Other Costs	Other Costs
	Contractor's Profit Margins	Contractor's Profit Margins
	Productivity	Productivity
	Overheads	Overheads
		VAT
		Land
		Architect's Fees
		Other Costs
		Client's Profit Margins

There are several tools for computation of construction price indexes. However, the most common one are:Laspeyres, Paasche, and Fisher. All the three price index formulas use quantities of individual cost items as weights to their respective prices in calculating the aggregate price index. Each of them has their own merits and demerits (7).

In basic form, also known as modified Laspeyres formula, construction price index may also be computedas follows (8):

$$I_t = \frac{\sum W_i \left(\frac{P_{it}}{P_{io}}\right)}{\sum W_i} x100$$

where

- $\mathbf{I_t}$ is index for current period t
- $\mathbf{P_{io}}$ is price of item i at base period 0
- $\mathbf{P_{it}}$ is price of item i at current period
- $\mathbf{W_i}$ is weight of item i

Let's consider a hypothetical item, whose cost was 180 birr/unit at base time (index=100%).

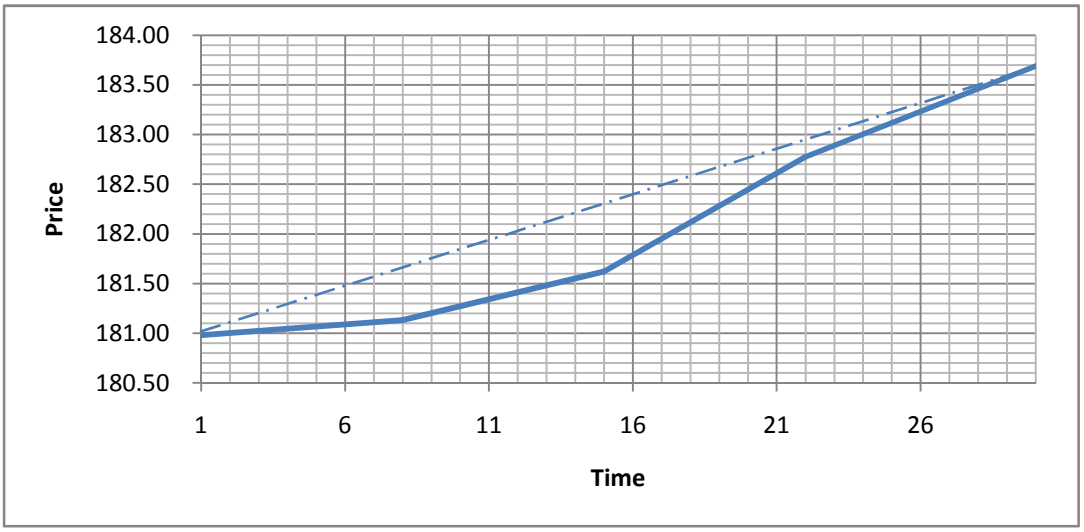
Table 2: Computation of Index

Time	Price per unit	Weight (W_i)	Price ratio (P_{it}/P_{io})	$\boldsymbol{W\frac{P_{it}}{P_{io}}}$
1	180.98	400	1.0055	402.18
8	181.13	164	1.0063	165.03
15	181.62	548	1.0090	552.94
22	182.78	623	1.0154	632.61
30	183.69	383	1.0205	390.85
	Total	**2118**		**2,143.61**

$$\boldsymbol{I_t = \frac{\sum W_i \left(\frac{P_{it}}{P_{io}}\right)}{\sum W_i} x100\%}$$

$$\boldsymbol{\frac{2,143.61}{2118} x100\%} = 101.21\%$$

Figure 1: Fluctuation of price for the hypothetical item



The index ratio and the price ratio are 1.0121 and 1.0205 respectively. This simply shows that price ratio cannot be a substitute for index ratio. Taking extreme values i.e. the base price and the current price, is *neither the accurate nor a plausible way of making price adjustmen*t. It is crucial to take a heed that the more the project duration is, the greater the difference will be. Besides, price adjustment factor is very sensitive as it is to be multiplied by thousands or millions in an interim payment.

