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A Complete Picture of Spatial Disparity in Cost of Living Index: A Case Study of Pakistan's Cities

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ABSTRACT
This study constructed the cost of living index by using all available data on 488 commodities of the 40 cities of Pakistan for the month of May 2019. Empirically, results revealed that there is a statistical difference in the cost of living index among cities from the standard of living. Based on the national average prices, the Islamabad is ranked at first, and Mirpurkhas, a city of Sindh, is at fortieth. Furthermore, Province wise highest cost of living is found in NWFP and lowest in Sindh. By employing national average prices that have aggregation bias; therefore, it is replaced by province-level prices; the ranking among cities within the province is changed. At province average prices, the highest cost of living index is found in Rawalpindi, Karachi, Abbottabad, and Loralai, and the lowest cost of living in Gujranwala, Mirpurkhas, Peshawar and Turbat, for the province of Punjab, Sindh, NWFP, and Baluchistan, respectively. This spatial disparity in the cost of living is mainly due to specific factors of production in a specific city as compare to other; Quetta is known as "fruit garden in Pakistan," and Khuzdar is an agriculture-based city. Similarly, Karachi and Lahore have (i) high per capita income, and (ii) over-population are the factors of the high cost of living. Hence, in the light of the present study, it is suggested there is no single rule through which disparity in the cost of living can be overcome. Preferably the solution is laying at the micro-level, i.e., the disparity in the cost of living is mainly due to disparity in prices of same goods and services across cities, therefore by controlling prices of goods and services across the cities will suppress this disparity.

Keywords
Cost of living, Disparity, Aggregation Bias, Micro-Level
JEL Classification
E21, R31, P22

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1. Introduction

Understating of spatial disparity in the cost of living (hereafter, CoL) is crucial to recognize inequality in terms of living standards, wage disparity, and amenities, etc. The CoL is a more appropriate and accurate measure of standard of living [Jorgenson and Slesnick, 2012; Argente and Lee, 2015]. This dimension of research, however, has been largely ignored in the literature due to the difficulty of calculating CoL at disaggregated data. Literature has given much attention to the CPI to measure the level of inequality. It is an inappropriate measure of inequality, (i) aggregation bias, (ii) no substitution effect, (iii) easier to understand, but misinterpretation, (iv) market-led substitution, and including many other issues [Boskin et al., 1998]. If the CoL varies across the cities, then the implication of any unique estimate or policy is ineffective, mainly when CPI is used for the construction of policy.

Several studies are available on this topic, which confirms that the spatial disparity in the CoL is present (Chaudhry and Chaudry, 1974; Deller et al., 1997; Kurre, 2000; Feenstra et al., 2017). Voicu and Lahr (1999) constructed the CoL index for metropolitan areas through expenditure data. The variation in expenditures can be taken to estimate prices when data on price is not available. The concept behind it is that the variation in expenditure reflects both quantity and prices according to the fundamental law of Demand. It is well established now that prices vary across spatial differences (Johnston et al., 1996, Walden, 1997, Deller et al., 1997, Handbury, 2013, Albouy et al., 2016), and across rural and urban areas as well (McMahon, 1991, Kurre, 2000, Timmins, 2006). CoL index for rural Pennsylvania's cities consistently lower as compared to the urban cities, and this disparity decrease over time [Kurre, 2000]. Practically, every study reveals that there exist a significant difference between CoL across cities, which is due to population density (Cebula, 1980, Langsten et al., 1985, Haworth and Rasmussen, 1993), climate change (Ostrosky, 1983, Haworth and Rasmussen, 1993), age-wise preferences (Cebula, 1998), housing price (Hederson, 1999), family and child well-being [Chien and Mistry, 2013]. Per capita income, right-to-work laws, temperature, and negative externalities are the adverse functions of CoL [Cebula and Toma, 2008]. The CoL is lower in more substantial cities due to higher competition among firms [Handbury and Weinstein 2015, Feenstra, et al., 2017]. Pasha and Pasha (2002) calculated the CoL index by using 274 commodities of 25 cities in Pakistan for different categories.[1] They found that the CoL of Karachi is the highest and lowest for Jhang. Similarly, Ahmad and Gulzar (2008) constructed the CoL index by employing 133 commodities of 32 cities for three categories.[2] This study concluded that CoL in Turbat is the highest and lowest in Karachi. Furthermore, Province wise CoL is highest in Baluchistan and lowest in Sindh.

[1] Food and Beverages, Apparel and Footwear, Fuel and Lighting, Rent, others.
[2] Food and Beverages, Wheat and Non-Food

Pasha and Pasha (2002) and Ahmad and Gulzar (2008) explored the CoL for the cities of Pakistan. These studies have the following issues; first, these studies used some part of the whole data set on prices for a few commodities and categories. Hence, the inference will be biased and misleading, based on the bias data set. Furthermore, they used national average prices for the construction of CoL; these prices have aggregation bias if a good is produced in Karachi; like fish at the shore of the sea will cheaper, and will be expensive at the mountain of Mingora due to transportation cost and expected margin of profit. The average prices of these two cities will represent neither Mingora nor Karachi. This aggregation bias also affects the measure of CoL and hence, the ranking of cities. Instead, the more appropriate measure lies at the disaggregated level. Lastly, there is no research available on this issue after the study of Ahmad and Gulzar (2008). In these years, many structural reforms have occurred; therefore, it is time to re-estimate the CoL index. All these issues are analyzed in the study by using all 488 commodities of 40 cities in Pakistan. This disaggregated data will present the complete picture of CoL across cities of Pakistan. The study has the following objectives to overcome the above issues; the first objective is to construct and analyze the disparity in the CoL index across the cities and provinces of Pakistan. The second objective is to examine the aggregation bias across national and province-level prices.

In the case of Pakistan, wage policies are often implemented across provinces on the bases of political interest, which implicitly increases the disparity in the CoL across different regions. Therefore, it is essential to estimate the CoL because it not only gives information about the disparity in the CoL across cities but also highlights the ranking across cities. Furthermore, this information ultimately is used by the policymaker for the construction of adequate wage policy. In the current situation of Pakistan, its importance to construct a CoL index, where different groups of individuals are demanding higher wages. This study helps the Government of Pakistan to analyze the disparity in the CoL index across different cities and also in wage adjustments.

