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How Chained CPI Underestimates Inflation: Chained CPI, Transition Costs and Behavioral Economics

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Abstract: Some economists contend that accounting for substitution bias improves Chained-CPI's estimate of inflation. This paper considers that the cost to change behavior increases the total cost of a new market basket, thereby leading to Chained-CPI underestimating inflation. This contradicts the premise of substitution along a fixed indifference curve. We use the concept of an *exclusionary zone* to explain why people might not change behavior, and how the utility derived from change is less than expected. It is concluded that the fixed-basket approach is the more accurate inflation estimate, while differences between CPI and COLA can be clearly stated so that people can better optimize consumption.

Key words: chained CPI; exclusionary zones; transition costs; behavioral economics; change-adjusted utility
JEL codes: E31, E70, D90

1. Introduction

There is an ongoing controversy over the use of traditional or chained-CPI for the purposes of adjusting benefits, such as Social Security. Consider a quote attributed to Marc Goldwein, "Chained CPI is absolutely a more accurate measure of inflation. All economists that aren't being hackish agree that chained CPI is better."[1] However there are many economists and policy makers, such as Paul Krugman, that are concerned that using this measure will reduce the benefits, which over time can significantly reduce standard of living[2]. The purpose of this paper is to demonstrate how Chained-CPI fundamentally underestimates cost of living increases by ignoring a real world issue, behavioral transition costs.

Behavioral transition costs are those associated with changing current behavior. While this could include transaction costs, they would also include the expected physical, emotional, mental, and social resources used as well. Another way to understand this is that changing behavior also consumes human capital. For those that are young, flexible and looking forward to change, these costs may be minimal, and the benefits substantial. For those that are older, such costs are considerable, even overwhelming. In terms of macroeconomics, it is not so much sticky prices as it is sticky behavior that is the issue. While there is an extensive literature on switching costs that invoke similar issues (for example, Yang & Peterson, 2004), we can consider switching costs as direct transition

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[1] Quote attributed to Marc Goldwein, by Dinan S., *Washington Post*, 5th Nov. 2017, available online at: https://www.washingtontimes.com/news/2017/nov/5/tax-bills-chained-cpi-sneaks-in-rate-hikes/.
[2] Available online at: krugman.blogs.nytimes.com/2013/04/05/desperately-seeking-serious-approval.

costs. The existence of indirect transition costs, those that exist as a consequence of changing behavior, must also be considered.

Behavioral economics is a modern field of study at the intersection of psychology and economics. It includes psychological and neurological foundations that deepen the context of what rational choice means (Wilkinson & Klaes, 2012). It is an outgrowth from the limits of the traditional models of rational decision making to explain habits, rituals, addictions, and dynamic preferences (such as induced myopia). A paper by Knoll (2010) for the Social Security Administration provides a nice summary. Simply put, the economic mind must work through the brain, and then the body, before expressing itself in the material world. It is, in a way, a principal-agent problem (Dawid & Neugart, 2011), with the mind as the principal and brain/body as the agent. There are costs to making decisions, and to changing behavior, which traditional neoclassical analysis ignores. The behavioral health sector exists, in part, due to these costs (Bickel & Vuchinich, 2000). Part of what our economy produces is the capacity to change behavior. Lunch might be free, but there are still costs to getting it.

Traditional CPI estimates the cost of a fixed basket of goods. It is the price index for continuing to behave as one has. Since market behavior is assumed unchanged, there are no behavioral transition costs. Chained-CPI takes into account "substitution bias", due to substitution effects (movements along an indifference curve) when relative prices of goods change[3]. It becomes an estimate of the cost for a basket of goods that remain on the same indifference curve. As such, it is the price index for continuing to derive the same utility, even as behavior changes.

However, this is premised on the assumption that there are no transition costs to modifying behavior. Some changes, such as substituting out of home ownership into a rental home, can be quite substantial. These not only include transaction and direct transition costs (such as expenses for commissions, lawyers' fees, rental search, moving and transferring services), but also indirect costs such as lost work and leisure time, physical and mental health care expenses to compensate for the stresses, injuries and damages of moving and adapting to a new environment, as well as externalities affecting friends and family (Winstanley et al., 2010). A home-owner does not just substitute into renting, they substitute into renting along with increased consumption of counseling/stress reduction therapies, resources used to meet new neighbors, and other expenses associated with novel experiences. These can also be understood as a type of expenditure required to make up for depreciation, and depletion, of human capital due to changing behavior. In essence, the individual must increase gross investment in their human capital to stay on the same indifference curve. This idea can find its roots in Tibor Scitovsky's "The Joyless Economy," where the ability to appreciate art, music, or life in general, is not a given but must be invested in.