When we substitute prices for indices, prices only take account of extreme values; it doesn't take account of intermediate price fluctuations and volumes of purchase Making price adjustment taking only extreme values is tantamount to saying: '*knowing only the initial and final speed of a car it is possible to know the distance covered during a particular period no matter what happened to the car in between.*'

Price adjustment in Ethiopian construction industry

In MoWUD 1994, PPA 2006 andPPPAA2011[1]contract forms price adjustment has been treated differently. The former considers price difference and the latter two consider index formula. The summary and their comparison with FIDIC contract form is shown in Table 3. Price adjustment using indexes is very challenging since Ethiopia has no construction materials price indices (9)&(10). This obviously will lead to interchangeable use of prices forindices (11)or use of foreign country indices (12) which might not reflect the actual conditions in Ethiopia. This is owing to the fact that some items might be bought from one country (or even in Ethiopia) while the index is from another country.

[1] PPA (public procurement agent) is reestablished as PPPAA (public procurement and property administration agency) by Proclamation No. 649/2009.

Table 3: Comparison between price adjustment provisions of contract forms

Issues	MoWUD 1994	PPA 2006	PPPAA 2011	FIDIC 1987	MDB2010
Necessary conditions for Price Adjustment	Change in cost of labor & contractor's compulsory contribution	Fluctuation in cost of inputs	Change in cost of inputs for projects longer than 18 months	Change in cost and legislation	Change in cost and legislation
Base pricing or indexing date	15 days prior to latest bid submission	28 days prior to latest bid submission	Bid closing or previous contract price adjustment date	28 days prior to latest bid submission	28 days prior to latest bid submission
Starting date of price adjustment	-	-	After a year	-	-
Adjustment application	Individual items	Certified amount less advance deduction	Contract value(contract price multiplied by quantity)	BOQ value except items with actual price	Amount payable to contractor
Method(s) of adjustment	Price difference	Index formula	Index formula	Index formula & price difference[2]	Index formula
Overhead & profit in price adjustment	Profit excluded	not explicitly stated	not explicitly stated	Overhead & profit excluded[3]	not explicitly stated

The challenges in price adjustment practices

According to the writer's experience and observation in national and international projects for more than a decade, the most prominent malpractices and challenges are listed hereunder.

1. Constant weighting coefficients throughout project lifetime

The consumption of inputs in construction is not constant throughout the project lifetime. For example, the consumption of cement and fuel at the start of a project will not be equal to the consumption at the mid or end of the project. In construction projects, where price adjustment is effected by index formula, it is not uncommon to use *varied sets weighting coefficients* during

[2], [3] Though it doesn't appear in general conditions of contract, the FIDIC guide suggests so. This means that it should be put in special or particular condition of contract.

different epochs of the project while keeping their *sum to unity*. Unfortunately, this is not so in practice; constant or average weighing coefficient is being used in the industry.

To expound the effect of constant weighting coefficient, it is quite crucial to go to the root definition and calculation of it. Weighting coefficient of an item may be computed as:

$$W_i = \frac{C_i}{C} = \frac{Q_i * (B_{oi})}{C} \; and \; A = 1 - \sum_{i=1}^{n} W_i$$

where

- $\mathbf{B_{oi}}$ is indexed (base) price of item-i
- $\mathbf{Q_i}$ is total quantity of item-i in a project (estimation)
- **C** is total project cost (estimation)
- $\mathbf{C_i}$ is total cost of item-i in project life time (estimation)
- $\mathbf{W_i}$ is weighting coefficient of item i
- **A** is nonadjustable coefficient

Let's see the following hypothetical example to make it more conspicuous.

