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POVERTY LINES AS CONTEXT DEFLATORS IN THE DRC
A methodology to account for contextual differences

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A methodology to account for contextual differences

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June 2010

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ABSTRACT

In this paper we present a specific methodology to make spatial well-being and poverty assessments based on expenditure data to some extent sensitive to contextual aspects other than price differentials. The rationale behind this method coincides with the view expressed by the advocates of human development pointing to the irrelevance of (real) income levels for well-being measurement compared to an analysis of people's ability to deploy this purchasing power in a very specific time and setting. Yet, in order to operationalize this principle, we opted to employ the ordinary technique of deflating nominal incomes, but in such a way that genuine comparability over different geographical entities comes within reach. Of course, the extent to which our methodology is able to achieve this goal, largely depend on the exact content and construction of the underlying deflators used.

Given our research agenda to analyze the distribution of poverty and well-being in the Democratic Republic of Congo (DRC), we decided to construct 56 regional poverty lines whose pair wise ratios in turn were used as a set of *context deflators*. The challenge of this exercise essentially boiled down to reconciling the two seemingly discordant –but highly appreciated– poverty line characteristics of 'specificity' and 'consistency': i.e. how to give due attention to the myriad of local living conditions while still ensuring sufficient comparability. Although this theoretical discordance has been settled some time ago, methodological problems to align both features still remain cumbersome in practice. Therefore, the main contribution of this paper needs to be understood in addressing these methodological issues within the framework of a household and expenditure survey.

As a natural starting point to deal with these issues, we screened the validity of the major criticisms raised against the Food Energy Intake (FEI) method. Indeed, this context-sensitive methodology for setting poverty lines is often condemned for generating inconsistent results, but –after closer scrutiny– not for every reason put forward in the literature. On the basis of these insights, we started to mould our own specific poverty line methodology in which we tried to accommodate the remaining pieces of critique. This resulted in a three-step FEI-like procedure where the anchoring device to ensure consistency between all 56 localities, was built upon the basic human functionings of being adequately nourished and sheltered. Finally, we applied this procedure to our data in order to discern the impact of our own methodology vis-à-vis other internally and externally computed approaches.

1. INTRODUCTION

Well-being and poverty are increasingly considered to be multidimensional concepts. However, which dimensions to take into account is generally less clear[1]. Furthermore, the exact location of thresholds a social planner should apply to identify people as poor along each of these dimensions, as well as the question whether overall poverty should entail being poor on each or on one of these dimensions, remain largely unsettled. The underlying rationale for such indecisiveness relates to the many views people may hold on 'the good life' and what the units are wherein this should be measured. Therefore, local participation and democracy have become important vehicles to structure those divergent opinions while conceiving social programmes and poverty alleviation strategies. As such, one hopes to nurture more commitment by those concerned, resulting in policies that better fit the local and particular circumstances people face.

However, if one is confronted with a heterogeneous society where real participation of civilians will still be no option in the near future (like the DRC), one should try to find other and more indirect ways to give due attention to local perceptions of well-being and what it would entail to achieve it in a very specific setting. One such way might be by means of household and expenditure surveys in which some of those clues may be hidden, but whose evaluation may also involve some risks of misconception: for example, we may notice in a person's expenditure basket that no income has been allocated to acquire a mosquito net. This could possibly mean that this person is either too poor to buy one or is not aware that a mosquito net may reduce the risk of getting infected from malaria. On the other hand, one may equally assume that in this person's view health is not that important or that this specific health risk just does not occur where s/he lives. Whereas the first reasons would promote interventions taking place (though being different in nature), the latter would probably not.

Now, confronted with the particularities of the countrywide Enquête 1-2-3 (henceforth 1-2-3 Survey) executed in the DRC, we will try to analyze the distribution of well-being and poverty throughout the country in such a manner that appropriate attention is given to those different local views and contexts that characterize the Congolese society. Indeed, if one attempts to correctly represent the living standards of different people, one should try to find a means to make those varying living conditions comparable. Of course, completely levelling the playing field (Roemer, 1998:1) by correcting for all due comparison-interfering contextual elements is far too demanding given the data available. By consequence, and given the size of the country and its spatially fractionalized economy, we opted in this paper to solely and partially give a geographical interpretation to context. Further, as a potential leveller for different contexts we found comfort in a set of regional poverty lines (to be used as deflators), each of them entailing the same amount of well-being but often expressed by very different monetary values. Of crucial importance of course for our concern to properly incorporate context, is the exact underlying methodology followed to set these poverty lines.

Hence, in this paper we will departure in section 2 from a discussion of two dominant approaches to construct poverty lines (namely the Cost-of-Basic-Needs (CBN) approach and the Food-Energy-Intake (FEI) method), and argue that the underlying –and seemingly conflicting– arguments to promote one or the other can be theoretically reconciled. From a practical point of view however, one should remain very cautious as shortcuts are often

1 See Alkire (2002) for an overview of some lists covering the multiple well-being dimensions that have been put forward in the literature.

inevitable when dealing with imperfect and incomplete information. In section 3 therefore, we will analyze the main criticisms employed against the use of the less demanding FEI method, and check whether they still hold in light of our theoretical ideal. Based on our findings in the previous sections, we will propose in section 4 our own poverty line methodology which tries to accommodate the remaining critical features inherent in the FEI method. After having deflated the income data with a set of 56 locality-specific poverty lines (following the methodology of section 4), we will present in section 5 our well-being and poverty estimates for the DRC. Not only will these results be triangulated as much as possible with other data sources, but we will also try to isolate the added value of our methodology vis-à-vis other methods by comparing the respective well-being and poverty results. And finally, in section 6, we will conclude this paper.

2. POVERTY LINES: PURSUING SPECIFICITY OR CONSISTENCY, OR BOTH?

In a discussion paper, Thorbecke (2004) reviews some conceptual and measurement issues related to the analysis of poverty. One of them treats the relative merits of the two dominant methods currently in use for setting poverty lines: "the CBN approach has the advantage of ensuring consistency (treating individuals with the same living standards equally) while the FEI approach has the advantage of specificity reflecting better the actual food consumption behavior of individuals around the caloric threshold given their tastes, preferences and relative prices" (Thorbecke, 2004:7). Although the natural response of many researchers is to give priority to the consistency criterion, Thorbecke (2004:8-9) argues for a more flexible attitude towards what poverty entails, especially when it comes to analyzing the dynamics of poverty across sectors over an extended time period. A similar argument has been made by Bourguignon et al. (2008:10) when analyzing the progress on meeting MDG1. They state that although the use of different base years (and thus different PPP-sets) to compute national poverty lines would create consistency problems, working with only one PPP-set (adequately corrected for national inflation) would on the contrary be totally indifferent to the changes in the consumption pattern of the poor throughout the years. Poverty measures further away from the base year would therefore become less specific.

Other authors experience a similar tension between these two positively regarded characteristics of poverty lines: Asra and Santos-Francisco see a "trade-off" (2003: 176), Ravallion and Bidani refer to a "conflict" (1994:76) and Wodon rather talks about "a matter of degree" (1997:75) wherein methods adhere to these two criteria. These statements imply that addressing both these elements of consistency and specificity, simultaneously and in a non-compromising manner, would be impossible to achieve. In other words, every set of poverty lines should make sacrifices on at least one of these two criteria. Therefore, it is said that a researcher should make a comparative assessment, and this should be based on the specific purpose s/he has in mind. For example, if the objective is to make worldwide poverty comparisons in order to equitably allocate donor efforts, then consistency should be the guiding principle for researchers. On the contrary, if one's aim is to measure poverty from a more local viewpoint by taking stock of all the contextual constraints people face, including the prevailing norms and values of a certain society, then the criterion of specificity will become more important. In this sense, it seems that consistency is mainly driven by a need to compare –so as to be able to establish priorities– while specificity follows from a claim for relevance. Furthermore, consistent poverty lines seem to have a more permanent character and a more international range of applications; specific poverty lines, on the contrary, are said to be more temporal and merely applicable to local contexts. Therefore, given the fact that the relative preference over these two criteria is induced by the final objectives, it is only natural that international organisations dealing with the distribution of donor funds are more inclined to focus on poverty lines being consistent, whereas national agencies prefer to compute their own estimates of poverty, which are more rooted in the specific local context of their country (Asra and Santos-Francisco, 2003:191).

This theoretical issue became tangible in a recent debate over the alleged decrease in worldwide poverty between the researchers of World Bank and UNDP[2]. In some

2 This debate included of course many more participants from other institutions and universities as well, but from our perspective the articles cited in the body of the text are most relevant. For a more extensive and recent overview of research on the trends of global poverty, see the introduction of Reddy et al. (2007).

recent publications, Reddy et al. (2002, 2005 and 2007) criticizes the World Bank's method from a technical and conceptual point of view. The technical debate focuses on the (in)appropriate computation and use of PPP-sets coming from different ICP-rounds (International Comparison Program), which would have resulted in partial and erroneous updates of the worldwide poverty estimates. From the conceptual side, the 1$ poverty line is condemned for its arbitrary and meaningless character: contrary to the practice of many national agencies, Reddy et al. (2005:5) say that the World Bank's methodology follows a money-metric and purely commodities-based approach that is insufficiently rooted in a framework of universal basic human requirements. In a reply to the initial criticisms, Ravallion (2002) provided counter-arguments and more clarifications on the calculations and methodologies used. Eventually, the World Bank presented a first major update of the International Poverty Line (IPL) since 1990, which resulted in an upgrading to 1.25$ a day (Ravallion et al., 2008). This revision actualised the original idea of generating a poverty line representative to the poverty lines of the poorest countries, but now applied to the latest sources of data: (i) a PPP-set based on the newly available 2005 ICP-round, and (ii) a new compilation of nationally determined poverty lines, of which 80% followed some sort of CBN method (Ravallion et al., 2008:4,8). An assessment of the extent to which these initial technical criticisms have been solved is not within the scope of this paper[3], but we are convinced that no conclusive answer has been given to the more conceptual problems raised above. To a certain degree, this has been acknowledged by the advocates of the World Bank themselves: firstly, in the same working paper, Ravallion et al. (2008:2-3) allow some room for more socio-specific views on poverty by recognizing the importance of relative consumption deprivation, however, they do not intend to make use of it for global poverty monitoring, as this would imperil the consistency criterion. And secondly, even if this concept of relative deprivation was introduced, it would still not include public goods, of which their provision would make a big difference for the poor. This too has been acknowledged (Ravallion et al., 2008:3), but again without a consequential change in the methodology used to monitor global poverty.

But next to these acknowledgements, the core issue remains untouched: what does a 1.25$-line really entail? Or, with respect to our analysis at hand, we may wonder what the 1.25$-equivalent in Congolese Francs (CF) could possibly mean for a Congolese; to what range of goods and services would s/he be entitled; and even more importantly, what would these commodities actually mean for his or her daily life? All these questions in one way or another inherently refer to the contextual relevance of such an exogenously induced poverty line. However, some degree of specificity has already entered the exercise when determining the IPL, i.e. through the calculation of the relative costs to meet a selection of nationally defined basic needs. Moreover, the 2005 ICP-round specifically increased its effort in designing lists of commodities and modes of consumption which better reflect local realities, by appointing regional agencies to coordinate the data collection process. As such, the African Development Bank for the first time became responsible for the ICP-Africa, which recently produced a set of African PPPs for the 48 participating African countries (African Development Bank, 2007). However, despite the fact that these efforts have probably increased the quality of data used, they are only relevant on a national level when comparing mean consumption of countries.

3 However, two technical remarks remain valid. First, since PPP-sets are based on mean consumption, they are as such not appropriate to express the IPL in a national currency equivalent or vice versa. To solve this, PPP's for the Poor (PPPP) have been proposed as a better instrument; they rather look at consumption bundles of people around the poverty line (Ravallion et al., 2008:18). Second, a similar argument also counts for the national CPI which are used to deflate/inflate the poverty line from the base year to other years. These CPI again are based on the mean consumption level, and thus insufficiently account for relative price changes between daily commodities for the poor and luxury goods.

Indeed, the moment we engage in poverty estimates on a more disaggregated sub-national level, the 1.25$-poverty line quickly becomes irrelevant the higher the degree of internal diversity of the country, and the more its mean consumption deviates from the national poverty line. Undeniably, for our DRC case study where more than 400 different tribal groups live, four national languages are spoken and the economic fragmentation is extremely pronounced, we are forced to look for a more specific tool to analyze the distribution of poverty within the DRC. Although resorting to the computation of regionally defined and thus more specific poverty lines would be very tempting to do –even more so within the light of the DRC's ongoing decentralization process– we however do not want to give in on the consistency criterion. In fact, we still want to treat all Congolese equally, but in such a manner that more weight is given to the local circumstances they face. In other words, given our specific objective of analyzing well-being and poverty in the DRC, choosing between consistency and specificity is not an option: we want to include both. Thus, is there no way to reconcile both these criteria?

To a certain extent, this practical trade-off refers to a theoretical debate between Peter Townsend and Amartya Sen discussing poverty to be a more relative or absolute phenomenon (Sen, 1983; Sen, 1985; Townsend, 1985). Despite the fact that 'relativity' is at the heart of Sen's criticism with respect to income-poverty, it also provides the key element for him to state that poverty assessments should always be made in absolute terms. The exploration of a totally new evaluative space of functionings and capabilities[4] in which those assessments should take place, served as a means of taking the sting out of this debate: Sen says "there is no conflict between the irreducible absolutist element in the notion of poverty (related to capabilities and the standard of living) and the 'thoroughgoing relativity' to which Peter Townsend refers, if the latter is interpreted as applying to commodities and resources" (Sen, 1983:161). Remark also that, in theory, the concepts of functionings and capabilities do not allow well-being comparisons to become subjective, since they refer to what people (can) 'objectively' do or be rather than to the personal satisfaction they (can) derive from doing or being certain things. However, given the specific nature of functionings and capabilities, any operationalization of this framework seems subjective as long as the underlying normative choices are not made explicit.