The rest of the paper is organized as follows. Section 2 describes the data and methodology. Section 3 explains the empirical results along with the discussion and comparison with previous studies. The final section concludes the paper.

2. DATA AND METHODOLOGY

2.1 The data:

For the construction of the CoL index, monthly prices of 40 cities, along with all 488 commodities is used. This data set is collected for the month of May 2019 from the latest available Monthly Bulletin of Statistics, of the Pakistan Bureau of Statistics. Out of these 40 cities, nineteen are from Punjab; eight are from Sindh, six are from NWFP, six are from Baluchistan, and Islamabad. The data of province-wise share in household consumption by category is used as a proxy of quantities[3], which has been taken from

[3] For detail see Pasha and Pasha, 2002.

the latest available Household Integrated Economic Survey, of the Pakistan Bureau of Statistics 2015-2016.

2.2 Methodology:

Local consumer prices are required to construct spatial disparity in the CoL index. It provides information on precise and actual levels of money expenditures and consumption across spatial disparity, respectively. The spatial disparity CoL index for any region j may be written as follows (Thomas, 1980):

$$CoL_j = \frac{\sum_{i=1}^{n}\sum_{j=1}^{m} Q_j P_{ij}}{\sum_{j=1}^{m}\sum_{k}^{n} Q_j P_k}.100 \quad \ldots \quad (1)$$

where Q and P are quantities and prices, respectively, for the commodity i in region j, and k represents the cross-sectional average price for the i^{th} commodity. Eq. 1, can be modified in terms of relative prices using expenditure weights instead of quantity weights is given below:

$$CoL_j = \frac{\sum_{i=1}^{n}\sum_{j=1}^{m}\sum_{k}^{n} Q_j P_k \left(\frac{P_{ij}}{P_k}\right)}{\sum_{j=1}^{m}\sum_{k}^{n} Q_j P_k}.100 \quad \ldots \quad (2)$$

where, $n = 488$ (commodities) with $j = 40$ cities, therefore Eq. 2 can be rewritten as follows:

$$CoL_j = \frac{\sum_{i=1}^{488}\sum_{j=1}^{40}\sum_{k}^{488} Q_j P_k \left(\frac{P_{ij}}{P_k}\right)}{\sum_{j=1}^{40}\sum_{k}^{488} Q_j P_k}.100 \quad \ldots \quad (3)$$

Eq. 3 represents the CoL index for the region j.[4] It is used to construct the CoL index for each category separately based on Household Integrated Income and Consumption Survey.[5] Similarly, this procedure is repeated for all other cities. Moreover, to analyze the comparison among provinces, this study repeats the procedure by changing the average cross-section price of all cities, with cross-sectional average prices of the province. Through this procedure, it can be analyzed that the variation in the CoL is present among and within provinces. The ANOVA test is applied to analyze statistical variation in CoL among provinces. Furthermore, to examine the variation in CoL among cities, the one-sample t-test is applied.

3. Empirical results and discussion

National Level Average Prices: Appendix 1 presents the CoL index for 40 cities with 12 categories at national level average prices. In the case of Islamabad, the value of the CoL index for most of the categories is higher than the 100, which implies that

[4] The value of calculated CoL for the region *j* will be positive. If the calculate value is 100, then it implies the price of region *j* are equal to the national average prices. This point can also be called as standard of living. However, if the value is greater than the 100 then it implies that the prices in region *j* are higher than the national average prices and hence high cost of living, vice versa.

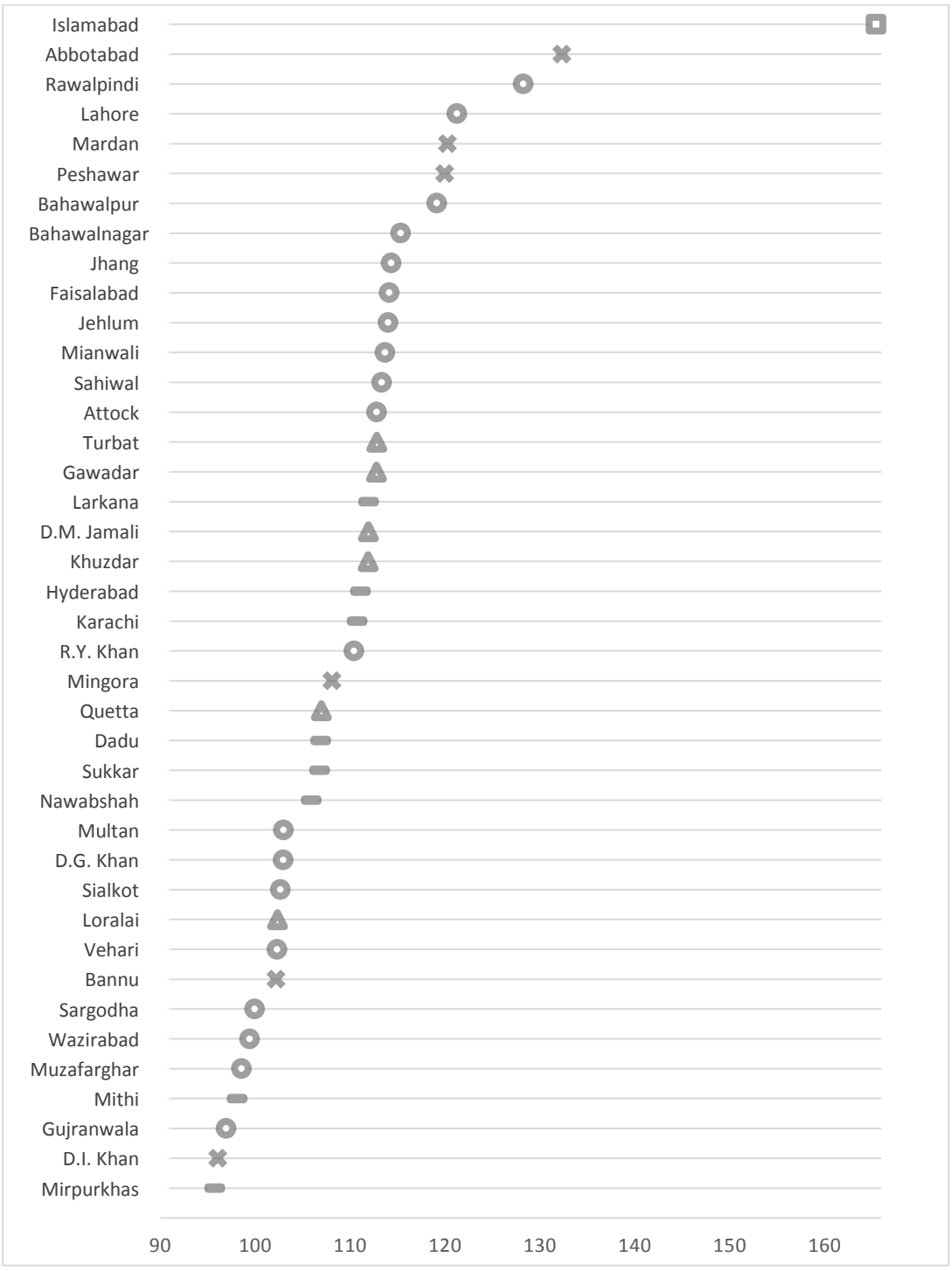
[5] There are 12 categories in Household Integrated Economic Survey, i.e., Food & Non Alcoholic Beverages, Alcoholic Beverages and Tobacco, Clothing and Foot Wear, Housing, Water, Electricity, Gas and Other Fuels, Furnishing, Household Equipment and Maintenance, Health, Transport, Communication, Recreation & Culture, Education, Restaurants and Hotels, and Miscellaneous Goods and Services