Table 4: Application of different set of weighting coefficients

Construction Time	Non adjustable	Adjustable Weighting Coefficients			Sum	Remark
	A	**B**	**C**	**D**		
Base Period	-	102.4%	98.23%	104.25%	-	Base indices
Period-I	45.00%	32.53%	9.08%	13.40%	100%	
Period-II	45.00%	40.13%	12.35%	2.52%	100%	
Period-III	45.00%	35.00%	18.75%	1.25%	100%	
Period-IV	45.00%	19.75%	32.45%	2.80%	100%	
Period-V	45.00%	15.00%	38.90%	1.10%	100%	
Average	45.00%	28.48%	22.31%	4.21%	100%	

The price adjustment formula for the respective periods will then be

$$\boldsymbol{for Period - I,} \quad \boldsymbol{P_n = 0.45 + 0.3253\frac{B_c}{B_b} + 0.0908\frac{C_c}{C_b} + 0.1340\frac{D_c}{D_b}}$$

$$\boldsymbol{for Period - II,} \quad \boldsymbol{P_n = 0.45 + 0.4013\frac{B_c}{B_b} + 0.1235\frac{C_c}{C_b} + 0.0252\frac{D_c}{D_b}}$$

etc

Making several adjustment periods is quite essential for three main reasons: 1) BOQ quantities hardly remain the same; 2) time value of money and 3) to avoid distortedcash flow. To see the

effect of the varied and constant weighting coefficient, one may run simulations and see their effect.

One may argue that this might lead to manipulation and involves tedious work. The writer, however, believes otherwise. The originalweights are more prone to manipulation than revised since the contract BOQ quantities might be made erroneous deliberately. Mistake in bill of quantities also another factor, which necessitates revision of weights. Besides, as interim payments progresses, the actual values of adjustable items become known and the rest calculation will be a matter of spreadsheet. One thing should always be clear; contract is always prone to manipulations as estimate shows that corruption siphons off 10 to 25 percent of the contract value at an average and as high as 50 percent in worst case(13).

2. Different estimators give rise to different weighing coefficients

It is quite apparent that many contractors mayhave their own preferences and peculiar method of constructions, estimations, and output or productivity. Evidently, estimators may end up with quite different weighing coefficients. One may argue that it is the same with price difference adjustment. However, slight weight changes affect adjustment factor and price adjustment amount heavily unlike price differences adjustment.

3. It does not consider actual labor work time

When calculating weights for classes of labor, the weighing coefficients are calculated using normal working hours.Otherwise, it will be a sheer guess if one tries to incorporate them at bid or contract signing. However, it is not uncommon for a contractor to work overtime to meet d-days or to get finished a particular urgent or continues work, viz. concrete casting. Moreover, a contractor may use special treads of labor for short period of time, for example, installation HVACequipment.

4. Change in project cost

The amount stated in the contract can only be a reasonable estimation. The actual cost usually goes up or rarely the actual cost my get down at the end of a project. Besides, there may be an alteration, addition or omission of works (variations) or claim for extra payments and times. All these affect the weighting coefficients and then the price adjustment factor too. If weighting coefficients left unrevised at final payment and price adjustment is not recalculated for all interim payments, the adjusted price no longer reflects the true or reasonable value.

5. Constant input material amounts

The weighting coefficients are computed assuming constant amount of components or ingredients in a given work item. For example, it is assumed that C-25 concrete requires 360kg of cement. However, it is not uncommon that to raise or lower the cement quantity depending on the prevailing site conditions and/or ingredient materials and tests. This is especially prominent in fluid retaining structure, where strict quality control is mandatory.

It is only in chemistry lab-controlled environment-that fixed amounts, viz. 4gm of hydrogen and 32gm of oxygen equals 36gm of water works. Unfortunately, this is not so in the construction industry.

6. Computation time

The other important factor is the computation time. Compared to price differences adjustment, price adjustment using indices takes longer time to compute price adjustment weights and there may also be a disagreement among parties which will cause delay. This may delay the contract signing date, project start and completion. To compute cement weighing coefficient in building project, for example, one has to calculate the cement requirement for all work items which requires cement viz. C-5 concrete, C-25 concrete, masonry, plastering, screed, etc.

7. Considering only extreme prices

Whenever prices are deemed to be substitute of indexes, there will not be any consideration for price fluctuates between the extreme values (base and current) values.Insome cases, however, prices may substitute indexes for items which do not show drastic and frequent price change in course of time. As shown in Figure 1, the price cost slope might not be closer approximation of the prevailing intermediate fluctuation. Note that Figure-1 doesn't account the weight of the item. Had it been accounted, the deviation would have been even bigger.