In a similar vein and with respect to our discussion of poverty line methodologies, it would be theoretically feasible to ease the tension between the specificity and consistency criteria if one agrees to claim the latter requirement within the same space as Sen would do. In other words, we could easily state that two different monetary poverty lines are still consistent if the well-being they (could) generate, entails a same amount of functionings or capabilities. Given the infinitely different local and temporal conditions people face, it should not be surprising that consistent poverty lines (framed in terms of capability to function) are more often than not expressed by very different monetary values. Not only are local and temporal price variations responsible for these different monetary poverty lines but any other contextual variability[5] could be legitimate to enter the analysis as well. In this sense we do not agree with the specific observation made by Ravallion and Bidani (1994:82-85) when they criticize the FEI method for generating urban and rural poverty lines for Indonesia of which the difference far exceeded general price differences between the two sectors. For example the additional deviation in poverty lines could be attributed to the more demanding lifestyle (in terms of resources) that urban citizens often face in order to being able to participate in social and

4 For a concise overview of Sen's capability approach and its relation with more traditional welfarist approaches, we refer to Sen (1999b).

5 Sen (1999a:70-71) has categorized this contextual variability into five sources of parametric variation which could influence the translation of income into capabilities and back.

economic activities, and this relatively compared to farmers in rural settings where such a capability may require less resources. To be sure, this suggestion to explain the discrepancy between poverty lines of two groups of people may not be read as an absolute defence of the FEI method: we too are convinced that this method may yield results that are also inconsistent from a functioning/capability perspective, but not for every reason that has been put forward in the literature by the CBN advocates. It is in countering some of the criticisms against the FEI method and confirming to others, we believe to provide better insights into the rights and wrongs of both these methods[6]. This is exactly what we will do in the following section. Thereafter, based on this discussion, we will eventually propose our own poverty line methodology in section 4.

6 In order to avoid a purely semantic discussion, this examination of the FEI and CBN method will focus mainly on the basic underlying principles to these methods rather than on the many different versions and applications there may exist in real world poverty measurement.

3. DIAGRAMMATICAL INSIGHTS

Since our basic concern expressed above principally relates to the poor contextual embeddedness of poverty lines, we opted to departure in this section from the FEI method, which is considered most appropriate to cope with this concern[7]. Hence, we will first give a brief account of the key characteristics of this method, along with its ideal extension. Next, we will discuss the main five criticisms put forward against its use, and re-evaluate their validity from a functioning/capability point of view. As inspiration for this section, we will heavily draw on Ravallion et al.'s influential work in Indonesia (Ravallion and Bidani, 1994) and Bangladesh (Ravallion and Sen, 1996) which resulted in discouraging the use of the FEI method and promoting the CBN approach as the only viable alternative. Yet, the main message here is to doubt this conclusion: when the consistency criterion is perceived from a functioning or capability angle, a lot of critiques against the FEI method will almost automatically dissolve.

The FEI method (so-called by Ravallion and Bidani, 1994) is a very popular and widely used approach to translate minimal energy requirements into corresponding poverty levels in the monetary space. In practice, one can compute the mean income of households whose energy intakes fall within a range from the prescribed minimal energy threshold. Other versions try to estimate functions (through regressions or other lines of 'best fit') between energy intake levels and total expenditure or income, whereby the coefficients are used to translate the energy threshold into an overall poverty line. Since the FEI method maps energy intakes against total income or expenditures, the corresponding poverty line gives the total amount of money that people typically need in a specific context of place and time to satisfy their food and non food needs. In light of Sen's framework to define poverty as basic capability deprivation rather than just having a low real income, this method offers a promising starting point at first sight: the identification problem of poverty is tackled based on an important characteristic (i.e. calories) of the crucial functioning "being adequately nourished", and not just in terms of income. Yet, and largely in line with Reddy et al.'s argumentation (2006:5-6), we also favour the more ideal case where (i) other characteristics too (such as proteins, fats, vitamins, etc) and their minimal thresholds enter the analysis as essential building blocks for the same functioning, (ii) –given the multidimensional character of poverty– more basic functionings are promoted (such as being adequately sheltered and educated), (iii) allowance is made to capture people's *ability* to pursue those basic functionings, in an attempt to measure the cost to dispose of a certain number of basic capabilities. This ideal approach of translating basic capability deprivation into a monetary equivalent[8], and applied to a highly disaggregated field of application, would finally offer the ultimate key to a sound way of poverty profiling.

Of course, given this idyllic prospect, it would be no surprise that compromises will form the main ingredient of the story hereafter. Not only do our data refrain us from fully taking context into consideration, but we will also need to look for shortcuts and introduce assumptions for many other aspects. One of the most important things in this regard relates to the difficulty –or even desirability– of accommodating point three above, i.e. how to capture the freedom notion attached to the (non) execution of a certain functioning? In this respect, Fleurbaey (2006) makes a strong case in preferring the use of 'refined functionings' over 'opportunity sets'. Compared to approaching capabilities by means of this latter concept, the refined functionings alternative offers a broader informational basis as it also allows considering final achievements,

7 Apart from this theoretical motive, the less demanding character of the FEI method in terms of price information also formed a practical reason to use this method as a first entry point.

8 This is what Sen (1999a: 83-84) would categorize under the indirect approach, as being one of three general ways to make the Capability framework operational.

next to a sole evaluation of the opportunity sets that preceded people's choices to lead a certain life. Apart from this theoretical argument not to neglect the functionings achieved, one can think of empirical applications where a focus on functionings alone might be sufficient or at least the only feasible possibility. Indeed, Robeyns (2006:353-354) states that the added value of working with capabilities instead of functionings becomes less pronounced in case of large-scale quantitative applications to measure well-being. Therefore, given our research objectives and the data available, we will readily limit our ambitions here to assess well-being solely within the space of functionings. Yet, a more comprehensive analysis which aspires to be also policy relevant, should exactly go beyond this functioning level by examining the real opportunities faced by poor people under their very specific circumstances. Given the more pronounced informational demands, such a complementary analysis will certainly form the subject of further and more detailed research.

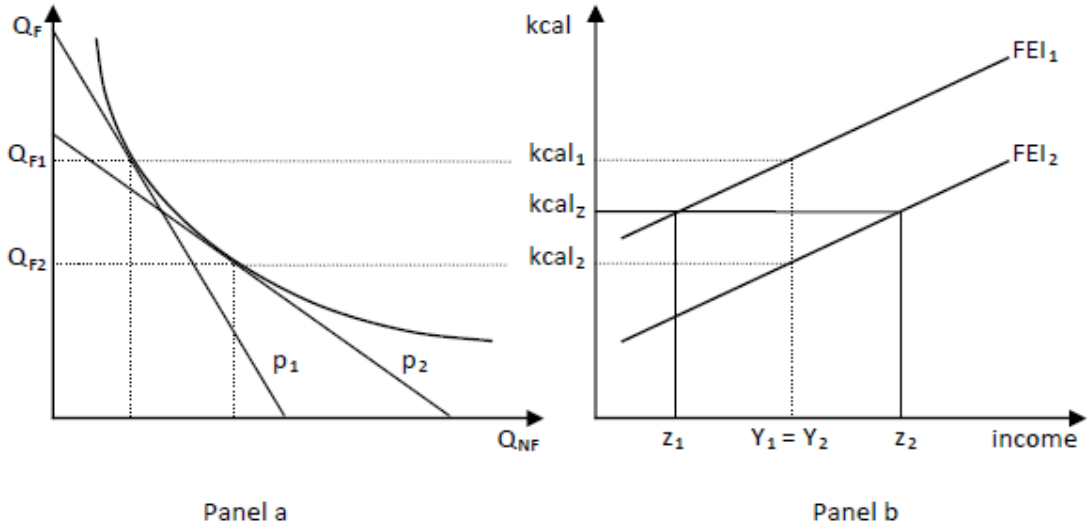
Now, having introduced the FEI method and the normative well-being framework based on achieved functionings, we are finally able to start re-evaluating each of the five main criticisms developed against the use of this poverty line methodology. All five elements in one way or another relate to the basic identification problem typical for any poverty analysis (i.e. who is poor and who is not?). In order to structure the remaining part of this section, we opted to set-up a gradual illustration in which the well-being of two fictive persons will be compared under slightly different circumstances. Each time the panel on the left will try to capture the differential behaviour of these two persons; whereas the right-hand side panel will illustrate the consequential effect of such a behaviour on the FEI method's derivation of poverty lines. To be clear, the first panel closely resembles to a standard illustration of consumer behaviour, except for the convex indifference curve which has been replaced by a similar-shaped iso-functionings curve. This latter curve connects equal levels of an aggregate value of functionings promoted by the various consumption bundles, containing quantities of a food (Q_F) and a non food (Q_{NF}) good. For the purpose of this illustration, it suffices to state that a certain trade-off between the consumption of both these goods generally exists, without needing to specify the exact aggregative function behind it. Indeed, if the non food good would be 'medical treatment', then a same level of the general functioning "being free from hunger and disease" could be obtained by different combinations of food and non food. Although this kind of graphical representations will tend to oversimplify reality, it will prove to be effective for clarifying our position vis-à-vis each of the FEI critiques, which we shall discuss now each in turn.

3.1 Relative Price Problem

A first argument against the use of the FEI method is that possible trade-offs between food and non food goods solely induced by different relative prices remain unchecked (Ravallion and Bidani, 1994; Ravallion and Sen, 1996). This is the case because the poverty line derived from the FEI method is unilaterally being benchmarked through the stipulated minimal energy requirements, while –from a multidimensional perspective– nutritional status (and thus the consumption of food) alone is not enough to fully describe someone's well-being. As Ravallion and Sen (1996:766-767) correctly highlight, even the FEI-proponents (at least) implicitly agree with this argument: if not there would be no added value in moving from caloric shortfalls to the monetary space. In other words, and to the extent other functionings than "being adequately nourished" are vital too, the consumption of non food goods besides food

items will become also important[9]. Now, to see more exactly how differences in relative price structure between food and non food may result in inconsistent poverty lines (and profiles), let's take a look at Figure 1. The example accompanying this figure assumes two persons, each of them hypothetically sharing the same income but facing a different relative price structure between the two available commodities; one food and one non food item. Let p be the relative price of food over non food whereby p1 < p2. Additionally, we assume that both persons are facing the same context, which could thus be represented by a same set of iso-functioning curves.

Figure 1: Relative Price Differences



Assuming further that both consumers try to maximize their functioning well-being, we find person 1 consuming relatively more food than non food compared to person 2 (panel a). The consequence of this different demand behaviour can be noticed in panel b, where the kcal-axis translates the food quantity into its corresponding calorie consumption[10]. Finally, the FEI method maps the energy intakes of the two types of consumers against their respective total incomes or expenditures. If we also assume that the commodity bundles of person 1 and 2 lie on the same iso-functioning curve (as in panel a), then the FEI method starting from any minimal energy requirement will yield two different monetary poverty lines. Knowing that both persons shared the same income and the same well-being (same iso-functioning), this result can only be considered as inconsistent.

However, there are two reasons why the inconsistency is bound to remain small in reality. First, around the 'minimal' food consumption, the marginal rate of substitution between the food and non food item will be quite high, thus limiting the potential trade-off considerably. This argument aligns with the common observation that people around the poverty line spend a large share of their income on calories. In graphical terms, the iso-functioning curves will become more angular when approaching this minimal threshold, and will thus limit the relative

9 Saying this we do not want to stress any straightforward relationship between the consumption of certain types of goods and the achievement of 'corresponding' functionings. For example, consuming food may not only effect nutrition- or disease-related functionings but possibly also signals one's ability to appear in public without shame, as another critical functioning in life. In a similar vein can many types of consumption imply just one functioning.

10 Since there is only one food item, the association between the amount of food and the total calorie intake is just a simple linear relation.

deviation between the two calorie functions FEI_1 and FEI_2. And second, people who face relatively higher food prices may tend to shift to cheaper calories as one of the many coping strategies. This latter possibility supposes an extension of our example in saying that Q_F is a composite quantity of more than one food item. As a consequence, the relationship between food and calories becomes more complex and depends on the underlying composition of the food basket. For our example, this would result in an upward shift of the FEI_2-line, reducing the relative deviation with FEI_1. Indeed, a study of the evolution of households in Kinshasa by De Herdt et al. (2008:410) has highlighted a dramatic shift between 1986 and 2004 from cassava to some more calorie-advantageous types of wheat such as maize and rice. Even though these two elements may downscale the alleged error being made due to a relative change in food over non-food prices, poverty lines generated with the FEI method remain inconsistent in this regard.

3.2. Superficial Notion of Nutritional Well-being

Secondly, the FEI method considers only one element of nutritional well-being, i.e. energy needs. Although this is an essential and overarching[11] characteristic of food, meeting these requirements not automatically represent a well-balanced diet containing also enough proteins and micronutrients, which are equally important. Indeed, in a recent study on food insecurity in 12 Sub-Saharan African countries, Smith et al. (2006:35) showed that there was no strong association between food energy deficiency and low diet diversity, which is induced by socioeconomic and cultural differences. In a similar vein, and linked to our assessment of the FEI method, this means that two equal poverty lines derived from equal calorie intakes may still vary substantially when it comes to intakes of other important nutrients. And thus –where this is the case and as long as diet quality forms an irreducible aspect of "being adequately nourished"– the derived poverty lines cannot be considered consistent anymore since they refer to different food security levels. Moreover, the FEI approach only measures 'intakes' which neglects two important elements of variability between individuals. The first one is the differential capacity to transform calories and other nutrients into energetic and nutritional outcomes, i.e. a person's metabolic rate. And secondly, differences in occupational activity levels too may cause similar intakes to yield different levels of "being adequately nourished"; something we will further discuss below. Both elements indicate that intakes as such are only proxies of being well-nourished. In this respect, anthropometric indicators are more useful, yet much less available. Although possible extensions towards other nutritional thresholds and/or outcomes seem feasible, the basic FEI method as such only works through calorie intakes.