the prices of commodities in Islamabad are high as compare to the national level average prices. Mainly there are two significant reasons behind; (i) highest per capita income among all other cities (ii) low production units and high demand for luxury living at Islamabad put positive pressure on prices. Moreover, to satisfy the needs of citizens, goods are imported from other cites, which contain two types of additional prices, i.e., transportation cost and expectation of high profit by the supplier. Moreover, In the case of Mithi and Mirpurkhas, the value of the CoL is approximately consistently low as compare to all other cities, more specifically in Sindh. The CoL in Abbottabad for Alcoholic Beverages and Tobacco is significantly high, as compared to others. Khuzdar and Turbat are expensive for the communication category. Loralai is valuable for Restaurants and Hotels category. Similarly, there is variation in prices within and across provinces for the same category.[6]

Figure 1 presents the CoL ranking for all 40 cities.[7] Islamabad is ranked at first, and Mripurkhas is ranked, at last, i.e., CoL is highest in the case of Islamabad and lowest for Mirpurkhas. As Islamabad has high CoL for most of the categories (for detail, see Appendix 1). The CoL for the category of Food, Housing, Health, Education, and Recreation & Culture is highest as compared to all other cities. Which accumulating the over-all CoL in Islamabad and hence have the highest CoL. It is mainly due to the high per capita income and luxury lifestyle of living in Islamabad. And in the case of Mirpurkhas, the CoL for most of the categories is lowest. In Mirpurkhas, the average monthly is about 11000 rupees, which significantly less than the minimum wage in Pakistan.[8] Moreover, the overall value of the CoL is also less than 100, which implies that it is below the standard level of living. In this ranking, Abbottabad is ranked second. Rawalpindi is at third. Lahore is ranked at fourth and Karachi is ranked at twenty-one. The over-all picture implies that there is a difference in CoL among cities. To test this difference statistically among cities, the one-sample t-test is applied. Statistically, there is an insignificant difference among all cities (P-value – 0.9000), while it is statistically different from the standard of living (P-value - >0.0000).[9] It can be visualized as well in Figure 1. The ANOVA test is applied to test the statistical difference among provinces. Results of the ANOVA test are presented in Appendix 2-A. These results imply that the mean of all provinces is approximately the same, i.e., there is no statistical difference among provinces. Appendix 3 lists the category-wise over-all ranking of the CoL index with the province. Based on the national level average price Islamabad is the most expensive city to live, while Sindh is the cheapest to live, reason remains the same behind this ranking. NWFP is ranked second after Islamabad. Baluchistan is at third, and Punjab is at fourth.

[6] These results are not discussed in detail because of aggregation bias.
[7] This is constructed by taking the average of all the categories for each city.
[8] Pakistan Emergency situational analysis, district Mirpurkhas, October 2014.
[9] One-sample t-test is applied two times; first, by comparing the sample mean, i.e., 111 with the data series, second, by comparing with the value of 100, which implies the standard of living.

Figure 1: Over-all Cost of the Living index with ranking by Cities. (National Level Average Prices)



Province Level Average Prices: Appendix 4 listed the CoL index for 40 cities with 12 categories at province level average prices.[10] The first category is Food and Non-Alcoholic Beverages, in which the CoL for Rawalpindi city is highest, while the lowest for the D.G. Khan. Notably, there is no significant production unit in Rawalpindi; therefore, to fulfill the need for the citizen, goods are imported from other cities. Rawalpindi and Islamabad are twin cities, and the standard of living in both cities is not only high, but also highly correlated, and have similar consumption behavior patterns. Because of this behavior, the CoL in Rawalpindi for most of the categories is high, i.e., Health, and Recreation and Culture. While D.G. Khan is the city of Punjab where not only is wheat produced, but it is also used as a raw material in many products; bread, Rusk, Biskets, Somasa, Nimko Chips, among others. This city is also rich in production livestock, dairy products, Almonds, Raisin, Lal beans, Onion, Tomato, Tomato Ketchup, Carliforwer, Bottle Ground, Pickels, Vinegar, Garlic, Tapal Danedar, Mosambi, Malata, Kinu, Banana, Guava, Kharbooza, Gram whole, Tinda, Card, Lemon, Sugar, Gur, Honey, Milo, and many more. The second category in Appendix 4 is listed as Alcoholics, Beverages, and Tobacco. For this category, Faislabad has the lowest CoL, while Mainwali has the highest. There are six commodities in this category, where the Betel Nuts have the highest weight, and it has minimum weight in the case of Faislabad and maximum weight for Mainwali, according to the demand of these cities, respectively. Figure 2 presents the province-wise CoL for cities. In the case of Punjab, the CoL for Rawalpindi is the highest and lowest for Gujranwala. The difference between Rawalpindi and Gujranwala is about 24 percent.

The fourth category is Housing, Water, Electricity, Gas, and Other Fuels, the CoL is highest for Lahore and lowest for Wazirabad. It is mainly due to the over-population at Lahore. Thus, an increase in population needs more housing and related material; therefore, it puts upward pressure on CoL. It is also true for Transport and Education category in Lahore. Similarly, for Karachi in Sindh province. Furthermore, the CoL in Sialkot is about 101.55, just close to 100, and it implies that the most favorable city for a living is Sialkot regarding this category. So, the CoL for Wazirabad indicates that it is not a desirable city to live in a living standard.