8. Complication of price adjustment formula

Whenever there is a tendency to substitute prices for indices, the price adjustment formula tends to become complicated and long.For example, galvanized steel pipes of different diameter are treated differently when we substitute index for price. However, the indices are basically published in baskets of items viz. steel indices instead of publishing indices for every material made of steel. The following, for example, was an actual formula, which was used in one of university capacity building program (UCBP) construction contracts.

$P_n = 0.775+5.175*(C_n/C_o)/100+0.223*(S_n/S_o)/100+1.602*(ST_n/ST_o)/100+ 0.009*(EGA400_n/EGA400_o)/100+ 0.004*(GMS_n/GMS_o)/100+0.006*(SS_n/SS_o)/100+0.001*(SP_n/SP_o)/100+11.50*(D_n/D_o)/100+0.022*(R_n/R_o)/100+0.23*(CA_n/CA_o)/100+1.17*(M_n/M_o)/100+3.71*(DL_n/DL_o)/100+0.44*(EL_n/EL_o)/100+0.23*(AEL_n/AEL_o)/100+0.66*(PL_n/PL_o)/100+ 0.31*(APL_n/APL_o)/100$

9. Adjustable amount

PPA 2006, sub-clause 47.1 contends, "If so provided, the amounts certified in each payment certificate, *after deducting for advance payment*, shall be adjusted by applying the respective price adjustment factor to the payment amounts due.*"* (*Emphasis added*).Mathematically, this may be expressed as:

$$A = P_n * (Amt - AL) = P_n * BOQ_{ev} - P_n * AL$$

where

AL is advance loan repayment

P_n is adjustment factor

Amt is executed work value
A is adjusted amount of an interim payment

One may argue that this is essential since the contractor is getting interest free advance. However, the argument does not hold water for couple of reasons: 1) advance will be paid whether there is price adjustment or not; 2) price adjustment is what a contractor should get for what happened after contract signing; 3) commercial interest rates in most cases aremuch less than escalation factors. Evidently, it is better that the contractor borrows from bank than from client or if the already borrowed from client, better repay outstanding balances and get deduction free adjustment. Simple math will unveil the truth.

This phrase obviously has put the contractor on the losing side of the equation. This has been a controversial issue and still it is for those who use PPA 2006. The deduction will be higher depending on the amount of advance payment and the adjustment factor.

This is basically corrected in PPA 2011, where the price adjustment factor is directly applied to BOQ values and it is also explicitly put in the formula.

10. Adjustment for non-used items

In a construction, several months may elapse before a contractor completes excavation works and start concrete casting. Nonetheless, the current practices make adjustment for cement, even though the item was not used at all. This is owing to the fact that the weighing coefficient is already in the adjustment formula. This, however, is ludicrous and is a conspicuous indicator of the misusage and misapplication of the price adjustment formula.

11. Failure to make periodic payment

The last point is failure to make periodic payment as stipulated in conditions of contract. This is mostly contract administration problem and sometimes contract drafting problem. The essence of price adjustment is to make compensation for actually executed work in the particular interim payment application period. If price adjustment not made periodically (preferably monthly), the adjustment will no longer reflect true value. To make the matter clear, suppose a contractor failed to apply in month X and applied next month Y. When price adjustment factor is computed in month Y, it may be inflated.

The limitation of price adjustment using indices

Though price adjustment using published indices is one choice of price adjustment, indices have their own inherent limitations. Some of the limitations include the following (8):

- Limited observations to compile indexes. This may be due to technical, economical or several other reasons and this will make errors in price data accrue.
- Limited list of basic item headings or classes. For example, for labor the classes may be classified as unskilled, semiskilled and skilled labor.
- Unavailability of data. Sometimes data are not available for some items. If so, a value is imputed based on the price movements of other items within the same basic heading.

- Average data. Succinctly speaking, indices are based on average data and may not reflect actual values at hand.

Adjustment using difference of rates

Price adjustment using price difference is quite a legitimate way of making price adjustment and it has many merits which adjustment using price indices do not have.