These issues are particularly salient for the individuals most likely to depend on inflation adjusted income. It is one thing to have to downsize, it is another when downsizing itself is costly. Thus, changes in income and prices, transaction and direct transition costs, and indirect transition costs and depreciation of human capital, are all three considerations in estimating how much it will cost to change to an indifferent outcome.

2. Exclusionary Zone

The reduction of human capital can also mean a decreased appreciation for one's new life. It can impact on the well-being experienced after the changes have been made (Lucas, 2007). Thus, even if the shape of the indifference curves remained the same after the changes, they would no longer represent generating the same

[3] Available online at: https://www.cbo.gov/publication/44088.

utility. It will be useful to consider a utility function that has both the quantity of commodities consumed and the change in those quantities, to address our next concern. Boyer (1978) considered something similar when using a utility function which included both current and previous period's consumption level.

These real world considerations can generate an "exclusionary zone" with respect to changes in consumption. This zone represents a region around the current behavior that a consumer would not move to, even if it was seemingly preferred. They involve two scenarios. The first occurs when real income increases and the benefit from the new behavior does not exceed the cost to transition to it. For example, when an increase in income (or decrease in rent) is deemed insufficient to move to a slightly better apartment, because of the cost and hassle of moving[4]. The second occurs when income decreases (and/or prices increase) and the current behavior is no longer affordable. Because of the transition costs, it is as if income is decreased further. For example, if someone moves to a less expensive apartment but has to borrow the money to move. The increased interest payments reduces the otherwise disposable income to support a lifestyle. In this case the standard of living is reduced by both the lower income and the increased interest payments.

These can be considered as a type of behavioral poverty trap (Kraay, Aart & McKenzie, 2014). Moreover, it also implies an important asymmetry, with larger changes for transitioning downward than upward. To use an analogy, it is more dangerous to stumble while hiking down a trail than up it. The exclusionary zone is thus associated with the economic equivalent of a quantum leap in microeconomic behavior: if there is change, it is not infinitesimal. What might seem like a small change to someone wealthy, leads to a series of big changes to someone poor.

3. Models

A simple behavioral economic model that incorporates this asymmetry of change in adapting to real income changes is displayed in Table 1. The model takes the traditional assumptions of budget constraints, but includes an additional term, $C(Q^k,Q^0)$, to represent the added cost of changing ones behavior from Q^0 to Q^k. In many situations such a cost is negligible, such as when one substitutes out of apples into pears. In other cases, such as with housing, health care, and education, these transitions costs are critical to the decision making process.

Table 1 Behavioral Transition Cost Model

M = Monetary Income

P_i = Price of good i

Q_i = Quantity of good i

S = Savings or financial slack

$C(Q^k,Q^0)$ = Transition cost of changing behavior from Q^0 to Q^k

Market Constraint: $M = \Sigma P_i Q_i + S,\ S \geq 0$

Initial Conditions: M^0, P^0, Q^0, S^0

Conjectured Variations: M^1, P^1, Q^1, Q^2

Transition Cost Assumption: $C(Q^k, Q^0) > 0$ for all $Q^k \neq Q^0$, and 0 otherwise.

Implied Behavioral Constraint: $M^1 = \Sigma P^1{}_i Q^1{}_i + C(Q^1,Q^0) + S^1$, where $S^1 \geq 0$

Associated with this model is a taxonomy of outcomes. Whereas traditional neoclassical economics describes all behavior as voluntary (i.e., choosing the most preferred feasible alternative), in this paper we distinguish

[4] The phenomenon was widespread during the "Great Recession" when people couldn't get out of their mortgages for job opportunities at a distance.

between voluntary and involuntary outcomes. If income and prices change such that a more preferred outcome is affordable, then it is a voluntary transition to the new behavior. If the income and prices allow for the current behavior to be maintained, but no preferred behavior is attainable after transition costs are included, then the person voluntarily continues with their current behavior. If the current behavior is no longer affordable after the income and price changes, then an involuntary transition to a less preferred outcome has occurred. Finally, if after accounting for transition costs, there is no affordable behaviors, the person experiences "economic death." They have no capacity to choose an outcome. All of these are summarized in Table 2.