In Sindh, the CoL for Karachi is highest and lowest for the Mirpurkhas, and the difference is about 17 percent. In the case of Karachi, the high CoL is due to the high population, i.e., the population of Karachi is about 8 percent of the total population of Pakistan, and about 34 percent of Sindh.[11] This high level of the population puts upward pressure on prices like the housing category among others.

[10] In the table Islamabad is lost, i.e., now this study considering the average level prices within province, and Islamabad is not included in province. Or, even we can add it into the table but all values will be equal to 100, which give no information.

[11] Population Census 2017.

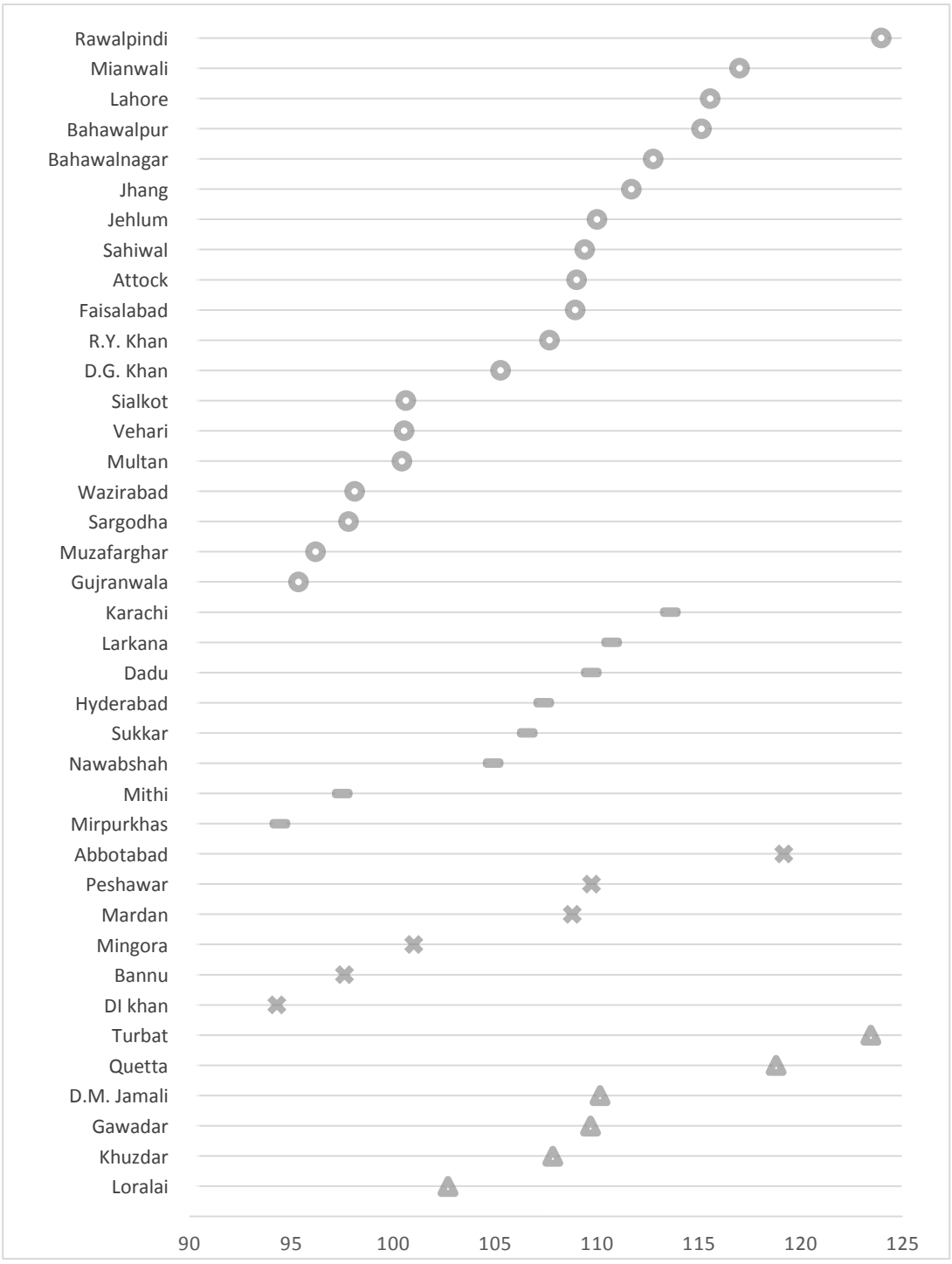
In KPK, the highest and lowest CoL is for Abbottabad and D.I. Khan, respectively. The difference between Abbottabad and Peshawar is about 21 percent. Abbottabad is the main junction for the tourism places, like; Ayubia National Park, Bara Gali, Shimla Hill, Dor River Valley (at Harnoi). Khaira Gali, Thandiani and Nathia Gali. Abbottabad also links Skardu, Hunza, Pak-China border, etc. Tourism generates a high level of income and employment multipliers per unit of visitor spend (Slee et al., 1997), and the likelihood of spending is higher due to the luxury effect. Contrary to Abbottabad, the CoL of D.I. Khan is the lowest in KPK. This is mainly due to the lowest price level for the most categories, like; Alcoholic Beverages & Tobacco, Clothing & Footwear, Recreation & Culture, Restaurant and Miscellaneous Goods & Services. In Baluchistan, the CoL for Turbat is highest and lowest for the Loralai, and the difference is about 17 percent. In the case of Turbat, the prices are higher for the category of Education, Recreation & culture, Furnishing and Miscellaneous Goods & Services, as compare to all other cities in Baluchistan.

The CoL is quite high for most of the categories in Abbottabad because it is a junction that connects most of the tourist areas; Naran Kaghan, Skardu, Nagan Parbat, Gilgit, and many others. In other words, it provides a platform for tourists to stay here and then move to other areas for enjoyment. Due to this luxury effect, most of the commodities are expensive in this city. In addition to this, most of the population of Abbottabad is belong to the transportation and hoteling sector as a profession for their living. Similarly, for Turbat in Baluchistan.