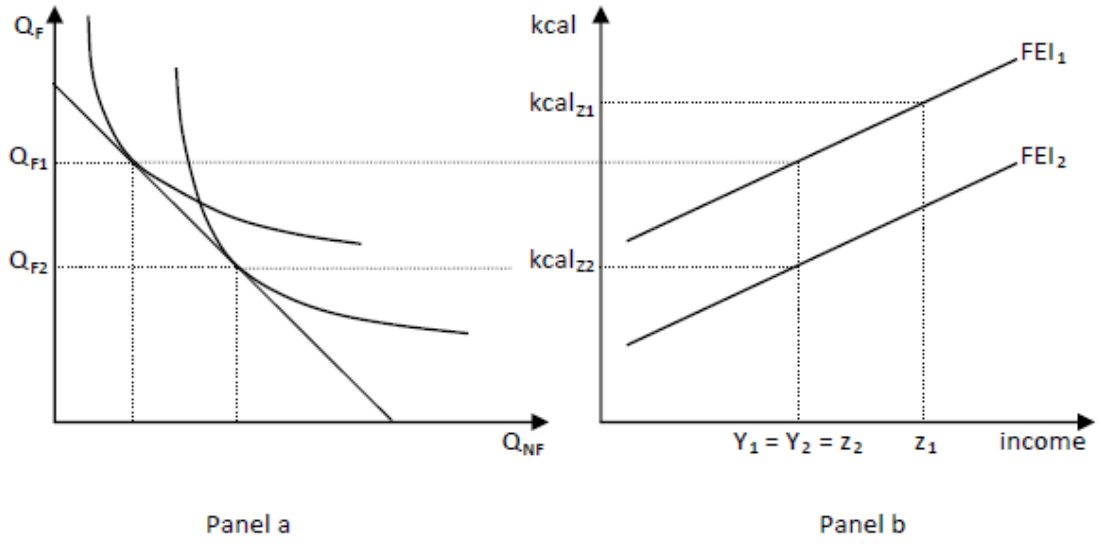
3.3. Differences in Activity Levels

Thirdly, it is said that different activity levels may inconsistently influence the setting of poverty lines derived from the FEI method. Urban jobs for instance, typically require less calories than rural jobs for any given income level (Ravallion and Bidani, 1994:80). According to us, this is an erroneous statement because the FEI method itself cannot be held responsible for this error. The real problem is exogenous to the method and lies in the incorrect fixation of a same minimal calorie threshold for sectors with differential energy 'needs'. Graphically, this contextual difference would mean that another trade-off between food and non food applies, resulting in different maps of iso-functioning curves for each of the two sectors. Now, if we

11 Overarching, in the sense that every food item contains at least some calories.

further reframe the example introduced above by imposing a same price structure between the two sectors and further keeping all other things constant, it becomes clear why the FEI method cannot be blamed for this presumed inconsistency. Indeed, given the more advantaged urban environment in this respect, it should be obvious that the same level of income would generate more well-being for the urban dweller than for the villager, all other things constant. By consequence, the iso-functioning curve of person 2 tangent to the budget constraint will entail a higher value than the optimal curve of person 1 under the same income restriction (Figure 2 panel a). Now, if we set different energy thresholds mirroring the differential needs for the two sectors under review, an evaluation of the resulting poverty lines with the equal income levels can be perfectly in line with the well-being ranking of the two persons. Whereas, as drawn in panel b, our urban citizen (person 2) has an income equal to his sector-specific poverty line, the villager's income (Y_1) falls short of what a poor person should earn in his respective sector.

Figure 2: Differences in Activity Level



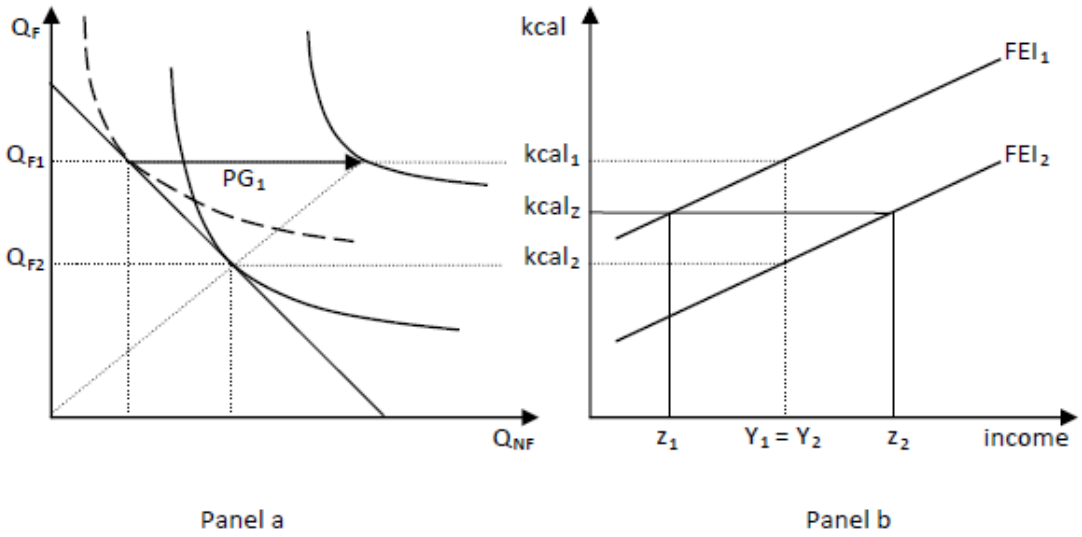
However, determining in practice how much these different energy requirements may vary between sectors with different energy needs would be a difficult exercise; and in any case it will not give due attention to all possible variation in activity levels within each of the sectors, as correctly highlighted by Ravallion and Sen (1996:767). Surprisingly, Ravallion and Lokshin (2006:408-410) do not seem to disagree with using different energy standards for different groups as long as this would correspond to heterogeneities in food needs: while testing the utility consistency of Russia's official poverty lines, the authors seem to accept higher energy requirements for colder regions.

3.4. Presence of Public Goods

Fourthly, the presence of public goods has been argued to influence the determination of poverty lines in an inconsistent way. We disagree with this statement. Consider the next extension of our example in which our two identical persons are still sharing the same

income and the same relative price structure. Furthermore, assume both are performing a similar type of job too (having thus similar energy needs), but person 1 has been fortunate to live in a place where a certain amount of non food is freely available (let's say a free visit to a doctor each week), whereas this is not the case for person 2. Again, the iso-functioning curves and thus the income allocation between our two persons will differ, and obviously person 1 in this case will be better-off under the assumption of equal incomes. Indeed, this could be easily noticed in panel a of Figure 3 where the provision of the freely available public good (i.e. horizontal arrow PG_1) will result in person 1 experiencing a higher functioning well-being than person 2. Given the fact that both persons have similar energy needs, we can employ an energy threshold which would yield different poverty lines for our two sectors under review. More specifically, a lower poverty line will be obtained for sector 1 where the public good was made available compared to a higher poverty line where this was not the case. Contrasting these divergent poverty lines with the equal incomes assumed, person 1 will always be deemed better-off than person 2, which only sounds very consistent given their respective levels of functioning well-being.

Figure 3: Presence of Public Goods



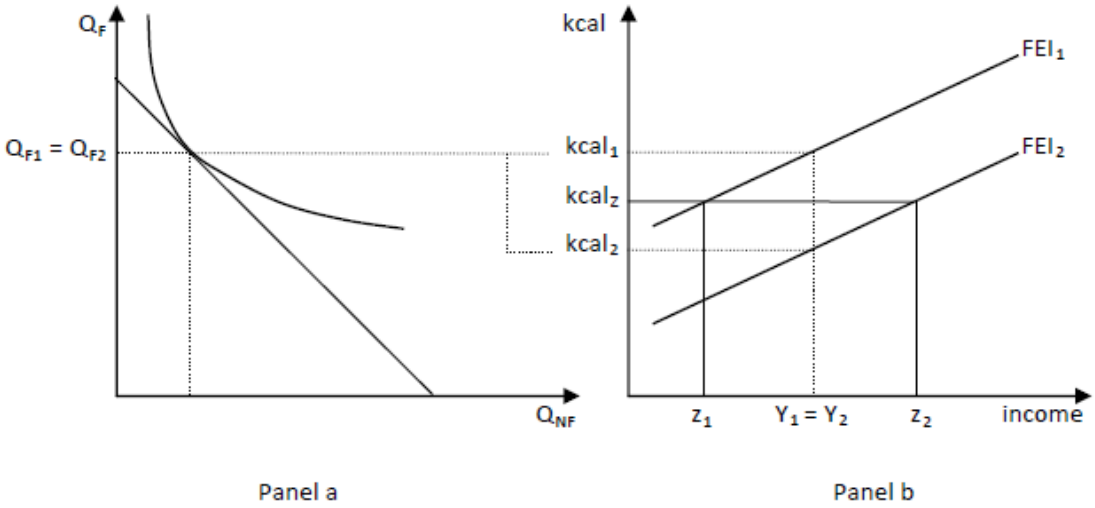
Ravallion and Sen (1996:767) argue that access to better schooling or health care centres may allow people to consume more expensive calories (containing more micronutrients) which would lead to higher poverty lines and thus could offset the more advantageous environment of public goods. While this argument seems very plausible, we should not double-count the criticisms against the FEI method: under the second critique above, we already disapproved the one-dimensional character of nutritional well-being comprised in the FEI approach, and we suggested to integrate notions of diet diversity instead of solely relying on energy intakes. When such an approach would be applied, the trade-off between public goods and nutritional well-being would disappear.

3.5. Tastes vs. Needs

Fifthly, it has also been said that differences in tastes can yield FEI poverty lines being mutually inconsistent. This can easily be understood from the well-known 'expensive taste

argument' raised as a critique against welfarism (Rawls, 1971; Dworkin, 1981): if we take individual preferences for granted, we may end up compensating unhappy persons with an already extremely expensive lifestyle to the detriment of very modest individuals who tend to be only slightly more happy. Applying this to our evaluation of the FEI method, we can indeed confirm that this may lead to inconsistent poverty lines. To see this, we must again consider Q_F as a composite variable, this time explicitly consisting of cheap (let's say maize) and expensive (let's assume cassava) food items. In Figure 4, we again hold every aspect between person 1 and 2 constant (i.e. identical persons, same income, same price structure, and same context) except for differences in taste: person 1 being a modest individual, happy with any composition of fufu[12]; and person 2 only willing to eat fufu that consists for 95% out of cassava.

Figure 4: Tastes and Needs



Resulting from the specific relative price structure between maize and cassava, we can note in panel b that FEI_2 is situated below FEI_1, therefore yielding a higher poverty line for the same calorie threshold. Consequently, persons with more expensive tastes are easier deemed to be poor than more modest individuals, a situation reasonably to be considered inconsistent.

This critique more generally counts for all sorts of behavioural approaches that take revealed preferences for granted (and which is truly the case for the FEI method). In the literature on social choice therefore, this argument of expensive tastes has led to the introduction of concepts as responsibility and merit, which supplemented welfare metrics with a notion of freedom: from welfare to 'opportunity for welfare' (Arneson, 1989), and to 'access to advantage' (Cohen, 1989) or from functionings to 'capabilities' (Sen, 1999b). Although this broadening of the informational basis may have conceptually eased the tension, the practical challenges however remain as to where exactly to draw the line for compensation, the so-called 'responsibility cut'. In fact, most of these revisions follow a very individualistic view; in the sense that individuals become fully responsible for their own well-being once all elements of 'brute luck' have been levelled out by the community. For several reasons, it has been argued that such a strict distinction between public responsibility and personal freedom is untenable (De Herdt and Deneulin, 2007; among others). Sociologically speaking, livelihoods are not shaped in isolation, but are temporal constructs of social and cultural interactions wherein persons try to

12 In the DRC, fufu can be considered as the national dish, which is a type of flour paste that is composed out of flour from maize and cassava.

shape their identities. Therefore, individuals' preferences revealed through their productive and consumption behaviour exceed more often than not the sole level of a person's own responsibility. This statement has important consequences for correctly labelling preferences as needs or tastes, and subsequently for blaming that the FEI poverty lines might be inconsistent. To see this, let's get back to the example of our two persons who were identical in all respects, but had different food tastes. Now, if person 2 lives in an environment where nothing else than 95%-cassava-based fufu is deemed appropriate to be part of that community and any deviating behaviour is not tolerated in this respect, this lifestyle rather reflects a real social need instead of an expensive taste, for which compensation by the planner seems much more legitimate.

Having said this, we think that for our specific research objective, the expensive taste argument may be less problematic than it seems, and this for two reasons. The first reason deals with our field of application; that of an African society where social states and individual circumstances are principally explained by 'luck' rather than by 'effort' (Platteau, 2007:22). Therefore, the range of activities for which a social planner could hold members of these societies responsible, is more limited than elsewhere. For example, when people in a certain community are wrongly convinced that malaria infection is just a question of brute luck, then withholding medicines to cure them seems more unethical in this case than when people were completely aware of all preventive measures and deliberately refused to make use of them. The second reason has to do with the central role given to caloric intake as the anchoring device to distinguish poor from non poor. Even though this variable is an imperfect surrogate for general nutritional well-being as already said above, one can not underestimate the fact that calories are extremely crucial, and often directly impact on the possibility to exercise other essential functionings in life. Therefore, it would be too harsh to state, at least in our opinion, that when a person's income allocation negatively impacts on that very crucial functioning of "being adequately nourished", that s/he just pursues a too expensive lifestyle. Furthermore, such observation could signal important additional information about the social and cultural limitations people face; relevant things that otherwise may remain unnoticed. Therefore, a total refusal to allow preferences entering the analysis under the pretext of possibly accommodating unjustified tastes, would seem in our case of analyzing the distribution of poverty and well-being in this culturally and socio-economically highly diverse country much too restrictive.