The merits of this method include:

- It is more accurate as long as applicable rates do exist,
- More reliable,
- It favors neither the employer nor the contractor,
- No delay in contract signing, mobilization, start of project & payments,
- It takes account of variations (alterations, deletions and additions),
- It takes account of actual worked hours,
- Different estimators reasonable agree on the adjusted amounts,
- It takes account whether a particular item is used or not during the application period,
- It is immaterial whether the project cost rises or falls and
- It is immaterial whether ingredients of an item, for instance concrete, increase or decrease.

The demerits of this method are:

- Rigorous quantity calculations,
- Maintain records viz. payroll and invoices,
- Leaving comfort zones.

It is apparent that adjustment using difference of rates requires careful documentation and periodic calculation of quantities consumed. The accuracy of this method, of course, comes at cost.

In order to apply this method the following information are important:

- Items quantity can be directly or indirectly found from takeoff,
- Base rates which are in the contract,
- Current rates from reliable & applicable sources.

Merits and demerits of Price Adjustment

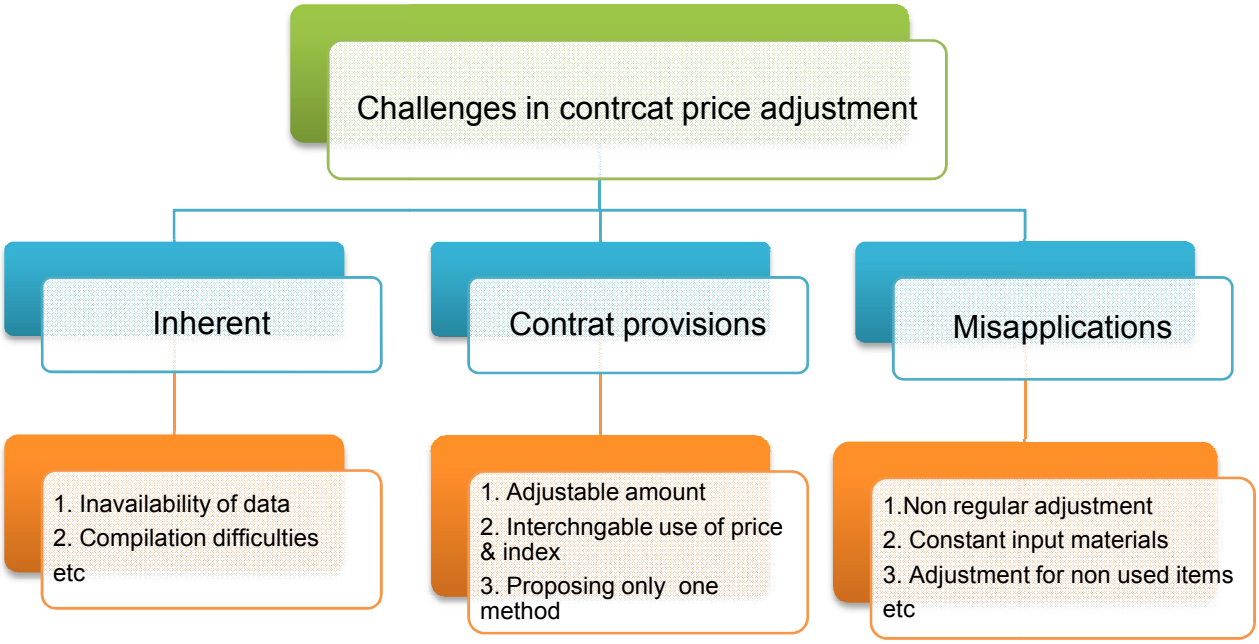
Incorporation price adjustment provisions in a contract have both merits and demerits. The merits include: decreased bid price, more bidders and few contract retractions and consistent contractor profit margins. The demerits include: the accuracy of indices, extra administration cost, and price adjustment payouts (2).

Conclusions and recommendations

According to the writer's view, the problems in contract price adjustment may be categorized into three main categories as shown in Figure-2. Consequently, client should not leave this

problem laden issue to the consultant and contractor alone; the client needs to be represented by competent professional with good knowhow of contractual skills.