The comparison of the Transportation category across provinces is on standard, i.e., around the value of 100, for the province of Punjab, while there is considerable variation in transportation category can be seen in the case of Sindh, NWFP, and Baluchistan. It is suggested based on the results that transportation CoL is on its standard in Punjab, other provinces should adopt this model to control transportation prices in their areas.

Figure 2 presents the CoL index for each city separately, and cities are ranking within the province, based on the province level average prices. ANOVA test is applied to test the statistical difference among the province. Results of the ANOVA test are presented in Appendix 2-B. These results imply that the average CoL in Baluchistan is statistically different from all other provinces. In cases of Punjab, the CoL in Rawalpindi is highest among other cities, and the reason remains the same, that the behavior of individuals in Rawalpindi is approximately the same as in Islamabad as defined earlier, hence increase the CoL. Furthermore, most of the well-established housing societies are in Rawalpindi, where the luxury effect is dominated, which also increases the CoL in Rawalpindi. The CoL for Sialkot, Multan, and Vehari is around 100, which implies that these cities are most favorable to live in the province in Punjab. Wazirabad, Sargodha, Muzaffargarh, and Gujranwala are the cities in which CoL is below the standard of living.

Figure 2: Over-all Cost of the Living index with ranking by Cities. (Province Level Prices)



The CoL for the Karachi is highest and lowest for the Mipurkhas, for the province of Sindh. In the case of Karachi, the CoL is high due to the high per capita income and demand by over-population in this city. While Mipurkhas is below the standard of living, it can be easily visualized that the CoL in Mirpurkhas and Mithi is significantly different from other cities of Sindh, i.e., they are deprived of necessary facilities. In the case of NWFP, Abbottabad is ranked at first, and Peshawar is last, and in Baluchistan, Turbat is ranked at first, and Loralai is at last.

Aggregation Bias: comparing Figures 1 and 2 highlights the issue of aggregation bias. In Figure 1, Peshawar is ranked after Mardan and Abbottabad, while in Figure 2, Abbottabad is at rank, and Peshawar is at last for the province of NWFP. Similarly, for the province of Baluchistan, at national level average prices, Quetta is ranked fourth and Gawadar at second (Figure 1). When national level average prices replaced by province-level average prices, Gawadar is at fourth, and Quetta is at second.

3.1 Comparison and Discussion:

In the literature, it is found that there are different determinants of the CoL in an economy. This inference is extracted based on the national price level, which has aggregation bias. Moreover, before applying any statistical analysis, it is essential to know "*what is data, and from where it comes*" Mahmood (2017). Often it is the practice of researchers that they feed data into the system without analyzing data and treat the output of system persuasive; therefore, it could lead to misleading inferences. This study it is analyzed that the CoL varies across cities with no particular reason. For example, in Jhang, the price of the visit to the doctor is high, in Abbottabad's cost of transportation and housing is high. In the case of Mirpurkhas, the average monthly income is quite low. In Karachi, it is over-populated and has high per capita income, and hence high CoL, similarly in Lahore. Rawalpindi and Islamabad have no significant unit of production; that is why CoL is high. Hence, it can be inferred that there is no single solution through which disparity in CoL can be removed.

Pasha and Pasha (2002) and Ahmad and Gulzar (2008) concluded that the population has a positive impact on the CoL, which is not valid. It is just an Anscombe's effect (for detail see, Anscombe, 1973), as shown in Figure 3. It can be easily visualized that there is no effect on the population on the CoL. For example, Karachi has the highest population among all other cites but has low CoL. Contrary, Islamabad, Rawalpindi, and Abbottabad have a low population with high CoL. Similarly, Lahore has a population about 12 million and has CoL 121, while Peshawar has about 2 million with CoL 120. The population of Peshawar is just 17% of the population of Lahore.

Ahmad and Gulzar (2008) concluded that, as the distance from Karachi increases, because Karachi has a port, the CoL increases, which is also not true both logically and based on the results of visualization in Figure 4. It is also Anscombe's effect and an example of spurious regression. For example, the CoL in Karachi is 111, which has 0-

kilometer distance; contrary, Mingora has the most substantial distance from Karachi and has less CoL than Karachi, i.e., 108. Similarly, Mirpukhas has the same CoL as D.I. Khan, but has a distance of 240 and 1067 kilometers from Karachi, respectively, fortunately, their CoL is less than the CoL in Karachi. Moreover, Gawadar has its working port and has approximately the same CoL as Karachi, but the distance of Gawadar from Karachi is about 630 kilometers. Hence, it can easily be inferred that distance from Karachi does not have any impact on CoL.

Figure 3: Impact of population on the CoL by cities.