Table 2 Taxonomy of Outcome

If [$S^1 \geq 0$ and $Q^1 \succ Q^0$]:

Voluntarily change to Q^1

Else If [$S^1 < 0$ and $M^1 \geq \Sigma P^1_i Q^0_i$]:

Voluntarily remain at Q^0

Else If [$M^1 < \Sigma P^1_i Q^0_i$ and $\exists Q^2$ s.t. $Q^2 \prec Q0$ and $M1 \geq (\Sigma P^1_i Q^2_i + C(Q^2,Q^0))$]:

Involuntarily change to "least bad" Q^2

Else [$M^1 < (\Sigma P^1_i Q^2_i + C(Q^2,Q^0))$ for any Q^2] :

Economic Death

To the extent that an individual has available liquid assets (W_L), and/or capacity to borrow (B), the constraints above can be modified by using $M + W_L + B$. In this case, there will be a secondary choice of how to allocate any positive savings between financial assets and paying down debt.

3.1 Fixed Transition Cost Model

In this case,

$$C(Q^k,Q^0) = \alpha > 0, \text{ if } Q^k \neq Q^0 \text{ , and 0 otherwise} \quad (1)$$

The affect is to reduce income at all points, except when keeping behavior constant. When prices are rising, it implies a further reduction in consumption. When prices are decreasing, and the current behavior is still feasible, it implies that price must decrease sufficiently for the consumer to change behavior. If income increases by less than α, and prices are unchanged, then behavior is unchanged. However, financial slack (available savings plus capacity to borrow) would increase. One implication is that over time sufficient slack could be accumulated such that a behavioral transition would then occur. This is displayed graphically as a two-good model (Figure 1), where the current behavior, Q^0, being included within the budget constraint, along with the budget line $M = P_1Q_1 + P_2Q_2+\alpha$. If preferences remain unchanged, then Q^0 will be preferred to any other point within the budget constraint. Indeed, even a moderate change in preferences would not lead to behavioral change. However, if the change in income and prices excludes Q^0, there will be a discrete change in behavior. Further, the size of α exacerbates the decrease in consumption.

3.2 Linear Variable Transition Cost

In this case,

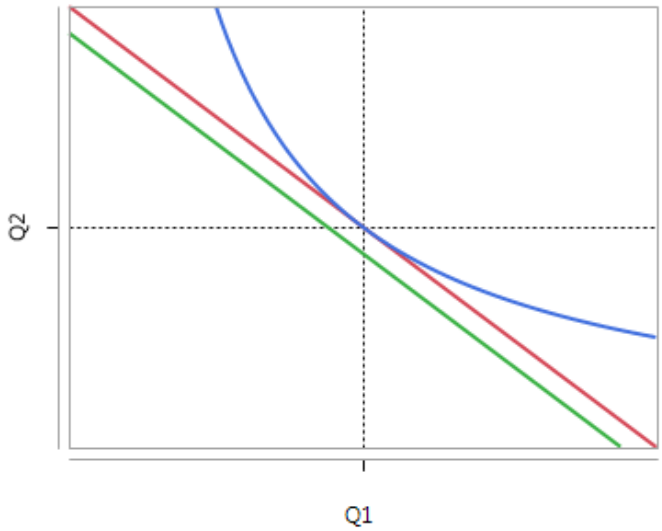
$$C(Q^k,Q^0) = \alpha + \beta * | Q^k - Q^0| \text{ if } Q^k \neq Q^0, \text{ and 0 otherwise, where } \alpha, \beta > 0 \quad (2)$$

Thus, the larger the change, the greater the transition cost. If β is a vector, then

$$C(Q^k,Q^0) = \alpha + \beta_1 * | \Delta Q^1| + \beta_2 * | \Delta Q_2| + \ldots. + \beta_n * | \Delta Q_n|, \text{ if } Q^k \neq Q^0, \text{ and 0 otherwise} \quad (3)$$