In line with this latter reasoning which stresses the overall importance of "being adequately nourished", we could go further by attaching even more gauging power to this very crucial functioning. This is, in our opinion, exactly what the FEI proponents (implicitly) assume, and what Reddy et al. (2006:7-8) have framed as the 'equiproportionality assumption'[13]. Of course, this assumption that all other functionings in all circumstances perfectly act as communicating vessels with nutritional well-being is certainly too severe. Indeed, achieving certain functionings can sometimes be extremely expensive or even completely impossible, what makes pursuing them senseless. Consequently, the FEI method may lead to wrong overall well-being and poverty estimates. For example, people living in very remote areas in the countryside may forego the endeavour to see a doctor to get some medical treatments. As a result, these people may divert the money that people in other areas would devote to medical health care, to something else that is available; food for example. Consequently, people living in these remote places may then be falsely considered much better off than their homologues in areas where medical services do exist; which sounds very counter-intuitive. This 'absolute price'

13 Reddy et al. (2006:7) define the equiproportionality assumption as follows: "we make the operational assumption that if the food energy intake of the reference quintile falls below 2,100 kilo calories by x percent, the shortfall in other required characteristics (and in the commodities that possess these characteristics) is x percent as well".

problem, which relates in the literature on price indices to the 'new goods bias' (Blow et al., 1999:12), is actually nothing more than an extreme illustration of the relative price problem as explained above: the budget constraint now completely coincides with one of the two axis. To a lesser extent but equally applicable here as a reproach to the equiproportionality assumption for being too severe, is the 'quality bias' (Blow et al., 1999:16): in many cases people in more remote areas may have access to some sort of health care, but quality may differ enormously from the health care centres in more urbanized zones. When well-being indicators are based on the FEI method, this quality bias can have a similar but less pronounced effect on the valuation exercise, as compared to the new goods bias.

3.6. FEI Method, Which Way Now?

In sum, the use of the FEI method seems to entail both a blessing and a curse, which in any case should urge one to be cautious when using it. However, depending on the specific research set-up, the data available and the exact methodology applied, the blessing may considerably outweigh the curse. Most essentially, by having replaced the traditional welfare metric of utilities by one of functionings –in which the FEI method is intrinsically more rooted– we are better equipped to reconcile the characteristics of specificity and consistency, as discussed above. Apart from all arguments made above to counter or downplay the problematic features of a pure FEI method, we still need to make operational choices and accommodate the remaining elements of critique. More specifically, we still have to deal –partially or completely– with (i) the relative price problem, (ii) the incomplete notion of nutritional well-being as measured through calorie intakes, (iii) different nutritional needs across sectors, and (iv) the potentially problematic introduction of illegitimate preferences into our well-being analysis. In the following section, we will try to settle each of these issues while introducing our own methodology to make household budget data comparable across different regions in the DRC. Thereafter, these context deflated data will in turn be used to draw geographical profiles of well-being and poverty.

4. DATA, CONTEXT AND METHODOLOGY

In this section we will present a specific methodology to compute a set of local poverty lines, which in turn shall be used as deflators to level the consumption data of different households across the DRC. In pursuing poverty lines that are 'specific' enough to incorporate the relative cost to achieve the same level of basic functionings in varying areas of the country, we are convinced that the resulting deflators will not only correct for price differences but also –partially– for many other circumstantial factors that may impact on people's livelihoods and for which we do not want to hold them responsible[14]. Thus, the resulting equivalent incomes aim to be consistent, and thus comparable, beyond a person's sole purchasing power. In order to determine such context-sensitive but functioning-consistent poverty lines, we will follow a technique which closely resembles to the FEI method, but is sufficiently adapted to avoid the potential pitfalls discussed in the previous section. Nevertheless, given the data at our disposal, we may sometimes be obliged to resort to rather arbitrary shortcuts when no other alternative is valid or achievable. But before introducing this specific methodology, we will first give a brief account on the 1-2-3 Survey itself (along some other relevant data sources we will use in section 5) and on what we consider for our objective to be a primary and crucial element to define 'context' in the first place.

4.1. Data and Context

In 2004/05 the DRC's National Institute for Statistics executed, under the authority of the Pilot Unit for Congo's PRSP and supported by a team of Afristat and Dial, a broad household and expenditure survey that followed the so-called methodology "1-2-3 Survey". In this methodology each number refers to each of the three phases involved: employment, informal sector and consumption. The final sample covered more than 12.000 households and assured by means of random stratification coverage close to one thousand households for each of the 11 provinces[15] (Ministère du Plan, 2008). Given its large scale and acceptable quality, this dataset provides a unique and scarce opportunity to quantify the living standards across this vast country. Previous household and expenditure surveys were often limited to the capital Kinshasa or date back from the mid eighties and before. However, some other large-scale household surveys do exist[16], yet without recording expenditures. Among this type of surveys, we find the two Multiple Indicator Cluster Surveys executed in 1995 (MICS1) and in 2001 (MICS2), and the recent Demographic and Health Survey (DHS) which dates back from 2007. Whereas these three latter surveys draw profiles on health and education among children and women, other available studies are more linked to agriculture, such as the very recent 2007-2008 survey executed by the World Food Program (WFP) on food security and vulnerability. Finally, we would like to draw some attention to the national Human Development Report (HDR) of 2008. Notwithstanding the specific focus of all these studies, they allow for a partial confrontation with the results from our dataset, as we will do in the following section.

Up till now we have refrained ourselves from defining what we exactly mean by 'context'. Entering this practical stage, we are obliged to dissolve this vagueness in order to

14 The authors are fully aware that this implies normative judgements to be made.
15 A few months after the data collection (end of 2005), the Congolese population by means of a referendum approved a new constitutional law subdividing the country into 26 provinces. Given the time-frame, these new developments have not been taken into account in the specific sampling setup of the survey.
16 See De Herdt et al. (2008:403) for a graphical overview of the most important available surveys executed in the DRC until 2005.

know the dimension and level where to apply our own poverty line methodology. In the World Development Report of 2009 on Reshaping Economic Geography, it is said that "The best predictor of income in the world today is not what or whom you know, but where you work" (2009:1). Given the highly fragmented economy as a result of the country's natural geography combined with its specific historical trajectory, we are convinced that this quote also fits the DRC very well. Furthermore, spatial cleavages in Congo become even sharper or more cross-cutting when other elements of cultural and socio-political heterogeneity are added, features which are equally important for constructing people's identities and livelihoods. Now, in line with these highly diverse multi-layered spatial realities, we decided to use geography as a first natural delimiter to approach 'context'. Apart from the evident remark that such partitioning should be supplemented with information on diversity beyond geography, we still need to decide on the exact level of aggregation. Ideally, we would focus on a level that splits the country into a series of completely homogeneous regions. Such demarcation lines do not exist and choices will largely depend on the data available.

In this respect, the 1-2-3 Survey allows us to delimit 56 separate 'localities', which were obtained from the 26 pools that were used to logistically organise the execution of the survey[17]. Subsequently, we subdivided each of these pools into 1, 2 or 3 localities according to the sampling selection and sector to which they belong[18]. Three types of sectors have been identified in the 1-2-3 Survey: statutory cities (villes), smaller cities (cités) and villages. As a result, each of the 56 localities (except two) comprises more than 100 households surveyed, which should be sufficient for the procedures to follow. The choice of these so-called localities was inspired by our attempt to focus on the most decentralised level of geographical information in order to capture enough of the economic, political and social diversity of the country; but at the same time they assure enough observations within each of them. Whereas the first element seeks to broaden the informational basis by giving due attention to contextual variability; the second part however should allow us to make the necessary adaptations when countering the remaining methodological issues highlighted in section three above.

That our assumption of a thoroughly fractionalized economy is very much linked to reality (and which thus legitimizes our explicit concern for specificity), can be illustrated by means of Figure 5, which shows for each locality the Fisher Price Index for food computed according to the multilateral EKS-method (Deaton et al., 2008:8-11). This figure should be read as follows: if food in Kinshasa Ville would cost 100 CF, then the same cross-weighted food basket would cost 64 CF in Matadi Ville, and respectively 49 CF and 37 CF in the smaller cities and villages around DRC's main harbour. This sole observation of general food prices being substantially more expensive in Kinshasa than in Matadi Ville, is already very instructive – judging this inter-city connection as probably the most economically integrated area of the country. Indeed, closer examination of all other price indices reveals a huge variability in food prices between all 56 localities throughout the country: for major cities these indices seem to vary between 100 for Kinshasa and merely 28 for Gbadolite; range from 80 for the smaller cities surveyed from the pool of Tembo to 27 for those in Lubumbashi's pool; and fluctuate between 79 for the villages around Tshikapa to barely 14 for the rural settlements around Gbadolite.

Figure 5: Fisher Price Index for Food per Pool and Sector[19]

(Kinshasa=100; Villes-Cités-Villages)

17 Note that with this decision we may have increased the probability of delimiting more homogeneous areas.

18 Hence, this means that not every stratum was covered in each of the 26 pools. In the counterfactual case, we would have obtained 78 localities.

19 Given the extended time period during which this survey was executed (i.e. more than one year), a small inflationary error might be present in these indices, especially regarding Kinshasa which acted as a

Source: Own computations based on the 1-2-3 Survey (2004-05), and displayed by means of the QGIS-software (www.qgis.org) and Africover dataset (www.africover.org).

The exact story behind all those food price variations certainly falls outside the scope of this paper, as it comprises a complex analysis of local productive capacities, market access and local demands for food. However, explaining the much higher food prices in Kinshasa is not really a challenge, considering the huge demand expressed by the 7 million inhabitants of this second largest city in Africa, combined with its almost complete dependency on imported food from other provinces (not to mention the extremely high transaction costs involved during this transport process). How these price differentials exactly impact on people's food security depends on their nominal income levels, which will be part of the analysis in section 5.

4.2. Our Methodology

Having defined the localities for which to construct context-specific poverty lines, we finally enter here our own methodology to which we would give priority when dealing with the objectives and data limitations at hand. From the previous section, it is clear that the FEI method was considered the most natural candidate to assure a poverty line being sufficiently

pilot phase. However, when these price indices would be applied to the dataset in order to translate nominal into real incomes, this error would automatically dissolve because the corresponding incomes exactly refer to the same time period as the price information.

specific to its corresponding locality, and without becoming inconsistent as long as we could accommodate the four remaining problematic features (as summarized by the end of section three). However, with respect to our problem of illegitimate preferences, we have nurtured an adequate remedy. Indeed, by having kept the size of each of the 56 localities sufficiently large, the probability that individual tastes besides social needs may influence the results, is highly reduced. Additionally, in order to better reflect the genuinely accepted preferences even more, we discard those households within each locality who belong to the first and last decile, as ranked by total consumption per adult equivalent[20]. As such, each locality is reduced to 8/10th of its original size, but now only contains those households with the most common and typical consumption behaviour, thus better signalling the 'true' local circumstances. Furthermore, since our particular methodology will work through the computation of poverty lines, opportunities for deviant behaviour will anyway be more reduced and limited to only a few, probably highly similar, survival strategies (as compared to higher well-being levels where more divergent budget allocations are feasible)[21]. And finally, while discussing this issue in the preceding section, we also referred to the more anthropological view within many African societies that many things exceed a person's individual responsibility and often entail a more social dimension.

As far as this issue, related to illegitimate preferences, can be considered sufficiently settled, we then still need to find similar ways to accommodate the remaining critiques related to (i) the relative price problem, (ii) the imperfect notion of nutritional well-being as measured through calorie intakes, and (iii) the different activity levels observed across sectors. Of course, since fully conclusive answers to each of these elements will often be infeasible, the added value of this section must be understood in terms of its capacity to neutralize or limit the remaining problematic features.

In the previous section, we agreed in principle with the critique that the FEI method is unilaterally approaching nutritional well-being on the basis of calorie intakes alone. Despite the fact we won't be able to go beyond 'intakes' nor will we be capable to know the distribution of intakes 'within' the household, we certainly should be capable in extending the one-dimensional anchoring device of calories. That this theoretical remark is also empirically important can be seen in Table 1. In this table we calculated the average diet diversity for each of the 11 provinces by applying a seven-point score card to each household's food basket. Inspired by Arimond et al. (2004:22-24), who used a 24h recall period to assign one point for each time a food item from a different food group was consumed, we opted to follow a similar procedure but by investigating the household's expenditures during a 3-day period[22]. By tripling the reference period, the methodological difference of recalling consumption versus tracking purchases will be more levelled out, thus controlling for households which buy food for a few days at once. Thus, for Kinshasa we could notice substantially higher diet diversity than for any other Congolese province, and the reverse is true for North Kivu –both being controlled for differences in calorie levels. More generally, of all 55 pair wise combinations of provinces, we

20 In this respect, total consumption comprises all expenditures minus savings, investments and gifts to others, but increased by gifts received in kind and imputed household rents. As for the equivalent scale we opted to parameterise the effects of household composition and size separately, by writing the equivalent adults as $(NA+\delta NC)^{\theta}$, in which NA=number of adults, NC=number of children, δ=0.7 and θ=0.85 (Drèze and Srinivasan, 1997)

21 This argument was also brought up in section 3 when downscaling the potential inconsistency problem related to different relative price structures between food and non food goods.

22 This period actually refers to the first 3 days during which households were supposed to keep track of their expenditures. Given the broad interval (more than 1 year) in which the 1-2-3 Survey was executed, systematic seasonal differences in availability of food products between provinces could not be fully excluded.

found 46 means of diversity scores being significantly different from each other. In other words, where a Congolese is living seems to have a significant impact on the diversity of his daily meal beyond differences in well-being (here defined by calories) that may occur between provinces.

Table 1: Diet Diversity Card for each Province

Province	Mean	N	Std. Deviation
Kinshasa	5.81	962	1.151
Bas-Congo	5.37	987	1.063
Bandundu	4.44	1327	1.259
Equateur	5.15	1444	0.997
Orientale	4.58	1259	1.156
Nord-Kivu	4.17	1078	1.275
Maniema	4.49	853	1.057
Sud-Kivu	4.60	809	1.181
Katanga	5.01	1352	1.048
Kasai-Orientale	4.90	999	1.128
Kasai-Occidentale	4.53	983	1.469
Total	4.85	12053	1.250

Note: Controlled for differences in calorie intake based on quartiles of kcal intake per equivalent adult, the main effect of 'province' is still significant up to 0.05. Further Post-hoc analysis indicated that this significant mean difference in diet diversity occurred for 46 of all 55 pair wise combinations.
Source: Own computations based on the 1-2-3 Survey (2004-05).