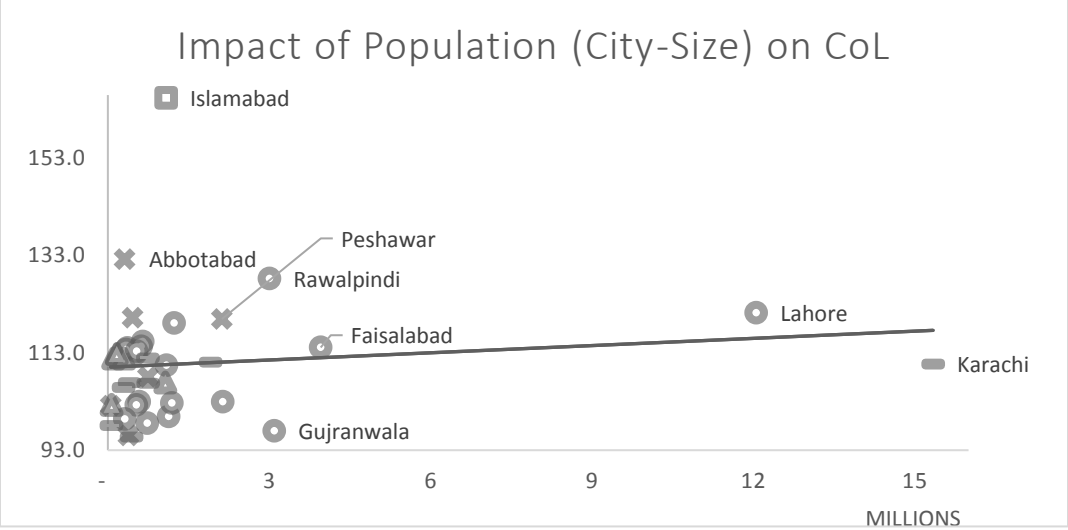
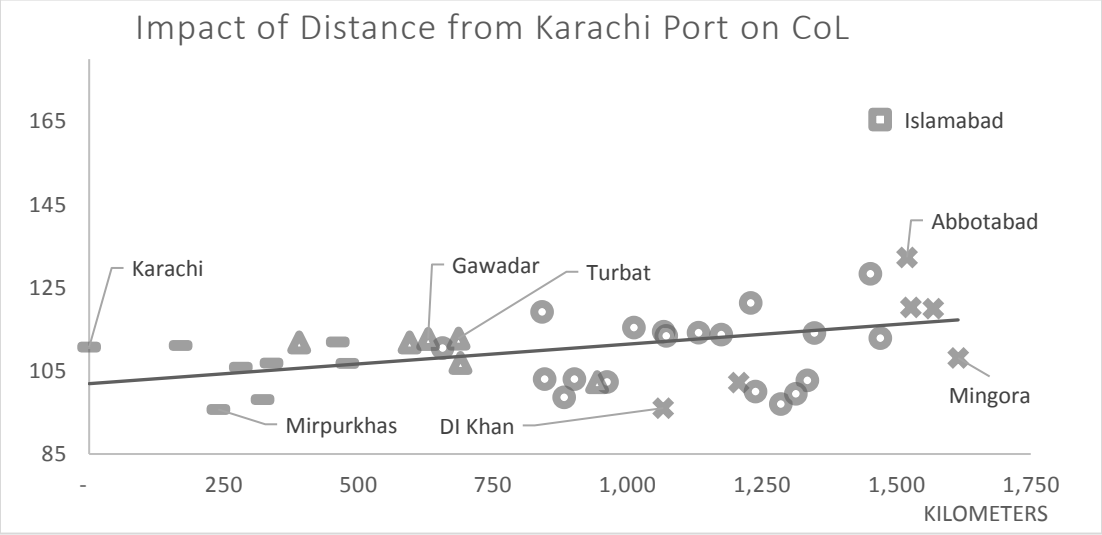


Figure 4: Impact of distance[12] from Karachi port on the CoL by cities.



[12] The data on distance is collected through google.map, and the unit of the distance is Kilometers.

4. CONCLUSION

The primary purpose of this study is to construct the CoL index for the cities of Pakistan based on the latest available data set. This research is constructed in the CoL index for 40 cities with 488 commodities. These 488 commodities are divided into 12 categories. Following conclusion can be drawn from the empirical analysis;

First, the CoL for cities is significantly different from the level of standard living. Second, the CoL is different among provinces, and Baluchistan is statistically different from others. Third, due to aggregation bias, the ranking of cities varies within the province. The difference in CoL among cities is due to specialization in their given resources like D.G. Khan is specialized in Food and Non-Alcoholic Beverages, and Sialkot is famous for its production in Surgical and Musical Instruments, and Sports, Leather, and Textile goods. While Sialkot is the second-largest source of foreign exchange in Pakistan. Loralai is famous for the production of almond and apple. Moreover, the disparity in the CoL across cites within Province exists because the law of one price does not hold. It is also right across provinces. For example, in Jhang, the price of a visit to the doctor is high, in Abbottabad's cost of transportation and housing is high. In the case of Mirpurkhas, the average monthly income is quite low. In Karachi, it is over-populated and has a high level of per capita income, and hence high CoL, similarly in Lahore. Rawalpindi and Islamabad have no significant unit of production that why CoL is high. Hence, it can be inferred that there is no single solution through which disparity in CoL can be removed. Similarly, other cities are specialized in the production of some other goods and services, i.e., few cities are rich in some goods and services, while other cities are rich in others. Therefore, it is not possible to suggest a policy at a macro level; to overcome CoL disparity across cities and provinces; one should have to focus on micro-level issues. Preferably the solution is laying at the micro-level, i.e., the disparity in CoL is mainly due to differences in prices of the same goods and services across cities, therefore, controlling prices of goods and services across the cities will suppress this disparity in CoL.

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Appendix 1. CoL index with categories for each City (National Level Average Prices) Cont.

	City	Food and Non Alcoholic Beverages	Alcoholic Beverages and Tobacco	Clothing and Foot Wear	Housing, Water, Electricity, Gas and Other Fuels	Furnishing, Household Equipment, and Maintenance	Health
Islamabad		119	108	141	575	117	167
Punjab	Attock	105	88	127	115	110	102
	Bahawalnagar	102	78	127	102	133	128
	Bahawalpur	102	90	144	114	122	106
	D.G. Khan	96	109	82	100	94	103
	Faisalabad	109	72	107	108	106	133
	Gujranwala	99	80	98	101	109	96
	Jehlum	110	81	121	121	106	109
	Jhang	97	86	151	98	116	135
	Lahore	109	80	113	173	131	124
	Mianwali	102	202	95	98	103	115
	Multan	103	70	108	134	105	99
	Muzafarghar	101	70	103	123	104	85
	Rawalpindi	113	101	132	173	114	156
	R.Y. Khan	100	91	112	98	108	115
	Sahiwal	103	77	116	127	116	109
	Sargodha	106	84	105	110	103	98
	Sialkot	106	81	105	108	99	107
	Vehari	104	83	113	102	111	94
	Wazirabad	98	82	99	94	104	94
Sindh	Dadu	101	120	102	103	100	107
	Hyderabad	105	110	107	93	95	106
	Karachi	112	89	127	132	98	118
	Larkana	110	174	92	91	102	104
	Mirpurkhas	97	119	83	91	90	94
	Mithi	97	126	98	90	91	97
	Nawabshah	98	125	111	87	95	117

	Sukkar	103	86	104	96	108	170
NWFP	Abbotabad	108	328	132	114	120	121
	Bannu	97	111	111	88	100	92
	D.I. Khan	105	76	99	92	111	113
	Mardan	99	243	134	97	107	108
	Mingora	98	103	135	100	96	116
	Peshawar	101	194	137	118	109	110
Baluchistan	D.M. Jamali	102	222	92	101	98	103
	Gawadar	106	164	96	115	110	168
	Khuzdar	110	163	101	95	103	111
	Loralai	101	103	93	102	83	100
	Quetta	105	125	98	135	103	112
	Turbat	106	164	93	106	118	102