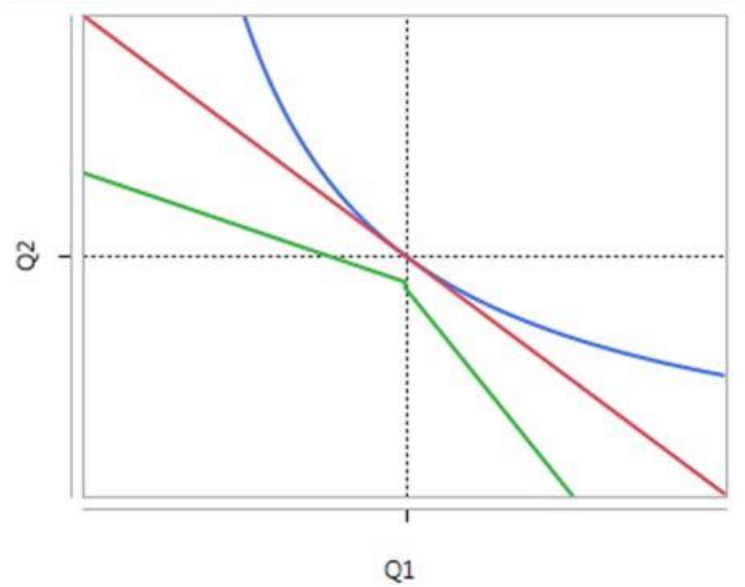
The 2-good model can be graphed as in Figure 2. Notice the double kink in the budget constraint. The portion of the line in to the lower-left of the initial consumption occurs where increasing the absolute difference of one good, lowers the absolute difference of the other. Thus, some of the transition costs are mitigated. However,

outside of this region the absolute difference of both goods increases, thereby increasing the transition costs of substitution.



Blue: Indifference Curve Red: Original Constraint Green: Constraint after Transition Costs

Figure 1 Effect of Fixed Transition Cost on Budget Constraint



Blue: Indifference Curve, Red: Original Constraint, Green: Constraint after Transition Costs

Figure 2 Effect of Variable Transition Costs on Budget Constraint

The cost models shown above are illustrative, and certainly not exhaustive nor completely realistic. However, they display the key issue — income constraints that incorporate behavioral transition costs substantially change the calculation of what is affordable (feasible). Perceiving the economic rationality of a behavior requires understanding these constraints. Indeed, many of the arguments for specialization of labor, such as time and effort lost moving between different tasks (i.e., different behaviors), are very similar.

3.3 Change-Adjusted Utility

Transition cost reduces the amount of resources available for the new lifestyle. However, many people find changing how they live annoying as well, thereby reducing their sense of well-being. In this case, the utility derived from the consumption of Q units is adjusted by the change in consumption from the baseline behavior. Here we use the absolute value of change in our model, although using the change squared could work as well. Letting $|\Delta Q| = |Q^1 - Q^0|$, the utility function would be of the form $U(Q^1, |\Delta Q|)$, where $dU/dQ^1 > 0$, and $dU/d|\Delta Q| < 0$. For illustrative purposes, we assume the following particular form:

$$U(Q^1,\Delta Q) = (Q^1)^{\alpha} / (1+|\Delta Q|)^{\beta} \quad (4)$$

Using a preference preserving monotonic log transformation we get:

$$\log U(Q^1) = \alpha \log(Q^1) - \beta \log(1+|\Delta Q|) \quad (5)$$

For further convenience, rewrite logU as a function of ΔQ given the initial behavior Q^0:

$$\log U(\Delta Q; Q^0) = \alpha \log(|\Delta Q| + Q^0) - \beta \log(1+|\Delta Q|) \quad (6)$$

The income constraint becomes:

$$M = PQ + C(|\Delta Q|), \text{ where } C > 0 \text{ when } \Delta Q \neq 0, \text{ and 0 otherwise} \quad (7)$$