Having illustrated that the general critique of calorie-unilateralism embodied in the FEI method also constitutes a real empirical issue here, we may then consider on how we could translate information other than calories into monetary terms, i.e. how should this information on diet diversity be valued in Congolese Franc? Since to our knowledge no such method exist that can avoid an unacceptable degree of arbitrariness, we need to revert in one way or another to some alternative of the same FEI method. Yet, we can still include some notion of diversity by trying to introduce next to calories another characteristic. A crucial requirement however is to dispose of a natural threshold to distinguish sufficient from insufficient intake. Within the category of macro-nutrients, we think proteins can serve our needs in this respect: food composition tables generally give accurate information on the protein content of a certain food amount, and minimal thresholds for intake have been set as well. By consequence, the original FEI method could be easily extended by bringing in this nutritional indicator as a second independent variable (next to calorie intake) into a multiple regression, in which the resulting coefficients are then used again to translate both thresholds in monetary terms (i.e. the overall poverty line). In order to obtain the necessary data to run such regression, we need to compute the calorie and protein intakes per adult equivalent for each of the 12000 households. This is done by summing the calorie and protein content per adult equivalent for all food outlays per household, which in turn resulted from the computation of a set of locality-specific food prices and the necessary food compositions tables (see annex for much more detail about these computations). Although nutritional well-being also comprises a sufficient intake of micro- and other macro-nutrients, the insertion of protein information is certainly a move in the right direction, and in our case the only immediately feasible one.

As a logical extension to this discussion, we still need to find reasonable thresholds to represent dissimilarities in caloric needs between people living in different sectors[23]. As

23 Since we just extended the notion of nutritional well-being by information on protein intake, it is important to mention here that –apart from differences in needs related to age or gender, which we took into account while computing the protein intake per adult equivalent– we did not found information about

highlighted in the previous section, we rather considered this as a problem exogenous to the method itself. Indeed, as far as one may consider the determination of different energy needs being one of the many duties of a poverty analyst, the potential inconsistency this may create for the FEI-method, is merely a practical problem of where drawing the respective minimal thresholds for each sector. At best, one should apply these requirements on the very individual level, corresponding to the energy needs of the person's occupational profile. However, as it would be extremely difficult to assign all possible types of jobs to a certain specific energy threshold or even to just categorize jobs under broad headings as light, moderate and heavy work, we were obliged to resort to a much more crude sector-wide differentiation. In India, national poverty agencies explicitly set the minimal rural energy needs 300 kcal higher than the urban equivalent (Government of India, 1993:9-10). Since very little has been written on the differential energy requirements between sectors that would be deemed necessary, we took this differentiation of 300 kcal at face value in order to arrive at the following thresholds: 2550 kcal for urban zones (statutory and smaller cities) and 2850 kcal for rural regions, both per day and for an equivalent male adult of 30 years old. Thus, with these differential energy requirements we tried to accommodate mean variations in activity levels between people living in those different sectors, but at the same time we thereby remained within the range delimited by the prescribed levels of light and moderate energy requirements (being 2500 kcal and 2900 kcal respectively[24]). By assuming the caloric needs of a teacher and a farmer to equal those of correspondingly light and moderate activity[25], we therefore think to have better approached reality since of course not all urban dwellers have sedentary jobs, nor do all villagers work on the land.

Finally, with respect to the relative price problem between food and non food items, we would first like to remind the reader that the consistency error as explained above might be quite limited given the crucial importance of nutrition around the poverty threshold. However, this advantageous empirical characteristic may again be offset when the relative price problem becomes an absolute one; for example in case when a basic functioning-promoting non food good is completely unavailable. Therefore, this problem should be dealt much more accurately, as we intend to do by modifying the pure FEI method on three distinct levels. First, since the relative price problem originates from a total neglect of potential trade-offs between food and non food goods, we propose to follow a multiple-step procedure of first setting a food and then a non food poverty line[26]. Then, given the many important virtues related to its context-sensitive nature, we suggest to compute the food poverty line on a FEI-like basis, but now by regressing calorie and protein intakes against total food consumption; and using the resulting regression coefficients and nutritional thresholds to obtain this line.

Second, in order to better approach our ideal scheme of pricing the goods to achieve other basic functionings as well, we also opted to derive the house rent of a typical poor dwelling. Indeed, being adequately sheltered is often considered one of those other basic functionings in life. However, for sheltering there exists no similar natural threshold as for nutritional well-being under which one can be deemed poorly housed. Therefore, we need to

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significant differences in protein needs between different sectors. As a result, this practical problem remains limited to finding appropriate sector-specific calorie thresholds.

24 These thresholds are taken from FAO/WHO/UNU (1985) as published in Smith et al. (2006:25).

25 If one would categorize the caloric needs of a farmer as 'heavy work' (which corresponds to 3400 kcal per day and which may seem better representing reality), one would in our DRC case inflate poverty rates to such an extent that poverty decompositions as tools for identifying intervention priorities become worthless. More in general, given the highly divergent opinions on where exactly to draw a poverty threshold, any poverty analysis should always check the robustness of its statements over a broader range of potential poverty levels.

26 As this is common practice in poverty line measurement, we do not claim any originality here.

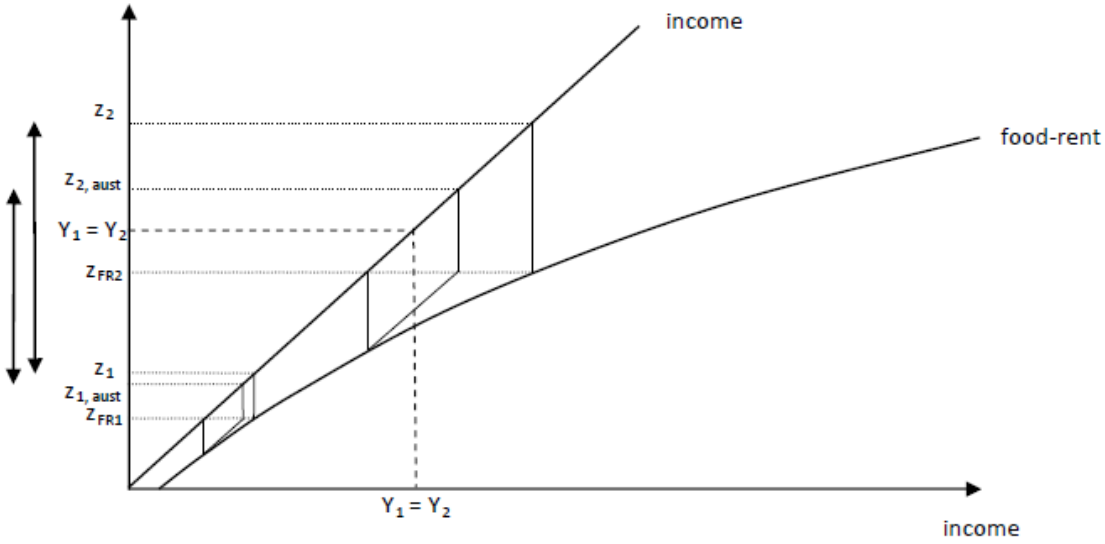
revert in one way or another to the nutritional thresholds in order to demarcate the characteristics of a 'poor house', which then can be priced afterwards. Though, this is a worthless exercise if we would propose to follow such a procedure for each of the 56 localities. Indeed, computing the mean rent of houses characterised on the basis of the nutritionally poor in each locality, and adding this house rent to the food poverty line, will essentially result in nothing more than what a one-step procedure of the FEI-method would bring about (see below), and this is exactly what we wanted to avoid in order to give due attention to potential trade-offs. On the other hand, determining the average rent in each locality of a poor house of which the characteristics have been identified by averaging over all the nutritionally poor in the DRC, would lack too much specificity given the diverse climate conditions throughout this country and the sociologically defined opinions on how a (non) poor house would look like. As a consequence, we defined 9 types of poor housing based on the three broad climates that prevail in an equal number of topological areas (i.e. the Congo Basin, the Southern and the Eastern Highlands), and the three sectors that have been identified in the survey. Subsequently, we computed for each locality the mean house rent of all houses that match the poor housing characteristics of the climate and sector to which that respective locality belongs. In annex, much more detail is provided about the housing characteristics involved and the exact computational procedures.

And third, after adding the food poverty line with this poor house rent (let's call this the food-rent poverty line), we then still need to make a final allowance for all remaining non food goods, responsible for the promotion of other basic functionings next to being adequately nourished and sheltered. In the literature, several techniques have been proposed to add such a non food allowance; ranging from simply adding an arbitrarily chosen percentage of the food-rent poverty line, over dividing this line by the average food-rent share of those households around the food-rent threshold, up to much more technical procedures (Ravallion et al., 1996:771-772). Since this paper is about context-sensitivity, we would not opt to use an arbitrary mark-up. Nor do we think that dividing each food-rent poverty line by its locality-specific share in total expenditure of those households on the verge of poverty, would be a good idea in our quest to reduce the inconsistency created by relative price differences[27]. Indeed, applying the latter procedure would again be essentially the same as mapping the nutritional and housing thresholds against total consumption directly, thus neglecting potential trade-offs induced by relative price differences between food and house rent on the one side and other non food goods on the other. As an alternative, we would therefore opt to apply a procedure proposed by Ravallion and Bidani (1994), in which the remaining non food allowance could be defined as that part of the budget that is "spent on non food goods [next to house rents] by households that are able to reach their nutritional [and housing] requirements but choose not to do so" (1994:87-88). Then, simply summing up the food-rent poverty line and the remaining non food allowance would result in what they call the 'austere' overall poverty line. Now, that such procedure would also reduce the degree of inconsistency in our case can be shown by means of the following figure, in which the example from Figure 1 is taken up again. Briefly rephrasing that illustration here, we observed different poverty lines for both price contexts although both identical persons shared the same income and the same level of well-being (as revealed by the same iso-functioning line). In Figure 6 these results are shown on the vertical axis: Y_1, Y_2, z_1 and z_2 being respectively the income levels and poverty lines of person 1 and 2. These latter two poverty lines, which are the result of the pure FEI method, could also be obtained by following a

27 Given the introduction of poor house rents above, we can easily translate the relative price problem now as one between food and house rents on the one hand and other non food goods on the other.

multiple-step procedure of first calculating the two food-rent poverty lines z_{FR1} and z_{FR2} (on a FEI-like basis as described above), and then adding a context-specific non food component based on the remaining non food expenditures typically observed in those households which were just able to finance their food and housing needs. Yet, when we would calculate the austere poverty lines for both contexts, then the non food allowance would only equal the budget allocated to other non food items by those households who could just (but did not) meet their nutritional and housing needs, only if all their budget would be diverted to this end. Not only will those respective austere poverty lines $z_{1,aust}$ and $z_{2,aust}$ always be smaller than the more traditional z_1 and z_2, but the former will probably also lie relatively closer to each other than the latter two lines; thus reducing the degree of inconsistency created by a different relative price structure (check the length of the vertical arrows!). The underlying reason for this convergence is Engel's law[28] which graphically results in a strictly increasing and concave food-rent curve[29].

Figure 6: Non Food Allowance



Of course, by applying the austere poverty lines[30] we do not claim to have fully excluded all potential inconsistencies due to a different relative price structure, just as protein intake was only a limited extension to better measure diet diversity. Nonetheless, combining all elements (initial arguments about limited degree of inconsistency, 2-steps procedure in which the poor house rent was (partially) separately calculated, and combined with a specific manner to determine the remaining non food allowance), we are convinced that the residual level of inconsistency is highly reduced, and certainly does not outweigh the richer contextual information we may derive from still using a sort of FEI-like approach.

28 Engel's law states that the income elasticity of demand for basic necessities (like food and housing) is less than unity and decreases with increasing incomes.

29 Actually, for each price context there exists a separate food-rent curve. However, given our explicit focus on incomes around the poverty threshold, the income elasticity for food and house rents will be close to unity for all food-rent curves, and thus will graphically not differ substantially from each other.

30 To be clear, our choice to work with austere poverty lines (as context deflators) is mainly informed by its capacity to reduce this type of inconsistency. After having deflated all expenditure data by means of these lines, we will revert to the more traditional type of poverty line when it comes to profiling poverty.

4.3. To Summarize

At this point, we have dwelled extensively on several theoretical and methodological issues related to what we would call 'FEI-like methods'. Having arrived at the end of this section, we think we may conclude that one should not, in principle, be refrained from using this kind of methods. Besides, a FEI-like method more than any other approach seems to be better equipped to capture the indispensable contextual information in order to make well-being assessments more equitable in terms of people's functionings. Indeed, from this perspective, equity considerations necessitate a much broader informational set than solely data on people's purchasing power. Yet, FEI-like methods can also have important drawbacks when they are insufficiently adapted to avoid certain residual sources of inconsistency. Whereas in section 3, we provided theoretical counter-arguments for some of the main critiques employed against the use of a pure FEI method; in this section, we rather focused on proposals to methodologically accommodate the residual valid elements of criticism. Now, before jumping to the more practical results in section 5, we would like to briefly summarize here the main elements of our proposed methodology.

1. On the basis of available geographical information, we defined 56 localities resulting from the division of the number of pools along the three sectors surveyed in the dataset.

2. Over a smaller interval (+/-1000 kcal and +/-30 prot)[31], we ran 56 separate multiple regressions between the logarithm of food consumption per adult equivalent per day (dependent variable) and the logarithm of daily caloric and protein intakes per equivalent adult (two independent variables).

3. By filling in the minimum daily caloric thresholds of 2550 and 2850 kcal per day for urban and rural zones respectively, and a daily protein threshold of 49 gram (no sector differentiation seemed to be necessary for this type of nutrition) in each of the regression functions, we obtained the locality-specific daily food poverty lines.

4. By using climate information as well as our division of the country into three sectors, we identified 9 different housing zones. For each of these zones, we repeated the same procedures of point 2 and 3 in order to obtain the zone-specific daily food poverty line. Of all households in each of these zones whose food expenditures fall within 10% of the zone-specific food poverty line, each time the median characteristic of a set of housing characteristics has been selected in order to identify the attributes of a typical poor house. Based on these 9 sets of poor housing characteristics, we derived the minimal daily housing budget necessary to rent such a house in each of the 56 localities. Summing these housing budgets with the corresponding food poverty lines, we obtained 56 locality-specific food-rent poverty lines.