Figure 2: Synopsis of price adjustment problems



The writer stronglyrecommends difference of prices adjustment is a still valid alternative and even a better alternative when there is hardly indexes of basic item lists. At least, it should be till central statistic agent publishes reliable construction price indexes. However, it is also good and reasonably accurate to use the combination of index formula and price difference adjustment based on the nature of the items. This was practiced in Tekeze Hydropower Project, where the writer used to work as a contract engineer.

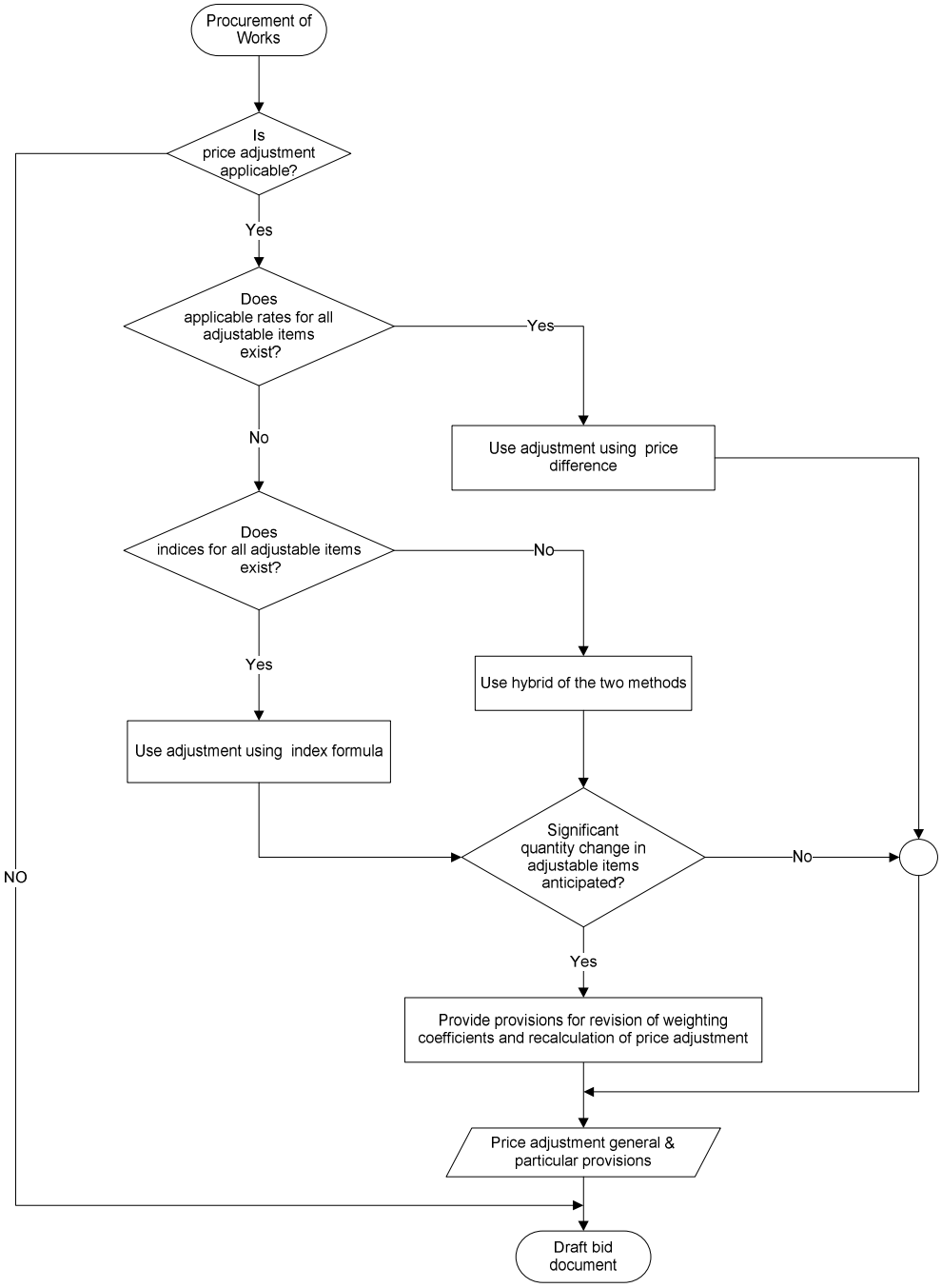
The validity and the legitimacy of adjustment using index formula is largely depending on weighing coefficients and availability of indices. Furthermore, the application of this method will yield better result if weighting coefficients are recalculated and previous price adjustments are revised at the final payment.Bid and contract documents also better bedrafted with such provision.