We can use this to show what an exclusionary zone of consumption would look like (Figure 3, using $Q^0 = 50$, $\alpha = 1$, $\beta = 0.1$). If real income falls, ΔQ must be large enough to account for the added transition costs. So, for Q to decrease there is a minimum amount it must decrease, thus excluding the range between 0 and the minimum decrease. Associated with this is a maximum utility attainable if downsizing. This discontinuity is problematic for a sound chained-CPI analysis, which assumes the consumer stays on the same indifference curve. If real income increases, ΔQ must be large enough such that the utility gain from the increased consumption is greater than the utility loss from changing behavior. So, for Q to increase there is a minimum amount it must increase, thus excluding the range between 0 and the minimum increase. Note, in the same way that large decreases in income can lead to economic death (where there is not a feasible decrease in consumption that keeps the person autonomous), it is possible that preferences against changing behavior are so strong that there is no amount of increased consumption that would overcome the distaste for changing. This does not preclude the possibility of a person adapting to a new lifestyle after the change (a form of hedonic adaptation). It just means someone else would have to bear the cost of change for it to occur.

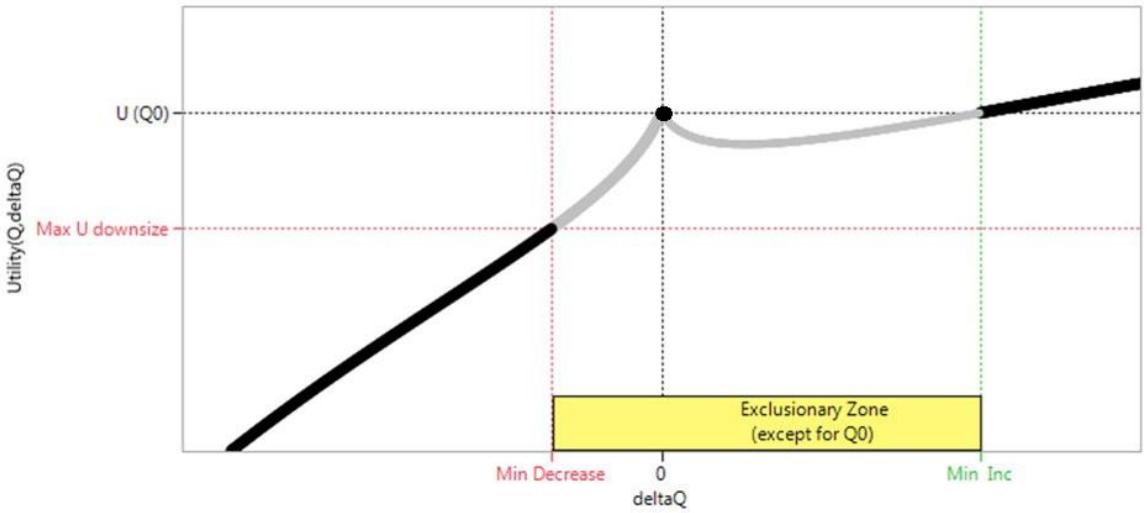


Figure 3 Change-Adjusted Utility and the Exclusionary Zone

3.4 Asymmetry of Lifestyle Changes

Transition costs also lead to asymmetry of lifestyle change. Standard economic theory overstates lifestyle expansion (i.e., utility gain) as income increases. It also understates lifestyle contraction (i.e., utility loss) as income decreases. Since behavioral transition costs exist in both directions, the net benefit of a gain is diminished, while the net cost of a loss is increased. It also provides a deeper rationality for loss aversion: if our conscious minds tend to underestimate the costs of change, our subconscious minds compensate by increasing our fear of loss. This also describes another issue in a society with increasing wealth inequality. Those with significant financial slack can afford the upwardly mobile changes that can compound constructively over time. On the other hand, those with little financial slack suffer in two ways. They can afford fewer (if any) upward changes, and go even lower if forced downward. Moreover, when wealth is sufficiently great, changes in income will have little effect on consumption and lifestyle. There is a distinction between the economics of the wealthy and of the poor.