5. Similar to Wodon (1997:96-97), we opted for a non parametric procedure in order to compute the austere non food allowances for each of the 56 localities. Basically, we calculated the overall mean of non food consumption (house rents excluded) of those households which fall within 10 slightly increasing intervals defined over the intersection point where the food-rent poverty line equals total consumption.

6. By adding the food-rent poverty lines of point 4 with the austere non food allowances under point 5, we obtained a set of overall austere poverty lines (one for each of the 56 localities). Finally, after assigning 'one' to the overall poverty line of Kinshasa, we were able to easily compute a set of corresponding deflators wherewith to level the consumption data across the DRC. As such, each adjusted consumption level should then be assessed through

31 This was done to make the assumption of linearity for regressions more acceptable.

the lens of a Kinshasa inhabitant with the specific socio-economic and cultural context that prevailed this city at the time of survey. Table 2 gives an overview of all these locality-specific austere poverty lines, along with their corresponding deflators.

Table 2: Overall Austere Poverty Lines and Deflators for the 56 Localities[32]

POOL	SECTOR					
	Villes		Cités		Villages	
	Z_{aust} in FC	Deflator	Z_{aust} in FC	Deflator	Z_{aust} in FC	Deflator
KINSHASA	490.19	1.000				
MBANZA-NGUNGU			395.88	0.808	246.17	0.502
MATADI	391.31	0.798	284.29	0.580	197.21	0.402
BANDUNDU	250.79	0.512			165.37	0.337
KIKWIT	204.48	0.417			135.15	0.276
KENGE			274.90	0.561	182.98	0.373
TEMBO			477.87	0.975	296.14	0.604
MBANDAKA	275.19	0.561			113.85	0.232
BOENDE					156.50	0.319
LISALA			180.94	0.369	107.25	0.219
GBADOLITE	161.33	0.329			107.49	0.219
KISANGANI	275.47	0.562			150.63	0.307
ISIRO			195.34	0.399	117.50	0.240
BUNIA			341.30	0.696	225.88	0.461
GOMA	287.53	0.587	209.68	0.428	183.32	0.374
KINDU	288.19	0.588	241.35	0.492	263.27	0.537
KISANGANI2[1]					204.84	0.418
BUKAVU	423.46	0.864	285.76	0.583	310.97	0.634
LUBUMBASHI	284.63	0.581	135.94	0.277	168.89	0.345
KAMINA					185.44	0.378
MANONO					99.70	0.203
KOLWEZI	288.12	0.588			207.32	0.423
DILOLO					195.08	0.398
MWENE-DITU	266.40	0.543	199.22	0.406	228.45	0.466
MBUJI-MAYI	348.96	0.712			280.73	0.573
KANANGA	261.84	0.534	230.98	0.471	242.51	0.495
TSHIKAPA	405.74	0.828	214.56	0.438	372.45	0.760

1 The pool of Kisangani also served to survey some of the villages in the Province of Maniema, therefore giving rise to a separate locality.
Source: Own computations based on the 1-2-3 Survey (2004-05).

32 Again, as for Figure 5, these deflators may not be considered at face value since they may refer to slightly different time periods. Yet, the expenditures to which these deflators will be applied and the underlying information on the basis of which they were constructed, are perfectly consistent, and thus constitutes no problem as long as one remains within the 1-2-3 Survey framework.

5. DISTRIBUTION OF WELL-BEING AND POVERTY IN THE DRC IN 2004/5

In this section, we will make our methodology operational by applying the set of 56 locality-specific deflators to the consumption data of the 1-2-3 Survey. Given the particular way in which we elaborated the underlying poverty lines (i.e. the methodology described above), we are convinced that the resulting budget information has become more comparable in the true sense of the word. Indeed, this comparability should be understood beyond a person's sole purchasing power to acquire commodities, as it also tries to take stock of the socio-cultural context wherein these purchases take place and how these commodities function to generate a person's livelihood. As such, the deflators we have presented above can be considered as context deflators correcting for general differences in functioning power, which is more than being solely price correctors to measure people's synthetic purchasing power[33]. However, thinking that our method in practice will always assess these circumstantial factors in a correct and consistent manner is a bridge too far. Yet, considering the extremely vital character of the two basic functionings we have employed to build up our method (i.e. being adequately nourished and sheltered) together with some other corrective measures induced, we judge our context-deflated budget data to be appropriate for making equitable well-being and poverty comparisons.

Simultaneous to such a well-being and poverty analysis[34], it would be interesting to know the relative merits of our method vis-à-vis other possible techniques we could apply to the data, also in order to possibly check the robustness of the policy conclusions we might draw from this analysis. Next to this, we should also try to triangulate the forthcoming results with information from other, mainly non budget, surveys around the same time period. For both these considerations as well as for the well-being and poverty analysis itself, we will again follow a strictly geographical approach by examining estimates for sectors and provinces.

To our knowledge, one other similar exercise has been executed to spatially level the budget information of the 1-2-3 Survey. This exercise, led by Afristat, followed a more traditional technique of pricing expenditure baskets in different spatial areas. More specifically, they computed for each of the 11 provinces the Fisher Index, which is the geometric mean of Paasche and Laspeyres indices. However, lacking prices on non food goods, the expenditure baskets only comprised food items, but which still represent 63% of the overall budget of all families in the DRC (Afristat, 2006:10). In the second column of Table 3, we provide these 11 Fisher-based provincial deflators computed by Afristat, along with the corresponding sector and provincial estimates for mean consumption; the first column is reserved for estimates where no spatial correction has been enforced on the data. In the following columns of the same table, we present the impact of slightly differential methods on the set of deflators as well as their resulting effect on mean consumption. Successively, we present the results of the Afristat method as they would result from applying the geographical division into 56 localities instead of 11 provinces[35]. As such, we derived 56 Fisher indices of which then a weighted provincial average has been computed according to the prevailing survey design. Afterwards, we show the deflators and mean consumption according to the most pure FEI interpretation applied to each of our localities (i.e. mapping calorie intake against total consumption, with no calorie

33 Of course, this methodology only tries to account for general differences between localities; contextual diversity within each of the 56 localities remains largely unaffected.

34 For a more detailed and less methodological account on DRC's distribution of well-being, poverty and inequality (and with a specific focus on the country's ongoing decentralization process), we would like to refer to Marivoet (2009).

35 By consequence, this completely aligns with the estimates displayed in Figure 5 above.

differentiation per sector). Next, we repeat the same method but we do accept calorie needs to be different between sectors (i.e. 2550 kcal for urban and 2850 kcal for rural zones). In a sixth column, we display the effect of also including a protein threshold, but still mapping all nutritional requirements (minimal protein and different calorie thresholds) against total consumption. And finally, we present the provincial deflators and effect on mean consumption according to our own method, as described in section 4.

Table 3: Mean Consumption According to Different Sets of Spatial Deflators

	No spatial correction	FISHER (11 Prov)	FISHER (56 Loc)	Pure FEI	FEI (kcal)	FEI (kcal-prot)	Our method
	SPATIAL DEFLATORS						
Kinshasa	1	1.0	1.000	1.000	1.000	1.000	1.000
Bas-Congo	1	0.8	0.438	0.371	0.394	0.462	0.506
Bandundu	1	0.7	0.310	0.259	0.278	0.333	0.388
Equateur	1	0.6	0.205	0.202	0.215	0.234	0.267
Orientale	1	0.6	0.326	0.313	0.338	0.375	0.419
Nord-Kivu	1	0.6	0.311	0.314	0.334	0.366	0.411
Maniema	1	0.8	0.328	0.360	0.390	0.449	0.499
Sud-Kivu	1	0.7	0.491	0.449	0.483	0.517	0.652
Katanga	1	0.6	0.355	0.303	0.319	0.335	0.398
Kasai-Orientale	1	0.8	0.506	0.437	0.461	0.471	0.565
Kasai-Occidentale	1	0.6	0.630	0.480	0.526	0.549	0.637
	MEAN CONSUMPTION PER ADULT EQUIVALENT PER DAY (FC)						
Urban	466	608	761	738	736	745	663
Rural	243	374	728	860	782	692	599
Kinshasa	561	561	561	561	561	561	561
Bas-Congo	302	377	689	843	784	659	604
Bandundu	194	276	608	725	671	555	478
Equateur	173	288	871	871	807	747	659
Orientale	269	448	823	906	831	750	663
Nord-Kivu	283	472	896	892	829	758	667
Maniema	329	411	995	922	852	739	672
Sud-Kivu	226	323	451	492	459	431	341
Katanga	322	536	866	1038	969	917	770
Kasai-Orientale	398	498	759	880	835	819	680
Kasai-Occidentale	388	646	617	802	734	695	603
Total	311	445	738	823	768	708	619

Source: Own computations based on the 1-2-3 Survey (2004-05) and Afristat (2006:11).

Now, when looking at Table 3, it should be clear that methods do matter a lot. First of all, when no spatial correction is enforced on the data, we will clearly overestimate the cost-of-living in the other provinces compared to Kinshasa: for each of the methods, all provincial deflators are consistently lower than 1, being the Kinshasa reference. By consequence, the real consumption level of people living outside DRC's capital is on average always higher than what their respective nominal consumption level would indicate, no matter which of these sets of spatial deflators are employed. However, the degree wherein nominal levels are adjusted, highly depends on the specific method used: whereas the Afristat method proposes relatively small corrections (i.e. deflators ranging from 1.0 to 0.6), the pure FEI method would advise much more severe corrective measures (i.e. deflators even up to 0.26 and 0.20 for Bandundu and Equateur, respectively). If we look at the resulting impact of these two latter –highly divergent– sets of deflators, we could notice that for the Afristat methodology the urban sector

would be almost two thirds richer than the rural sector. Yet, on the contrary, when applying the set of pure FEI deflators, the rural (!) sector on average would become more affluent than the urban one (respectively, 860 FC against 738 FC both per equivalent adult and per day). Contrary to Ravallion and Bidani's (1994:82-85) reasoning that this latter observation would be inconsistent because of the poor correspondence between the underlying deflators and the general price levels (as measured through the locality-based Fisher method), we too are convinced that such discrepancy in mean consumption levels between the two sectors would be hard to qualify but not for the same reason. Having followed the discussion throughout this paper, it is rather the pure interpretation of the FEI method one should reject, and not the method itself. Indeed, after having coped with the residual sources of inconsistency in our method, we can notice that people's living standard in urban areas is on average roughly 11% higher than the one of their compatriots in the rural sector (respectively 663 FC against 599 FC). By examining the mean consumption level per sector while gradually moving away from the pure FEI method to our own proposal (i.e. from the 4th to the 7th column), we could derive the importance of each of our small adjustments, all resulting in a relative improvement of the urban sector. In sum, we could state that urban residents (compared to rural villagers) relatively profit from less calorie demanding occupational profiles, a cheaper intake of protein-rich food, and a better access to decent housing facilities and other non food goods.

However, given the fact that the relative difference in living standards between sectors as measured through our own method is quite similar[36] with the results obtained by using the 56 Fisher Price Indices, one might not resist the temptation in saying that both methods to level the budget data are in this case actually interchangeable. Moreover, one might be even tempted to suggest that our method is nothing more than a complex way of simply assuring that expenditures are sufficiently corrected for differences in purchasing power, and that this would be de facto our only concern. That this statement is invalid directly follows from the theoretical and methodological discussions of sections 2 and 3. To summarize again the main points: first, the degree of specificity comprised in the calculation of price indices is quite moderate, since the same cross-weighted basket of commodities forms the anchoring device to assure consistency over different geographical areas. Moreover, the socio-cultural context in which these commodities are acquired and where they will be employed as instruments to achieve functionings and to build up a livelihood, is completely neglected. Now, having arrived at the end of this paper, we can also show from an empirical angle that the similarity between relative living standards of sectors is purely coincidental, and that both methods surely not always boil down to the same thing. Indeed, if we move our lens to the provincial estimates for mean consumption, we can notice quite some difference in the relative ranking of provinces: whereas the people in Maniema, North Kivu and Equateur surprisingly seem to dispose of the highest purchasing power of all Congolese (using the locality-specific Fisher Indices), their relative ranking vis-à-vis other provinces significantly decreases to respectively the 3rd, 4th and 6th position when we would consider functioning power as approached by our own method. Although a thorough explanation of these findings goes beyond the scope of this paper (as well as a quality assessment of the underlying data used), we can easily mention the ongoing conflict in the eastern part of the country as one of the main causes why people in Maniema and

36 The relative difference between the average consumption levels for both sectors yields to 10.7% and 4.5%, respectively for our own method and for the one using the Fisher Indices (each time the urban sector being richer than the rural one). This degree of similarity would even increase when one would be able to incorporate the price level of non food items into the calculation of these Fisher Indices. Indeed, since non food goods are in general relatively cheaper in cities than in rural areas, these indices will then relatively decrease for the urban sector, resulting in higher urban living standards when using these updated Fisher Indices.

North Kivu[37] seem to be unable in transforming their economic power into basic functioning achievements. Indeed, in times of war people may divert money from buying food or paying for shelter to other, probably more security-related, expenditures. As a consequence, being adequately nourished and sheltered becomes more expensive in such specific circumstances, which is captured through the resulting higher relative FEI-like poverty lines and deflators, and thus lower relative well-being levels. Further, people in South Kivu who are equally involved in the same war mainly seem to suffer just from an extreme lack of purchasing power, be it a relatively lower income or relatively higher prices or both, but which may also have its origin in the ongoing conflict. Remarkably enough, on this same side of the well-being spectre we also find DRC's capital Kinshasa, occupying the 3rd last position when adopting our own method. The most convincing argument to qualify this observation refers to standard economic theory which states that a combination of low supply and high demand will result in higher prices and an erosion of purchasing power. Indeed, the province of Kinshasa is almost completely dependent on the (food) production outside its borders, but at the same time houses more than an estimated 7 million people. Complementary to this explanation, we may notice a similar poor performance of Bandundu and to a lesser extent Bas-Congo, which are –due to their geographical location– the two main domestic suppliers of the capital city.