Appendix 1. CoL index with categories for each City (National Level Average Prices)

	City	Transport	Communication	Recreation & Culture	Education	Restaurants and Hotels	Miscellaneous Goods and Services
Islamabad		100	96	141	157	126	138
Punjab	Attock	99	94	141	112	127	134
	Bahawalnagar	99	115	131	109	146	113
	Bahawalpur	99	162	133	116	100	142
	D.G. Khan	101	149	97	120	91	93
	Faisalabad	100	75	126	146	129	158
	Gujranwala	98	101	83	99	99	101
	Jehlum	99	103	140	119	136	124
	Jhang	101	110	119	108	133	118
	Lahore	102	90	114	160	103	157
	Mianwali	97	107	112	123	102	107
	Multan	99	118	118	98	86	99
	Muzafargharh	99	118	116	87	79	99
	Rawalpindi	99	94	141	151	127	136
	R.Y. Khan	97	104	128	112	125	135
	Sahiwal	99	98	115	115	154	131
	Sargodha	99	84	98	106	108	100
	Sialkot	99	88	102	113	119	107
	Vehari	99	134	92	101	96	99
	Wazirabad	99	134	91	101	96	99
Sindh	**Dadu**	**168**	**97**	**104**	**103**	**82**	**98**
	Hyderabad	103	88	98	217	109	101
	Karachi	106	99	118	113	109	107
	Larkana	106	114	99	124	124	103
	Mirpurkhas	106	76	99	118	79	98
	Mithi	96	88	102	105	88	100
	Nawabshah	96	105	114	134	81	108
	Sukkar	96	95	67	138	119	99
NWFP	Abbotabad	107	142	104	110	102	101
	Bannu	107	106	113	114	87	100
	D.I. Khan	107	89	73	121	70	98
	Mardan	102	115	110	119	87	121
	Mingora	102	91	110	113	113	121
	Peshawar	102	112	123	122	97	112
Baluchistan	D.M. Jamali	102	118	98	96	110	101
	Gawadar	101	88	75	70	156	102
	Khuzdar	101	166	85	58	148	102
	Loralai	101	117	89	57	184	98
	Quetta	102	95	101	106	102	100
	Turbat	103	135	98	114	106	106

Appendix 2-A: Results of ANOVA test. (National Level Average Prices)

Multiple Comparisons						
Province		Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Punjab	Sindh	3.53	3.63	0.77	-6.26	13.31
	NWFP	-3.47	4.03	0.83	-14.35	7.4
	Baluchistan	-0.31	4.03	1	-11.18	10.57
Sindh	Punjab	-3.53	3.63	0.77	-13.31	6.26
	NWFP	-7	4.65	0.45	-19.54	5.54
	Baluchistan	-3.83	4.65	0.84	-16.38	8.71
NWFP	Punjab	3.47	4.03	0.83	-7.4	14.35
	Sindh	7	4.65	0.45	-5.54	19.54
	Baluchistan	3.17	4.97	0.92	-10.24	16.58
Baluchistan	Punjab	0.31	4.03	1	-10.57	11.18
	Sindh	3.83	4.65	0.84	-8.71	16.38
	NWFP	-3.17	4.97	0.92	-16.58	10.24

Appendix 2-B: Results of ANOVA test. (Province Level Average Prices)

Multiple Comparisons						
Province		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Punjab	Sindh	1.53	3.31	0.65	-5.20	8.25
	NWFP	2.03	3.68	0.58	-5.44	9.51
	Baluchistan	-4.96	3.68	0.19	-12.43	2.52
Sindh	Punjab	-1.53	3.31	0.65	-8.25	5.20
	NWFP	0.51	4.25	0.91	-8.11	9.13
	Baluchistan	-6.48	4.25	0.14	-15.10	2.14
NWFP	Punjab	-2.03	3.68	0.58	-9.51	5.44
	Sindh	-0.51	4.25	0.91	-9.13	8.11
	Baluchistan	-6.99	4.54	0.13	-16.20	2.23
Baluchistan	Punjab	4.96	3.68	0.19	-2.52	12.43
	Sindh	6.48	4.25	0.14	-2.14	15.10
	NWFP	6.99	4.54	0.13	-2.23	16.20

Appendix 3. The province with Category-wise over-all CoL index, Province-wise CoL, and Over-all Ranking.

	Category-wise CoL Index												**Over-all CoL and Ranking**	
	Food and Non Alcoholic Beverages	Alcoholic Beverages, Tobacco	Clothing and Foot Wear	Housing, Water, Electricity, Gas and Other Fuels	Furnishing, Household Equipment, and Maintenance	Health	Transport	Communication	Recreation and Culture	Education	Restaurants and Hotels	Miscellaneous Goods and Services	Province-wise CoL	Province-wise Ranking
Islamabad	119.26	107.73	141.27	575.27	117.25	166.94	100.26	95.75	140.53	156.52	125.95	138.49	**165.44**	**1**
Punjab	103.50	89.64	113.43	115.80	110.09	111.03	99.20	109.26	115.71	115.65	113.36	118.53	**109.60**	**4**
Sindh	102.97	118.74	102.86	97.72	97.31	113.98	109.74	95.21	100.05	131.51	99.00	101.61	**105.89**	**5**
NWFP	101.39	175.76	124.80	101.54	107.26	109.88	104.62	109.21	105.54	116.47	92.56	108.69	**113.14**	**2**
Baluchistan	105.09	157.01	95.36	109.16	102.61	115.91	101.81	119.58	91.05	83.64	134.39	101.67	**109.77**	**3**

Appendix 4. CoL index with categories for each City (Province Level Average Prices) Cont.

