Who and What in the Middle Class?
Going Beyond Income Distributions

Sagit Azary Viesel ¹
&
Itai Sened²

Abstract

The recognition of the significance of the middle class for the makeup, strength and prosperity of societies goes back to the writings of Aristotle. The effects of the strength or weaknesses of the middle class on the economics and politics of any society is one of the oldest topics in political economy. In recent years the subject has come to occupy much headlines but did not receive the scholarly attention it deserves. In particular, there is no established theory as to why the middle class may make any difference at all towards the well being of society as a whole. At the same time, the measurement tools used to measure the strength and size of the middle class are rather basic. We start with a general theoretical discussion aimed at explaining why the middle class may be so critical for the prosperity of the society as a whole and a justification of an adequate definition of what it means to belong to the middle class. We then operationalize our definition within a measurement strategy. We submit the theoretical discussion and the measurement tools as a foundation for a larger research program for the study of the middle class in the field of public policy. We then use our framework to examine the applicability of our approach against a rich data set that the government of Israel has made available to researchers for this purpose.

Key words: middleclass, income, measurement.

¹Tel Aviv University, Tel Aviv, Israel
²Tel Aviv University, Tel Aviv, Israel
"Thus it is manifest that the best political community is formed by citizens of the middle class, and that those states that are likely to be well-administered in which the middle class is large, and stronger if possible than both the other classes ... " (Aristotle, Politics, 1984 (350 B.C.), Book IV, 11th parag, 1295-6).

The preoccupation of scholars with the role of the middle class in the welfare of societies goes back to Aristotle and remained quite constant across centuries and millennia. Yet, rigorous scholarship of the subject has been sparse. The common measurement used by most economists for the strength and size of the middle class are different cut-points of the income distribution, a rather crude and a-theoretical measurement strategy.

In this paper we wish to remedy both weaknesses. In the following section we examine three theoretical explanations for the positive correlation between the strength of the middle class and the overall prosperity of society and derive a more nuanced definition of the middle class.

Once we have clear theoretical perspective of what the middle class may consist of, we devise a new methodology of assessing its size and strength, which allows us to support our theoretical claims with empirical data and a measurement tool to assess the strength, size and vulnerabilities of the middle class. In other words, once we have the characteristics of who is in the middle class we can move forward to the important analysis of how vulnerable these individuals are to different shocks and trends in the system that may kick them off this zone of comfort.

The merit of this approach lies, amongst others, in the heuristic it provides to deal with challenges that the middle class in the developed nations seems to be facing in our days. The existing approach that relies so heavily on cut-points in income distributions gives us little if any help in devising policies to strengthen or sustain the middle class. We know that more and more members of this class are slipping into what we refer more generally as the ‘decline of the middle class.’ Some argue that this decline leads them into a new ‘lower middle class’ status (Zoya, 2014). Others have claimed that this decline is really into a new status of poverty (Lama and Sened, 2014). But whatever the case may be, the current, theory thin, and empirically flawed strategy of scholarship, based on observing the declining income of the middle class has somewhat limited applications. Our approach that measures and understands the middle class in terms of measurable theoretical foundations, offers strategies to deal with the decline.

Our current research refines a theory and a measurement tool to answer two research questions:

- What characteristics define the lines that separate the middle class from the poor below and the rich above?
- What may make members of the middle class vulnerable to slipping down to the poor class and what agents of upwards mobility may help the poor rise to the middle class?

The goal is to come up with a high precision diagnostic tool to identify the demarcation lines, the bridges over these lines and the policies that may be most helpful in sustaining and strengthening the middle class as an agent of stability and growth in developed, OECD type societies.
1. Who is in the middle class: A Long Overdue Theory

The theoretical scholarship on the middle class has traditionally been weak, partially because the neo classical school of economics focus on the study of free markets. North (1990) attributed this neglect to the absence of a clear distinction, in the study of economics, between the structure and the performance of the economy (North, 1981) and the off-hand treatment of structures of property rights and their distributional effects (Sened, 1997).

The neo-classical school acknowledges the role of property rights in functioning free markets, but for too long has tried to explain this external determinant of social order from within the framework of the ‘friction free’ competitive market. Considerable effort has concentrated on the notion of ‘spontaneous’ emergence of property rights (Sugden, 1986). In the late 1990’s, such self-enforcement mechanisms were shown to be unlikely to work. Even relatively small groups cannot hope for sustainable self-enforcement of property rights structures (Calvert, 1995). At the same time, governments were shown to be rather reliable enforcers of property rights under a wide range of conditions (Sened, 1997). Whatever the case may be, one explanation for the strength or weakness of the middle class may be found in a ‘property rights’ theory of the middle class, which we undertake below.