Now, after having assessed the added value of our context-deflated consumption vis-à-vis other well-being measures, we would like to abandon the 1-2-3 Survey framework and examine some other sources of information that may confirm or disconfirm the conclusions so far. As already highlighted in section 4, all other budget surveys on a national scale date back from before 1986, and thus would offer no means to triangulate our results with. However, in 2001 and 2007 two large scale representative surveys have been executed (respectively following the MICS and DHS methodology) to map the educational and health profiles of children and women. Agreeing that none of these two vulnerable groups may perfectly match with a 'typical' Congolese, nor that any health or schooling indicator can be a good proxy for well-being in general, we are convinced that information on the 'body mass index' (BMI)[38] of women can –at least to some extent– provide important information to check our results. Therefore, one can observe in Table 4 the ranking of sector and provinces according to the percentage of women between 15-49 years suffering from chronic energy deficiency (i.e. registering a BMI index lower that 18.5), both for 2001 and 2007. In the middle part of the same table (in order to create a sort of chronological order between the 3 surveys), we have also computed the sector and provincial poverty headcounts based on our context-deflated budget data and a poverty line of 589FC (1.47$) per day, which corresponds with the poverty line we obtained for Kinshasa as it were when we added the more traditional non food allowance instead of the austere non food component. As such, we can observe that the overall poverty headcount yields to 61.4%, and varies between 50.8% for Katanga and 90.7% for Sud-Kivu. When comparing the ranking of provinces according to these poverty estimates with the one based on the average context-deflated consumption (see Table 3), one could notice a few important differences which are informative for assessing the degree of inequality within a provincial distribution. Among the most noteworthy examples, we find the Equateur province only occupying the 6th place in terms of average consumption, while it performed second-best with respect to poverty. And exactly the reverse is true for Kasai-Orientale. Correspondingly, this implies that the latter province seems to be more unequal than the former. Yet, this

37 For Equateur, other contextual arguments may be put forward to explain the discrepancy between purchasing and functioning power.
38 The BMI-indicator measures chronic energy deficiency as the ratio of weight over the squared height of a person (RDC, 2008a:177).

relatively good performance for Equateur is not reflected by the provincial ranking of women's nutritional status: both for 2001 and 2007, Equateur has performed even second-worst (though a small improvement from 24.4% to 19.7% could be observed). However, according to the survey done by the World Food Program in 2007-2008, the province of Equateur can indeed be ranked second-best: this province displays the second-lowest proportions of families characterized by a poor or a limited alimentary diet (WFP et al., 2008:62-63). On the other hand, for Kasai-Orientale, we can observe a strong correspondence between the nutritional and the expenditure data: whereas in 2001, this province occupied the 4th position, it slightly fell down to a 6th place according to our dataset and the information on chronic energy deficiency coming from the DHS in 2007. Further, and completely in line with the average consumption level, Bandundu turns out to be among the worst in terms of poverty headcount and female caloric deficiency, the latter highlighting more than 30% of women having a BMI index lower than 18.5 in 2007, a decrease of several percentages with respect to the MICS of 2001. On the other side of the spectre, we can notice –surprisingly enough– that the women in Nord-Kivu seem to be each time, in 2001 and 2007, the least undernourished of all, which does not really comply with our expenditure data pointing to a poverty headcount of 53.3% (a result equally doubtful for being too low considering the tragic events that have occurred meanwhile). Moreover, the nutritional situation in Sud-Kivu seemed to have drastically increased from 22% of women having a deficient BMI-index towards only 9.2%, an improvement we could certainly not confirm using the 1-2-3 budget dataset: the poverty headcount for this province amounts to an extremely high value of more than 90%. Drawing again on the results from the WFP, these unexpected observations for North and South Kivu are significantly disconfirmed: the highest percentage of families registering a poor alimentary diet, are located in South Kivu (WFP et al., 2008:62-63), which is completely in line with our context-deflated poverty results. For North Kivu on the contrary, it seems indeed that the ongoing conflict did not have a similar dramatic impact on women's BMI as was the case for South Kivu, though not being trivial either: according to the WFP study, North Kivu occupies the median position in terms of shares of its population having a poor and limited alimentary diet, again more in line with our results. With respect to the least poor province Katanga, registering a poverty headcount of 50.8%, the nutritional data on calorie deficiency at first sight do not seem to match: whereas in 2001 Katanga occupied the median position with a percentage of 17.7% of women with a BMI index lower than 18.5, it climbed to the 4th place in 2007 due to a moderate improvement in its female caloric deficiency. Yet, giving more credit to the World Food Program when it comes down to figures for both Kivus, Katanga would automatically mount to the second-best position in 2007, which would again correspond with our budget data. For Kinshasa, we can notice a significant decline in calorie deficiency from 15.6% in 2001 to 19.1% in 2007, accompanied with a tumble from the 5th position towards the third-last of all provinces. This latter information completely aligns with the provincial poverty estimates, yielding to a considerable 69.0%, as well as with the average context-deflated consumption of Table 3. Of course, the conclusion that Kinshasa no longer leads the nation remains striking, and should be examined much more thoroughly and possibly confronted with other pieces of information. Unfortunately, Kinshasa was no part of the survey sample executed by the World Food Program.

Table 4: Triangulation with MICS2 and DHS

Ranking	MICS2 (2001)		Our method (2004-05)		DHS (2007)	
	Sector	**%BMI<18.5[1]**	**Sector**	**P0[2] (%)**	**Sector**	**%BMI<18.5[1]**
	Urban	13.2	Urban	59.2	Urban	15.9
	Rural	19.2	Rural	62.3	Rural	20.6
	Province		**Province**		**Province**	
1	Nord-Kivu	6.4	Katanga	50.8	Nord-Kivu	8.1
2	Maniema	7.8	Equateur	52.1	Sud-Kivu	9.2
3	Orientale	10.2	Nord-Kivu	53.3	Maniema	9.3
4	Kasai-Orientale	13.6	Maniema	53.7	Katanga	13.1
5	Kinshasa	15.6	Orientale	53.8	Kasai-Occidentale	14.8
6	Katanga	17.7	Kasai-Orientale	58.2	Kasai-Orientale	16.6
7	Kasai-Occidentale	20.2	Kasai-Occidentale	60.1	Bas-Congo	16.9
8	Bas-Congo	20.4	Bas-Congo	61.0	Orientale	17.3
9	Sud-Kivu	21.5	Kinshasa	69.0	Kinshasa	19.1
10	Equateur	24.4	Bandundu	78.0	Equateur	19.7
11	Bandundu	28.1	Sud-Kivu	90.7	Bandundu	30.7
	Total	**17.3**	**Total**	**61.4**	**Total**	**18.5**

1 This column gives the percentage of women between 15-49 years of age who register a body mass index (BMI) lower than 18.5.

2 These poverty headcounts result from applying a daily 589 FC-poverty line (1.47$) to our context-deflated budget data. This poverty line corresponds with the food and non food needs of the Kinois at the time of the survey (i.e. the non austere poverty line).

Source: Own computations based on the 1-2-3 Survey (2004-05), and estimates from the second Multiple Indicator Cluster Survey (RDC 2002) and Demographic and Health Survey (RDC 2008a).

Finally, we would like to compare our results with some distributional estimates figuring in two important documents recently published, one being the country's first PRSP finalized in 2006 (RDC, 2006) and the other is the national report on human development of 2008 (RDC, 2008b). Again, we will follow a geographical perspective in displaying summary statistics for sector and province. In sum, we present in Table 5 two clusters of results according to our own method, along with the corresponding estimates coming from the national HDR and PRSP as well as crude attempts to recalculate these latter two statistics. In doing so, we try to isolate the differential features underlying each of these results in order to be able to make more sound comparisons and assessments. More specifically, we redisplay in the 1st and 4th columns respectively the average daily consumption (but converted in $PPP05) and the poverty headcount, both following the procedures of our method as in Table 3 and 4 above. Further, in column 2 we show the mean daily provincial 2003 estimates for the gross domestic product according to the HDR, but reconverted into PPP-dollars coming from the most recent ICP of 2005 (the estimates figuring in the HDR were based on the previous ICP-round which produced for the DRC a highly unreliable PPP conversion factor). Similarly to the second column, we present in line 5 the sector and provincial poverty headcounts produced in the country's PRSP, in which a discretional poverty line was used for urban and rural areas. And lastly, in columns 3 and 6, we attempt to approach these latter two series of statistics by using the 1-2-3 dataset.

Table 5: Triangulation with HDR and PRSP

	DAILY MEAN CONSUMPTION ($PPP05)			POVERTY HEADCOUNT		
	Our method	HDR 2003-estimates[1]	HDR-proxies[2]	Our method	PRSP-estimates[3]	PRSP-proxies[4]
Urban	3.09	-	1.58	59.2	61.5	64.3
Rural	2.80	-	0.83	62.3	75.7	75.0
Kinshasa	2.62	2.05	1.91	69.0	41.6	46.6
Bas-Congo	2.82	0.94	1.05	61.0	69.8	69.0
Bandundu	2.23	0.22	0.67	78.0	89.1	90.2
Equateur	3.08	0.18	0.58	52.1	93.6	91.1
Orientale	3.09	0.22	0.94	53.8	75.5	71.8
Nord-Kivu	3.11	0.76	0.95	53.3	72.9	75.5
Maniema	3.14	0.49	1.14	53.7	58.5	57.8
Sud-Kivu	1.59	0.46	0.76	90.7	84.7	82.8
Katanga	3.59	0.92	1.10	50.8	69.1	69.9
Kasai-Orientale	3.17	0.55	1.34	58.2	62.3	62.1
Kasai-Occidentale	2.81	0.58	1.30	60.1	55.8	58.8
Total	2.89	0.67	1.06	61.4	71.3	72.0

1 These 2003-estimates for the gross domestic product per person are the result of two important adjustments applied to the data figuring in the country's HDR (RDC, 2008b:157): (i) re-conversion of old into new PPP$ based on the ICP 2005 (World Bank, 2008:23), (ii) transformation into daily estimates.
2 For these proxies, we simply computed the average nominal daily consumption level per capita, converted into PPP$. Thus, no spatial correction or any equivalence scale beyond per capita-measures was employed to the data.
3 These poverty headcount estimates were simply copied from the national PRSP (RDC, 2006:23).
4 For these proxies, we inflated the Kinshasa budget data with 26% and used a sector-specific correction based on the urban and rural poverty lines calculated in the PRSP (RDC, 2006:22). Further, no equivalence scale beyond per capita-measures or any sizing variable was used to generate these poverty headcounts.
Source: Own computations based on the 1-2-3 Survey (2004-05), and estimates from the national Human Development Report (RDC 2008b) and the national Poverty Reduction and Strategy Paper (RDC, 2006).

Starting with an analysis of the poverty headcounts, we were able to compute quite the same output as in the PRSP: (i) the overall headcount only differs 0.7%, and (ii) except for the provinces of Kinshasa, Orientale and North Kivu, all poverty estimates remain within a confined range of 2.5%. As a result, the ranking of provinces according to the HDR estimates and the method we followed to proxy them is quite similar too. Thus, assuming these small differences only result from a slightly different underlying dataset, we can much better assess the quality of the spatial estimates presented in the PRSP document. First, given the fact the survey in Kinshasa functioned as a pilot phase and therefore took place several months ahead the actual execution in other provinces, we needed to slightly inflate the budget data of the families in Kinshasa. In line with the recommendation of the previously mentioned Afristat report, we opted to multiply all Kinois expenditures with 1.26, highlighting an inflation of 26% between November 2004 and mid-2005. Considering the 5% difference in the poverty headcount of Kinshasa, the actual multiplicator used to compute the PRSP output seems to have been higher. Second, as briefly explained in the PRSP (RDC, 2006:22), two separate poverty lines have been constructed to demarcate the poor from the non poor. As such, one arrives at an annual poverty line of 153265FC per person in urban areas and a similar line of 97655FC for the rural sector (RDC, 2006:22). In this manner, the analysts of the country's strategy to reduce poverty have tried to correct for some spatial differences in purchasing power, though be it on a very crude basis. Indeed, since no other spatial correction have been applied, the use of these discretional poverty lines would simply signify that the price level in all urban areas throughout the DRC is assumed to be same, just as for all villages in the country.

And third, it also seems that no equivalence scale has been used to allow correcting for economies of scale as well as differential needs between different household members. In other words, two Congolese living in two different cities (or villages) in Congo and both having of a same income per day are considered equally well off, notwithstanding their precise location (and highly diversified purchasing power this may imply, see again Figure 5) and notwithstanding the fact being a child or adult as well as being a member of a small or large family. Given these shortcomings[39], we would of course favour our own method, which tries to take all these elements in due account.

With respect to the HDR estimates, a similar clear-cut comparison seems to be infeasible, not at least because the underlying data is completely different: the figures in column 2 are produced on the basis of formal statistics of the Central Bank and the National Institute for Statistics, along with provincial estimates on the distribution of population and income, the latter dating back to estimates from 1996-1997 (RDC, 2008b:154). Following a procedure of linear interpolation for which strong assumptions needed to be made, the authors were able to produce provincial estimates for the annual 2003 gross domestic product per person in $PPP. In Table 5, we have rescaled these figures on a daily basis and adopted the most recent PPP conversion factors (see World Bank, 2008:23). In our attempt to approach these latter figures and in line with the severe third hypothesis of a constant spatial price level (resulting in the use of an identical nationally defined PPP conversion factor for all provinces (RDC, 2008b:155)), we removed the equivalence scale and did not enforce any spatial correction on the budget data. Indeed, only when no allowance was made to correct for spatial differences in purchasing power, we were able to find a similar marked gap between the average levels for Kinshasa as compared to all other provinces. To be sure, the HDR estimates point to a gross domestic product of Kinshasa being more than double as large as the ones of the second and third most important provinces, being respectively Bas-Congo and Katanga. And more or less the same is true for our HDR-proxies, though to a less pronounced extent in general and with the exception that Maniema and both Kasai's seem to be economically more important than Bas-Congo and Katanga. The specific observation that the overall consumption per capita as measured through our proxy is almost 60% higher than the one calculated by the HDR (1.06$PPP against 0.67$PPP), can further be easily attributed to the highly informalized economy of Congo, and this despite the fact that the gross domestic product next to consumption in theory also comprises a savings component. Indeed, whereas the HDR-estimates are based on formal national accounts, the 1-2-3 Survey directly measures consumption no matter whether this consumption originates from a formal or an informal economic activity. As such, the difference between both figures could form an illustration of the economy's degree of informalization. Thus, considering all these elements and notwithstanding the fact a sound comparison here is beyond reach, we would again largely favour our own methodology and data, which seems to be better equipped to deal with the highly fractionalized and informalized economy of the DRC.