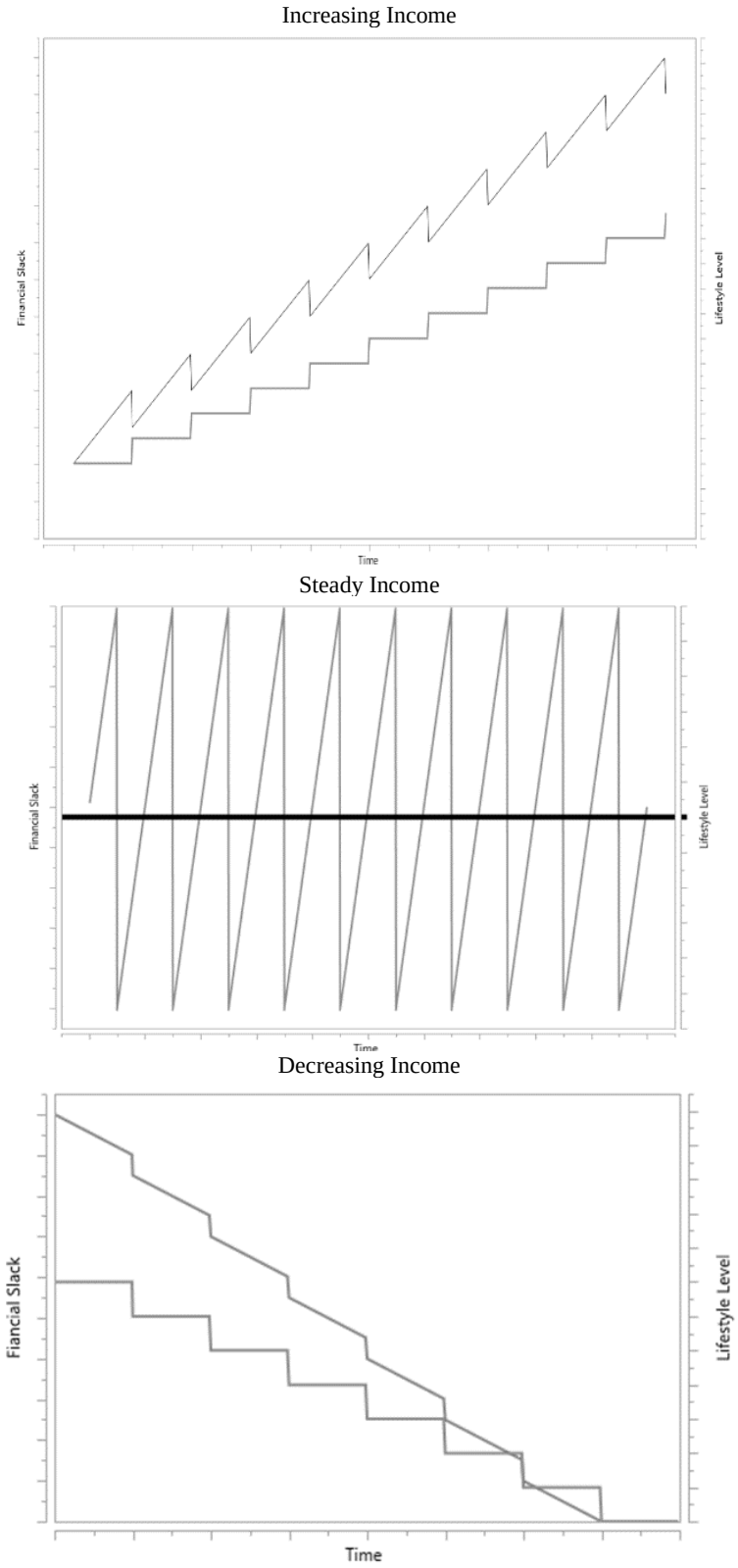
Consider three cases: increasing, steady and decreasing income. Note the use of a step function in the graphs to represent changes in material lifestyle. This captures the exclusionary zones discussed above. These are displayed in Figure 5.

In the case of increasing income, we expect consumption to increase but only as sufficient financial slack accrues to afford the transition to an expanded life style. Although the availability of easy credit requires less savings to reach the required the slack, it also implies that the share of income going to consumption falls. Eventually, a maximum level of consumption is reached either due to the lack of slack and/or increased interest payments

In the case of steady income, it is something like an oscillation around a “turnpike” solution (McKenzie, 1976). There are recurrent events, such as accidents, weddings, replacing old furniture and car repairs, that draws down the accumulating slack (but not to zero) on a regular basis. Not enough slack is ever created to expand one’s lifestyle, but enough slack is available to maintain it.