The fundamentals of the middle class can also be explained in terms of values that converge to certain patterns of behavior. In particular, the rich may not need to worry about a lot of things the middle class needs to worry about such as job security, health and relative advantages in labor markets. The poor may not mind such worries. They must attend to day to day, or month to month, survival issues first. This calls for what we call a marginal returns’ theory of the middle class. Different classes have their different marginal returns of investments of their scarce resources which leads to the variance of behavior patterns across classes.

A third option is to explain the middle class in terms of consumption patterns. The middle class does seem to have consumption patterns that are different than other classes (Banerjee and Duflo, 2008). But where does this come from? Why do they consume differently?

We review the logic behind these three theories in the order we introduced them.

2.1 A Property Right [PR] Theory of the Middle Class.

Piketty (2013) argues and illustrates at length, the intrinsic drive of capitalist economic regimes towards increasing inequality. But he does note, repeatedly, that the 1930 – 1980 period experienced a significant reversal of this trend. Piketty highlights a significant combination of idiosyncratic reasons associated with the world wars and the great depression between that led to sweeping redistributive policies that reduced the centuries long drive to increased inequality.

But what were these policies and how did they reduce inequality and reversed the general trend? Piketty and others come short of an answer to this question. Maybe because the answer is broadly well known and remarkably unpopular these days: At the heart of all of these policies were significant government grants of property rights that benefitted the middle class a great deal, providing them with cheap and affordable housing, free or relatively cheap and high quality education, job security, healthcare and pensions.
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Explaining these sweeping policies is not that difficult either. As monopolies that grants and protect property rights, governments are expected to apply monopolistic pricing. Thus, property rights are expected to be undersupplied and overpriced in that taxes levied by governments that protect property rights are likely to be too high (Sened, 1997), while the set of property rights protected are generically too narrow. More importantly, governments are motivated by distributive and redistributive rather than efficiency incentives (Knight, 1992). Add to that the rather well known range of x-inefficiencies that most central governments suffer from and you get notoriously inefficient mechanism of the protection of property rights. And yet, governments grant and protect property rights as a necessary and sufficient condition for markets to evolve and so many other societal structures to emerge and prosper (Sened, 1997).

Our argument follows Douglass C. North’s (1990) argument of how economic firms affect the evolution of economic institutions. Like any player in the Northean analytical framework, large middle classes should petition precisely for those institutions that protect the property rights they depend on, just like firms in the Northean framework are expected to affect changes in the institutional structures they operate under, by using their resources to petition and lobby for changes that increase their marginal returns. The middle class has less financial capabilities than the organizations referred to by North, but master political mussels to introduce and preserve institutions that protect the property rights they depend on. During the 1950s and 1960s, the middle class took political control of many central governments in the west and implemented strategies and property rights grants to enhance their interests.

Beyond the cynics of it, revenue-maximizing governments (Levi, 1988) are expected to invest in protecting the property rights of the middle class, as this class is the most likely to yield the highest return to their investment in the protection of property right. And that is exactly what governments across the world did when the international and economic crises hit them in the first four decades of the 20th century. It is interesting to note that many governments responded in the same rhetoric after the 2007-8 economic crisis, but failed to appreciate what FDR and Beveridge figured out in the 1930s: Words alone cannot remedy these crises, what is needed is a comprehensive grant and strengthening of a significant number of generic property rights that protect the interest of the middle class in cheap housing, free education and access to health care, job security and pensions that secured the middle class for five decades (Timmins, 2001).

The said structure of property rights by central governments that protected and promoted the middle class, came to be inefficient and extremely expensive at that. As expected, capitalist interests found a ‘Northean’ (1990) way to alter the structure of the property rights that regulate the economy, back to its current, laissez fair, neo liberal structure. With less property rights to enforce and highly efficient, large capitalist corporations, the economies of the world flourished in the two or three decades that followed, but with a declining middle class they quickly learned to appreciate the unstable ‘boom and bust’ dynamics with, as Piketty (2014) has pointed out, their intrinsic drive to inequality that comes mainly at the expense of the middle class. This ‘boom and bust’ phenomenon has been anticipated and well articulated by one of the most prominent but often forgotten economists of the 20th century and are know in the professional jargon as ‘Minsky cycles.’ While the phenomenon is well known and documented (Palley, 2012), very few remedies have been devised to protect society from its consequences or what

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1 For a broad discussion of the phenomenon and other related issues, see Thomas Palley, 2012.
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Palley calls ‘the destruction of shared property.’ Seemingly without knowing it, the civil servants of the 1940s and 1950s found such a mechanism. By protecting some of the shared property of the middle class in laws that protected their access to reliable pension funds, education and healthcare they protected by law significant portions of this shared prosperity of the middle class. The privatization that swept the western hemisphere in the late 20th century, eliminated these protection and seems a rather obvious part of the explanation to the financial crisis that followed in 2007-8, that has all the ingredients highlighted by Palley to qualify for a monumental case of destruction of shared property. It is often noted, but rarely studied carefully, that the big losers of the crises were the middle classes who have not regrouped to this day.