	City	Food and Non Alcoholic Beverages	Alcoholic Beverages and Tobacco	Clothing and Foot Wear	Housing, Water, Electricity, Gas and Other Fuels	Furnishing, Household Equipment, and Maintenance	Health
Punjab	Attock	105.33	106.21	119.22	110.10	104.96	98.48
	Bahawalnagar	102.38	91.26	121.80	97.14	**128.22**	129.65
	Bahawalpur	101.76	112.96	133.93	106.97	116.82	101.97
	D.G. Khan	**96.13**	146.31	**79.52**	94.89	**90.87**	103.48
	Faisalabad	107.55	**82.72**	102.12	101.90	101.29	127.89
	Gujranwala	97.88	96.13	93.79	96.69	105.03	92.14
	Jehlum	109.61	96.57	114.75	114.58	101.45	105.27
	Jhang	96.92	104.84	**142.35**	94.30	110.89	135.31
	Lahore	108.90	96.13	106.60	**159.94**	124.30	116.50
	Mianwali	101.85	**281.50**	91.04	94.49	98.98	113.78
	Multan	101.98	83.06	101.55	126.81	100.10	96.57
	Muzafargharh	100.52	83.06	97.47	117.10	99.70	**83.43**
	Rawalpindi	**113.36**	126.93	123.74	158.27	109.39	**150.54**
	R.Y. Khan	99.67	115.72	106.15	94.29	102.80	112.71
	Sahiwal	102.05	91.59	109.70	119.35	111.15	103.77
	Sargodha	104.68	100.85	99.86	104.47	98.24	94.75
	Sialkot	104.90	98.93	99.94	101.90	95.25	104.76
	Vehari	102.65	100.43	106.63	97.36	106.24	90.90
	Wazirabad	97.74	100.00	96.02	**90.97**	100.24	90.90
Sindh	Dadu	101.87	101.94	103.78	118.26	106.25	104.02
	Hyderabad	105.13	93.81	108.22	102.38	100.28	100.68
	Karachi	**111.48**	78.13	**130.91**	**153.94**	104.60	111.65
	Larkana	108.77	**143.56**	96.08	99.66	109.98	100.03
	Mirpurkhas	**95.84**	100.84	**84.04**	100.08	**94.14**	**88.24**
	Mithi	96.08	106.95	99.94	98.02	96.18	91.10
	Nawabshah	98.10	105.51	114.31	**94.61**	101.09	109.64
	Sukkar	101.92	**77.04**	107.08	108.69	**116.15**	**158.96**
NWFP	Abbotabad	**109.65**	**204.76**	112.48	121.20	**118.18**	**115.29**
	Bannu	**97.85**	78.53	96.80	**91.43**	98.82	**88.90**
	D.I. Khan	107.62	**61.83**	**86.77**	95.18	110.86	114.11
	Mardan	99.70	155.66	109.70	100.02	106.04	100.87
	Mingora	98.17	72.89	112.62	102.17	**93.86**	105.34
	Peshawar	101.68	125.93	**112.99**	**127.37**	107.46	103.02
Baluchistan	D.M. Jamali	**101.89**	**134.40**	107.23	102.29	102.75	97.64
	Gawadar	104.48	99.55	105.24	115.28	112.92	**168.42**
	Khuzdar	**109.02**	99.98	**112.45**	**96.69**	104.75	105.52
	Loralai	100.00	**70.75**	108.27	102.54	**86.39**	**96.13**
	Quetta	106.23	79.59	108.15	**132.15**	109.75	108.32
	Turbat	104.40	99.55	102.83	105.82	**129.95**	103.65

Appendix 4. CoL index with categories for each City (Province Level Average Prices)

	City	Trans-port	Communi-cation	Recrea-tion and Culture	Educati on	Restaurants and Hotels	Miscellaneous Goods and Services
Punjab	Attock	101.06	90.11	131.71	103.24	121.49	116.13
	Bahawalnagar	100.83	110.86	122.64	100.12	142.56	105.75
	Bahawalpur	100.69	156.38	125.72	109.20	95.37	119.89
	D.G. Khan	102.50	**162.37**	92.49	116.26	88.21	**90.31**
	Faisalabad	101.63	**74.07**	120.95	135.05	122.44	129.72
	Gujranwala	100.21	101.25	**79.28**	89.01	94.61	98.25
	Jehlum	101.06	100.54	131.08	108.49	127.96	108.71
	Jhang	102.54	108.40	112.31	99.26	127.38	105.84
	Lahore	103.73	88.45	106.54	**147.74**	98.56	**129.28**
	Mianwali	**98.79**	105.20	105.31	112.94	99.50	100.65
	Multan	100.46	114.21	111.27	90.33	83.11	95.87
	Muzafargh ar	100.46	112.14	109.98	**79.37**	**75.33**	95.84
	Rawalpindi	**101.09**	91.08	**132.36**	141.22	120.81	118.64
	R.Y. Khan	99.11	102.32	120.35	102.60	118.60	117.79
	Sahiwal	100.38	97.14	110.83	106.50	**145.32**	115.12
	Sargodha	100.86	81.05	91.07	97.18	103.78	96.91
	Sialkot	100.89	84.91	94.75	104.59	113.92	102.82
	Vehari	100.85	129.88	85.98	95.81	92.99	96.76
	Wazirabad	100.85	129.88	85.30	95.81	92.99	96.76
Sindh	Dadu	**160.80**	105.92	106.14	121.56	87.81	**98.34**
	Hyderabad	98.81	96.08	99.53	**169.64**	`112.81	101.34
	Karachi	102.28	108.81	**120.37**	118.02	115.12	107.85
	Larkana	101.77	**125.86**	99.78	111.78	**127.95**	103.45
	Mirpurkhas	101.78	**82.73**	100.29	104.03	**82.71**	98.58
	Mithi	93.18	96.10	102.15	**97.46**	92.27	100.55
	Nawabsha h	**93.10**	114.71	113.99	118.65	86.15	**109.02**
	Sukkar	93.16	104.94	**69.19**	118.04	124.86	98.98
NWFP	Abbotabad	**102.25**	**126.81**	106.42	**102.93**	109.95	100.11
	Bannu	102.24	98.01	110.31	116.74	94.44	97.20
	D.I. Khan	102.21	81.96	**74.12**	**123.99**	**75.83**	**97.00**
	Mardan	97.91	106.58	109.87	109.84	93.83	**115.51**
	Mingora	**97.89**	**84.10**	102.09	104.58	**123.73**	114.68
	Peshawar	97.93	103.86	**117.10**	107.71	104.62	107.13
Baluchistan	D.M. Jamali	100.05	116.27	110.51	151.49	93.77	103.34
	Gawadar	**99.99**	**79.79**	**85.74**	109.40	129.32	105.96
	Khuzdar	100.02	**137.67**	97.35	**100.31**	125.17	104.96
	Loralai	100.00	104.61	102.11	101.07	**160.23**	**99.40**
	Quetta	100.03	94.45	**119.15**	276.78	88.07	102.78
	Turbat	**102.15**	126.58	118.92	**284.26**	**93.20**	**109.87**