In the case of decreasing income, a consumer starts at a consumption level that cannot be maintained. Eventually they must downsize (to a smaller home, more modest clothes, less expensive car). This is the involuntary change in behavior, if in fact the consumer prefers how they had been living[5]. However, even the act of downsizing has a transition cost. If the person takes this into account they will contract their lifestyle sufficiently for it to be sustainable for a longer duration. If they do not, they will more quickly run into slack depletion, necessitating downsizes more quickly and frequently. Either way, as real income continues to fall downsizing continues until the person has no more savings, no ability to borrow and cannot afford to pay all their bills. This is a state of economic “death”.

[5] It is possible for someone who has a preference bliss point to voluntarily choose to consume less, but that suggests they had involuntarily been consuming more. An example of that might be a child who was raised in a materially lavish household grows up, moves out, and even with substantial income chooses to live a modest life.



Ratchets: Financial Slack Steps: Consumption (Lifestyle Level)

Figure 5 Financial Slack, Consumption and Income Change

4. Implications for Estimation of Chained-CPI

One of the important roles of CPI is to assist in calculating the yearly increases of Social Security Payments. It attempts to help maintain the recipient's purchasing power, and has been automatic since 1975. There is already concern over differences in the correct weighting of CPI for retired persons, since their age group tends to spend a greater share of income on medical care which tends to rise in price more quickly. We will not address that directly, but clearly it would be a related issue. However, according to the CBO[6], using Chained-CPI would lower these yearly increases by about a quarter of one percent a year (.25%). This amounts to roughly $80 a year at the maximum yearly benefit. Such a change is unlikely to cause a significant behavioral change in the short run. However, for those who are predominantly dependent on Social Security, over a decade (and especially if borrowing and medical costs keep increasing) it could be enough to trigger an involuntary behavior transition.

Let's consider the impact due to one component of CPI, housing. One estimate of the percentage of transaction and direct transition costs for selling a home, and buying a smaller home, is provided by Fidelity[7]. Their estimate is almost 13%. Moving from a home to a rental would be less, but still on the order of near 10%. With a median home price of around $250,000[8], the direct costs of moving would be at least $25,000. This is nearly one year of full retirement benefits. Home ownership among 65 and over is roughly 80%[9]. A study by Rand estimates the income elasticity of demand for homes of about 0.45[10]. This implies an income decrease of .25% generates a .11% decrease in quantity demanded for home ownership, and suggests average costs to move from home to rental would be $25,000 × 80% × .11%, or $22. Since the average monthly Social Security benefit is $1369[11], this makes the yearly impact about .13% of benefits. The existence of an exclusionary zone would suggest the percentage of households that will move would be less at first, but increase as time goes by with the accumulated drop in real income. As is often the case with cost-cutting, there seems to be little affect at first; however, it eventually it comes on with a vengeance – especially as it occurs even later in life, where the transitions become more difficult.

Moreover, the above only accounts for the direct costs of moving. Any additional costs beyond this can push the full cost, including the transition costs, of the new market basket to beyond what traditional CPI would have estimated, even before considering various externalities. There is a reasonable argument to be made that chained-CPI not only underestimates inflation, but also decreases well-being even further when accounting for effects such as decreased utility from what is consumed. It would seem how we measure our economy, can affect economic well-being.

Another ancillary consequence of being too stingy with cost-of-living adjustments is the increased stress it can trigger. There is strong evidence that major life events, such as moving, increase the probability of a health event (Lantz et al., 2005). Even if the retired are not forced to sell a home and downsize, other types of downsizing and increased stresses around finances, could be enough to trigger increased usage of Medicare, disability insurance and other government provided services. This would reduce the net savings from lowering estimates of the CPI. A quintessential case of "pennywise and pound foolish".

6 https://www.cbo.gov/publication/44088.
7 https://www.fidelity.com/viewpoints/retirement/relocate-in-retirement.
8 https://www.nar.realtor/sites/default/files/documents/ehs-01-2018-summary-2018-02-21.pdf.
9 https://www.census.gov/housing/hvs/files/currenthvspress.pdf.
10 https://www.rand.org/pubs/reports/R2449.html.
11 https://www.ssa.gov/news/press/factsheets/basicfact-alt.pdf.