Beyond the obvious merit of protecting shared property, if governments enforce property rights structures to maximize their own utility (Levi, 1988, Sened, 1997), they should be expected to protect property rights to enhance the economic strength of the middle class as it is well established that a strong middle class is critical for the long term economic prosperity of any government whose welfare rests on tax revenues. Only the middle class has the incentive to help governments protect those property rights against abuse by external and internal forces. Thus, contrary to Piketty’s dark predictions, we expect a cyclical return of legislations that would come back to protect the property rights that sustain and strengthen the middle class.

2.2 A Diminishing Returns [DR] Theory of the Middle Class

The ‘diminishing returns’ theory of the middle class is an important variant on the property right theory of the middle class. It turns out that the returns for the protection of property rights is quickly diminishing for the rich. They have more efficient and much cheaper ways to protect their property, as articulated by Zucman (2014) who traces just one significant way in which the rich can keep their riches without any complicated structures of property rights. More generally, the rich tend to fend for themselves and protect themselves using the very wealth they have, to protect this wealth. So they often depend less and even evade the offers of the state to protect them. Thus the very rich have quickly diminishing returns in the protection of the property rights of the public at large. Such protections are costly for the economy and serve little if anything from the perspective of the wealthiest segments in society.

The poor, on the other end of the spectrum, have very little incentive to protect the little they have, so taxes and other resources invested in protecting complex structures of property usually come, for them, at the expense of compromising their more pressing needs. Here again, the very poor have quickly diminishing returns to any investment in the protection of property rights of the public at large. While they are the first to lose from the lack thereof, for the short and medium term they would much better prefer welfare policies, directed at improving their immediate welfare, over complex, and often time quite expensive, property rights structures that protect mostly those who have much more to lose in the lack of such property rights structures.

The middle class, on the other hand has a very strong incentive to protect what it has, but members of the middle class are usually unable to protect it on their own. They must rely on central governments for this protection. Their comfortable life style can only be sustained if significant efforts are invested in protecting the assets and services, like health and education that help them sustain their position in society.

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Conventional wisdom highlights the importance of the middle class to the economy, but there is little theoretical basis behind this wisdom. The diminishing returns theory of the middle class states that the investment in services and protection of property rights for the middle class is likely to produce high returns in the productivity of its members and in the returns to the investments in their assets, mostly safe investment in real estate and financially secure investments that yield good returns as long as they are tended to. Helping the very poor is normatively appealing but not conducive to economic and societal long-term prosperity as the returns to these investments are likely to be small if any. The rich can probably generate significant returns on their assets but at the level and size of their fortunes they should reach diminishing returns on their investment that is another reason why they hide such huge proportion of their wealth (Zuckman, 2014) instead of investing it in market transactions.

For decades, the interest in the study of the effect of inequality served as a strong substitute to the theoretical interest in the well being of the middle class and the effect that the well being of the middle class may have on the well being of society as a whole. It is interesting to note that the conclusion of the debate on the effects of inequality on the welfare of society as a whole, are inconclusive. We would argue that the reason for this ambiguity in the empirical studies of the effects of inequality on the well being of society are so inconclusive resides in the fact that while reducing inequality by promoting a strong middle class may increase productivity, reducing inequality may also have a negative effect on economic growth (Lama and Sened, 2014). This argument follows two lines of reasoning. First, greater equality may have a negative impact on aggregate savings. If income is redistributed by transfers from individuals capable of saving to individuals with little propensity to save, the aggregate level of savings would be lower, decreasing the level of investment and economic growth (Kaldor, 1956). Second, governments promote redistributive policies to favor the poor, to alleviate political pressures, through progressive taxes. Imposed at the margin, such taxes should affect the incentives for investment and result in a negative effect on the rate of growth (Alesina & Rodrik, 1994). It should therefore come as no surprise that empirical studies, aimed at testing the effects of income inequalities on growth yield inconclusive results (Banerjee & Duflo, 2005; Lama and Sened, 2014). To put popular names on the phenomenon, Israel Turkey and the U.S. are very strong economies with very high inequality figures as measured by the Gini coefficients associated with their economies. West European countries like Germany, Sweden and Norway, to name a few, are also very strong economies with relatively low Gini coefficients. From a theoretical point of view, the size and strength of the middle class may be a better place to locate the explanation for social prosperity. At least one recent study found a very high correlation between the size of the middle class and a couple of measures of economic growth. Lama and Sened (2014) used a similar if somewhat more basic strategy of measurement of the middle class, compared to what we use here, and produced table 1, a & b, that we reproduce below.