To conclude this section, we would like to draw the reader's attention to the fact that our context deflated consumption as such may not be considered as a fully fledged indicator to measure personal advantage. Indeed, in order to make our methodology operational, we quickly resorted to functionings and discarded people's capabilities to function (see section 3). By consequence, the spatial estimates on mean consumption and poverty

39 Another element which has not been taking into account and which is required in order to avoid counting poor families instead of poor persons (heads), is correctly sizing the results according to family size (which is something different than applying an equivalence scale). Indeed, if one would apply such a sizing variable, the overall poverty headcount for the DRC would increase to 80.4%, indicating that poor households in general tend to be larger.

headcounts should be looked upon from a static angle, and provide no insights in the dynamics and opportunities that have led to these outcomes. From a policy perspective, however, this fuller picture comprising assessments on livelihood and vulnerability should become available as well, in order to decide on priorities and characteristics of intervention. Therefore, further research should focus on trying to map these underlying schemes of opportunities, which can be done –among other things– by means of asset-based approaches. An interesting hypothesis to test in this regard would be whether Kinshasa would move up in rank again when these broader dynamics were also considered as part of the analysis.

6. CONCLUSIONS

In this paper, the authors presented a specific methodology to account for contextual differences beyond price differentials. Indeed, if one only looks at relative purchasing power to make well-being comparisons, one risks to ignore some very relevant and crucial features embedded in the specific context that may facilitate or constrain people in their pursuit to make ends meet. Both when discussing the relative merits of two commonly used methods for setting poverty lines as when analyzing world poverty estimates, the degree in which 'context' should be accommodated, becomes the subject of debate. The essential part of this debate deals with the exact location on the trade-off between consistency claims and considerations of specificity. Although on a theoretical level this tension was already settled some time ago, we still needed to make a similar investigation along these two criteria when employing our methodology to a household and expenditure survey of the DRC.

Lacking qualitative price information on non food goods together with a strong preference to give due attention to context, the FEI method was a natural starting point for our analysis. After having explained the basic features of this method, we went through all of the major criticisms raised against its use. By means of a series of micro-economic diagrams combined with a simple gradual example in which the traditional welfare metric of utilities was replaced by functionings, we were able to capture more insights into the rights and wrongs of this method. With respect to differences in activity levels and the presence of public goods, we refuted the alleged problematic character for reasons external to the method or effects of double counting. Although mitigating arguments have been put forward in our specific case study for the remaining critical elements, we eventually agreed there could still be a structural problem as a result of (i) different relative price levels between food and non food goods; (ii) the one-dimensional benchmark used; and (iii) the behavioural approach employed which allows illegitimate preferences entering the analysis.

Within the proposed methodology we tried to accommodate each of these remaining criticisms, and made operational choices where possible and necessary. As a result, we give priority to a particular three-step procedure of first determining the food poverty line on a FEI-like basis, but fixed both on sector-specific caloric thresholds and on protein intakes, all in order to guarantee context-specificity as well as to broaden the notion of nutritional well-being. In a second stage, we compute the minimal housing budget necessary to afford a dwelling matching a set of poor housing characteristics defined over nine different socio-climatic areas. And finally, to this food-rent poverty line we add a particular non food allowance. The way in which this latter allowance is calculated combined with our food-rent poverty line (which by definition comprises both food and non food goods) should be sufficient to cope with the potential problem of different relative prices. And finally, when the entire three-steps methodology is applied to a well-defined unit of geographical disaggregation, we are convinced that the problem of illegitimate preferences does not compensate for the locality-specific information we may acquire through this method. Now, by having used this particular poverty line methodology as a basis to construct spatial deflators, we conceptually tried to bridge the PPP-technique applied to the poor with the literature on human development. Yet, given the data available, our analysis was inevitably built on a very superficial reading of this latter literature since we only examined two, though very essential, basic functionings (namely being adequately nourished and sheltered). Moreover, we also assumed that these functionings of well-being resonate quite well with other basic functionings; saying that a shortfall in nutritional and housing well-being expresses equivalent shortfalls with respect to other basic dimensions. Of course, this assumption needs to be examined more thoroughly in future research.

In a final section, we compared sets of deflators of all intermediary steps comprised in our methodology with other, externally and internally computed, spatial price indices. This comparison allowed us to better assess methodological differences as well as the impact of our successive adjustments. Although our focus was to give due attention to contextual variability beyond purchasing power, it should have been clear that a well-ventilated price scheme has already a very high added value on its own, especially considering the deeply fractionalized economy of the DRC. Yet, our final method still adds more crucial information to the analysis as could be noticed through an examination of the relative provincial rankings based on mean consumption levels. Further, we tried to triangulate our, sometimes remarkable, results with other important surveys and reports which directly or indirectly document on the spatial distribution of (some aspects of) well-being and poverty around the same period. As such, we were able to either confirm most of our output or criticize the particular methodological approach used by others. Now, following our methodology, Katanga is clearly faring best, and South-Kivu and Bandundu respectively worst and second-worst, all both in terms of context-deflated average consumption and poverty headcounts. Further, we could notice some significant divergence between the rankings based on mean consumption and poverty for the provinces of Equateur and Kasai Oriental, pointing to a more equal distribution of wealth in the former case and a more unequal in the latter. Finally, one could not forgo the remarkable fact that the capital city of Kinshasa is among the poorest regions in the country, an observation which should prompt researchers to complement our methodology with other approaches that may better capture the dynamics behind poverty.

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ANNEX

Since the FEI method is a nutrition-based approach to set monetary poverty lines, those willing to apply this technique should have an idea of the nutritional value of the household food expenditures. Often, this could be easily done by investigating the corresponding food quantities consumed for each food outlay. For our dataset, this simple procedure would have been inaccurate for two reasons: firstly, the variable covering food quantities seemed to be much less reliable than the associated expenditure variable. And secondly, next to the module for daily capturing of food purchases which provided prices and quantities of each purchase, there was also a module using a recall period of 12 months and which only recorded the total amount paid. Hence, in order to have an idea on nutritional well-being, we needed to derive locality-specific food prices from our sample to obtain the quantities that each household would have consumed on the basis of their respective outlays. Below, we provide a detailed technical account on how exactly we derived those food prices, and subsequently the total calorie- and protein-consumption per household's equivalent adult.

Additional explications on the calculation of food prices per locality

In contrast to common practice in the North, many African countries make use of local measurement units (like ekolo, sakombi, etc) to quantify weight or volume, instead of well-known standardized measures as pounds, kg or litres. Moreover, it was highly unsure that these local units were more or less the same throughout the country. As a consequence special teams were charged to measure and weigh the households' purchases at least 2 times during the period of daily registrations (on average, this period was 15 days), which gave rise to a separate dataset covering the standardized weights of each of those food purchases. This together with the full dataset of daily registrations provided all the necessary information to calculate local food prices per standardized unit in each of the 56 localities. More specifically, for each of the localities the procedure we adopted went as follows:

1. In a first stage the data of the first and the tenth expenditure[40] deciles were discarded to avoid including possibly non representative consumption behaviours.

2. Then total expenditures were ranked per food item and per local measurement unit through which the item was acquired. The first ranking was based on the combination of food expenditures registered in the daily and non-daily dataset, whereas rankings per local unit by default solely relied on the daily food purchases. (Moreover a test-variable was introduced to cope with potential irregularities encountered between the variables quantity, unit price and total amount paid for each purchase; the latter variable being the most robust).

3. Subsequently, we calculated the mean price for the most common local unit for each of the 90% most important food items within the total food basket. If for a specific food item the mean price for the most common local unit was based on less than 30 observations, we computed the mean price of the second most common unit, then the third if necessary and so on. If no calculations on 30 or more observations were possible, we left the price blank[41].

4. Once the price per local unit was known for each of the most important food items, we derived the standardized average weight or volume for those local units selected

40 In order to correct for economies of scale as well as for different household compositions, we calculated a preliminary daily wealth indicator defined as the total daily expenditures divided by the number of equivalents adults (based on: adults equivalents = (adults + 0.7*children)^0.85) (Drèze and Srinivasan, 1997).

41 Depending on the size of each locality, the number of blank prices was higher for localities where less households were surveyed, and vice versa.

under point 3. Therefore, we made use of the dataset collected by the special weighing teams and we applied the same selection criteria as above (removal of the first and tenth deciles, focus on only the daily food expenditures, and inclusion of test-variables). After a detailed purification process of this dataset, the standardized average weights and volumes per local measurement unit were computed for each of the food items. Since this data is provided by professional weighting teams, we opted to relax the minimal number of observations to 5 to remain still valid (often this actual figure was much higher).

5. A simple division of the average price per local unit per food item (calculated under point 3) with the corresponding average standardized weights/volumes (computed under point 4) resulted in the mean standardized price for each of the 90% most important food items. Of course, not for every mean price per local unit of a certain food item there existed a corresponding valid average weight or volume. If this was the case we screened the other local units and selected that local unit of which both mean price and weight/volume were eligible (based on at least 30 and 5 cases respectively), starting from the most common unit. In order to improve the coverage of mean standardized prices of the 70% of the most important food expenditures, a possible relaxation of the initial data constraints or inferences with other localities were allowed, only if considered realistic and reasonable.

Additional explications on the calculation of total calorie and protein consumption per equivalent adult

On the basis of these locality-specific standardized prices computed under point 5 above and using standard food composition tables[42], we could determine the total calorie and protein consumption per household starting from the annualized expenditures for each food item (within the daily and non-daily dataset). Since we could not compute a calorie- and protein-multiplicator for each purchased food item in each of the 56 localities (due to inadequate price, calorie and/or protein information), we linearly scaled up the total number of calories and proteins consumed by each household by using all seven food categorical proportions of total expenditures over total expenditures for which calories and proteins could be computed. Subsequently, by means of the demographic information provided in Phase 1 and a standard set of nutritional requirements by age and gender (using the table below), we could compute the total calorie- and protein-consumption per equivalent adult for each household[43].

42 These tables (FAO/WHO/UNO, 1985 as published in Dos-Santos, 1987) simply give the amount of macro- and micro-nutrients for each amount of a specific food item.

43 Analogously to the method followed by Smith et al. (2006:27), we equally defined our nutritional "equivalent adults" as men between 30 and 60 years of age and a moderate energy requirement, yielding 2900 kcal and 49 gram proteins per day.

Table 6: Recommend Daily Calorie and Protein Intakes

	Energy (kcal/day)		Proteins (g/day)	
Young	**M**	**F**	**M**	**F**
< 1	820	820	13	13
1-2	1150	1150	13.5	13.5
2-3	1350	1350	15.5	15.5
3-5	1550	1550	17.5	17.5
Older				
5-7	1850	1750	21	21
7-10	2100	1800	27	27
10-12	2200	1950	34	36
12-14	2400	2100	43	44
14-16	2650	2150	52	46
16-18	2850	2150	56	42
Adult[1]				
18-30	3000	2100	49	41
30-60	2900	2150	49	41
>= 60	2450	1950	49	41

1 Kcal-levels for moderate activity
Source: FAO/WHO/UNU (1985) as published in Smith et al. (2006:25)

Additional explications on the calculation of the minimal housing budget per locality

Making use of the 1-2-3 Survey strata division as well as knowledge about the different climate conditions that prevail in different topological areas in the DRC, we identified 9 different housing zones (see first column of the table below). Since no natural poor housing threshold exists, we employed the nutritional poverty line as bench-marker for being poorly sheltered. More specifically, for each of the 9 housing zones, we ran a multiple regression[44] between the logarithm of daily food consumption (dependent variable) and the logarithm of daily caloric and protein intakes (two independent variables), all per adult equivalent. Then, on the basis of the resulting coefficients as well as the minimal calorie and protein requirements per strata (as sketched before), we calculated the housing zone-specific daily food poverty line per equivalent adult. Subsequently, we examined the housing characteristics of those households who fell within a 10% interval around each of these latter 9 lines. After having re-categorized several housing variables and based on data quality for each of them, we identified the median attribute for a set of 4 housing characteristics for each of the 9 housing zones (see table below). As such, households around the nutritional poverty threshold who reside in villages in the Congo River Basin typically live in houses made of straw (floor and roofing), and where sanitation simply consists of a hole in the ground. Finally, we computed for each of the 56 localities the mean house rent of all houses that matched all 4 poor housing characteristics, according to the housing zone to which the locality belongs.

44 Again, this was done over a more limited calorie and protein interval in order to comply with the assumption of linearity.

Table 7: Poor Housing Characteristics in each of the 9 Housing Zones

ZONES_LOG	H1_ TYPE2	H3_ SOL2	H4_ TOIT2	H11_ AISA2
Bassin Villes	Maison	Planche/ciment	Tôle galvanisée	Trou
Bassin Cités	Maison	Terre battue/paille	Chaume/paille	Trou
Bassin Villages	Maison	Terre battue/paille	Chaume/paille	Trou
Eastern Highlands Villes	Maison	Terre battue/paille	Tôle galvanisée	Latrines aménagées
Eastern Highlands Cités	Maison	Terre battue/paille	Tôle galvanisée	Trou
Eastern Highlands Villages	Maison	Terre battue/paille	Chaume/paille	Trou
Southern Highlands Villes	Maison	Planche/ciment	Tôle galvanisée	Avec chasse
Southern Highlands Cités	Maison	Terre battue/paille	Chaume/paille	Trou
Southern Highlands Villages	Maison	Terre battue/paille	Chaume/paille	Trou

Source: Own computations based on the 1-2-3 Survey (2004-05)

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