Beyond the individual's own consumption effects, there are externalities. When a person moves at, or after retirement, there are costs to the family and friends that help them deal with the move. They may have taken time away from work, or cancelled a vacation, or increased their own stresses. One of the most important benefits to society of having Social Security is that as people retire and age, they are more capable of caring for themselves. This frees up those younger, and in peak productive years, to work more efficiently. The use of Chained-CPI might be a way to reduce the financial responsibilities of government, it is also likely to increase the burden of the governed even more so.

5. Conclusion

One way Chained-CPI underestimates inflation is by assuming transaction and transition costs do not exist. The assumption of a frictionless move along an indifference curve is not realistic for important consumer items, like housing, transportation and health care. A second way inflation is underestimated is occurs from ignoring the impact on utility from changing behavior patterns. Even if the monetary costs to change behavior were minimal, the loss of utility from change implies that the traditional assumptions about the shape of indifference curves do not hold. A third way occurs by ignoring the externalities imposed on others by these transitions. Chained-CPI ignores the full cost of changing market baskets, and therefore underestimates inflation.

Instead of using chained-CPI to attempt to reduce Social Security benefits, we suggest that it would be more methodologically sound, and politically transparent, to use traditional CPI with a stated modification for economic welfare reduction. If the United States decides that it will not provide the same real benefits of Social Security over time, then by stating what the ongoing percentage decrease will be can allow those who are retired, or about to retire, as well as their families, to more efficiently adapt to the real resources they will have. If reduction in standard of living is unavoidable, then sound economics would surely suggest we attempt to minimize the cost of making those changes.

References

Boyer M. (1978). "A habit forming optimal growth model", *International Economic Review*, Vol. 19, No. 3, pp. 585-609.

Dawid H. and Neugart M. (2011). "Agent-based model for economics policy design", *Eastern Economic Journal*, Vol. 37, p. 44.

Dinan S. (5th Nov. 2017). *Washington Post*, available online at: *https://www.washingtontimes.com/news/2017/nov/5/tax-bills-chained-cpi-sneaks-in-rate-hikes/.*

Frank R. and McGuire T. (2000). "Economics and mental health", Chapter 16, in: Culyer A. and Newhouse J. (Eds.), *Handbook of Health Economics*, Elsevier, Amsterdam.

Knoll Melissa (2010). "The role of behavioral economics and behavioral decision making in American's retirement savings decisions", available online at: https://www.ssa.gov/policy/docs/ssb/v70n4/v70n4p1.html.

Kraay Aart and McKenzie (2014). "Do Poverty traps exist? Assessing the evidence", *Journal of Economic Perspectives*, Vol. 28, No. 3, pp. 127-148.

Krugman P. (2013). Available online at: http://Krugman.blogs.nytimes.com/2013/04/05/desperately-seeking-serious-approval.

Lantz House, Mero and Williams (2005). "Stress, life events, and socioeconomic disparities in health: Results from the Americans' changing lives study", *Journal of Health and Social Behavior*, Vol. 46, No. 3, pp. 274-288

Lucas Richard E. (2007). "Adaptation and the set-point model of subjective well-being: Does happiness change after major life events?", *Current Directions in Psychological Science*, Vol. 16, No. 2, pp. 75-79.

McKenzie L. (1976). "Turnpike theory", *Econometrica*, Vol. 44, No. 5, pp. 841-865.

Bickel W. and Vuchinich R. (Eds.) (2000). *Reframing Health Behavior Change with Behavioral Economics*, Psychology Press, Mahwah, NJ.

Scitovsky T. (1976). *The Joyless Economy: An Inquiry into Human Satisfaction and Consumer Dissatisfaction*, USA: Oxford University Press.

Wilkinson and Klaes (2012). *An Introduction to Behavioral Economics* (2nd ed.), Palgrave Macmillan, NY, NY.

Winstanley A., Thorns D. and Perkins H. (2010). "Moving house, creating home: Exploring residential mobility", *Housing Studies*, Vol. 17, No. 6, pp. 813-832

Yang Z. and Peterson R. T. (2004). "Customer perceived value, satisfaction, and loyalty: The role of switching costs", *Psychology & Marketing*, Vol. 21, pp. 799-822.