Moreover, PPA in its future versions should incorporate all the possible methods of adjustment and also better consider a provision for the revision of weighing coefficients in case of significant change of quantity during execution of contract. The drafters of bid and contract documents and contract administrators need to give meticulous attention for the above misapplications and challenges.

PPPAA 2011 provision for price adjustment, whichrequires a project to be more than one and half year and application starts after a year, is a tight provision in the current construction climate of Ethiopia. This might be an international practice but it is a daunting provision for many local contactors of Ethiopia. Most contractors many not be able to account escalation in their bid offer or may not want to account for it for fear of losing bids since other may not account it.Client needs to beer the risk rather than asking tenderers to quote firm prices which include provision for increased costs (14).If the contractor didn't include the provision for possible escalation for projects less than 18 months, this might lead to lower profit margin or total loss, compromising on quality of works and even terminations. Other regional states, which do not entertain price adjustment issue, alsomust consider it for the same reasons.

In summary, the writer proposes the following flowchart chart might be useful while dealing with price adjustment issues in Ethiopian construction industry.

Figure 3: Summary of price adjustment flowchart



Bibliography

1. **FIDIC.***Conditions of contract for works of civil engineering construction.* Switzerland : FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS, 1987.
2. **Newcomb, David E., Lenz, Russel and Epps, Jon.***Price Adjustment Clauses: Report.* Texsas : Texas Department of Transportation, 2013.
3. **OECD.***Sources and Methods: Construction Price Indices,.* Paris : Organization fort Economic Cooperation and Development, 1997.
4. **FIDIC.***Guide to the Use of FIDIC Condition of contract for works of civil engineering.* Switzerland : FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS, 1989.
5. Ethiopian Labor Law. *Proclamation No. 42/1993, Negarit Gazeta, 20 January 1993, Vol. 52, No. 27.* Addis Ababa : s.n., 1993.
6. **European Union.** Construction cost index overview. *Eurostat information.*Retrived October 2014, from EU website. http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Construction_cost_index_overview.
7. **FHWA.** The Mathematics of the National Highway Construction Cost Index. *Federal Highway Administration.* Retrived October 2014, from FHWA website.https://www.fhwa.dot.gov/policyinformation/nhcci/math.cfm.
8. **UBOS.***Construction Sector Indices Explanatory Handbook.* Uganda : Uganda Bureau of Statistics, 2007.
9. **CSA.** Consumer price index. *Central Statistics Agency Website.*Retrived October 2014, from CSA website. http://www.csa.gov.et/index.php/2013-02-20-10-00-28/price-indices/consumer-price-index.
10. **CSA**. Producer Price Index. *Central Statistics Agency Website.* Retrived October 2014, from CSA website. http://www.csa.gov.et/index.php/2013-02-20-10-00-28/price-indices/producer-price-index-monthly.
11. **PPA.***Standard Bidding Document for the Procurement of Works.* Addis Ababa : Public Procurement Agency, 2006.
12. **PPPAA**. *Standard Bidding Document for the Procurement of Works.* Addis Ababa : Public Procurement and Property Administration Agent, 2011.
13. **Transparency International.***Corruption and Public Procurement.* Berlin : Transparency International, 2010.
14. **Corbett, E.C.***Supplement to FIDIC 4th Practical Legal Guide.* 1991.
15. **FIDIC.***Multilateral Development Bank Harmonised Edition.* Switzerland : FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS, 2010.
16. **IMF.** Producers Price Index Manual: Theories and Practices. *International Monetary Fund website.* Retrived October 2014, form IMF website. https://www.imf.org/external/pubs/ft/ppi/2010/manual/ppi.pdf.
17. **Choi, Minsoo, Kim, Jinu and Kim, Moohan.***A study on the Price Escalation System in a Construction Contrat.* s.l. : KSCE Journal of Civil Engineering, 2006.