Table 1a. Correlation between Middle Class and GDP Growth

<table>
<thead>
<tr>
<th></th>
<th>Middle class</th>
<th>GDP Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle class</td>
<td>1</td>
<td>.781**</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>13</td>
<td>.003</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>N</td>
<td>12</td>
</tr>
</tbody>
</table>

Source: Lama and Sened, 2014.
** Correlation is significant at the 0.01 level (2-tailed).
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**Table 1b. Correlation between Middle Class and GDP Per Capita.**

<table>
<thead>
<tr>
<th>Middle class</th>
<th>Pearson Correlation</th>
<th>GDP Per Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>.740**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.004</td>
</tr>
<tr>
<td>N</td>
<td>13</td>
<td>13</td>
</tr>
</tbody>
</table>

Source: Data from Lama and Sened 2014, based on the statistical analysis of multiple sources.

**.** Correlation is significant at the 0.01 level (2-tailed).

This rather strong finding, limited in its scope and generalizability as it may well be, strongly suggests that while the rich and the poor may have quickly diminishing returns in the investment in the erection, grant and enforcement of property rights structures that protect mostly the assets of the middle class, the middle class and tax revenues maximizing government may benefit significantly from such structures.

**2.3 The Values, Consumption [VC] Theory of the Middle Class**

Several years ago Banerjee and Duflo (2008) summarized the state of the art of the study of the middle class in terms of three common arguments:

In one, new entrepreneurs, armed with a capacity and a tolerance for delayed gratification emerge from the middle class and create employment and productivity growth for the rest of society …In a second, perhaps more conventional view, the middle class is primarily a source of vital inputs for the entrepreneurial class; it is their “middle class values”, their emphasis on the accumulation of human capital and savings, that makes them central to the process of capitalist accumulation [of wealth]... The third view, a staple of the business press, emphasizes the middle-class consumer, …who is willing to pay a little extra for quality. It is the demand for quality consumer goods that feeds investment in production and marketing, which, in turn, raises income levels for everyone.

In their summary, Banerjee and Duflo highlight the main ingredients of what we call the Values and Consumption theory of the middle class. All three arguments assume some intrinsic characteristics of the middle class that explain the contribution of the class to the economic growth of societies that breed it. Banerjee and Duflo find little significant empirical support for any of the components they articulate but they do find a tendency of the middle class to have less children and invest more in education, health care and other individual foundations that translate into higher paying jobs and longer life expectancy amongst others (2008: 22).

A more articulate VC theory of the middle class states that the three generic classes in society have different generic values that imply different behavioral patterns that explain, amongst others, the remarkable productivity of the middle class. A graphic representation of this theory may look like this:

![Graphic representation of the Values and Consumption theory of the middle class]

The poor enter the game with a minimal Endowment. Hence, they must sell their labor to survive. They cannot borrow money, and cannot accumulate capital or any other assets for that

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2 To the best of our knowledge, this graphic presentation and the articulation of the particular argument that follows is due to Ron Watson, a former student of Dr. Itai Sened who worked with him for a while on this line of research.
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matter. Their values are thus skewed towards the present with little emphasis on savings, investment, education and good health. They aspire to satisfy their pressing needs and look for policies that transfer resources for that purpose.

The middle class enters the game with modest assets but their main endowment is their individual human capital. Like the poor, they sell their labor, but they can borrow money to manage peaks/ troughs, and can accumulate further assets if and only if they manage their lives and their assets carefully and cleverly. This is why they develop a set of values that puts high premiums on hard work low risk investment and spend resources and attention to develop their individual human assets in education and good health as observed by Banerjee and Duflo (2008: 22). They aspire for “middle class bundle” of consumption consisting of the famous house, car, vacations, retirement and healthcare, so that their policy preferences favor public goods, such as good public schools and clinics and a safe and solid living environment.

The rich come to the game with large amounts of capital, they do not need to work to survive, and they can borrow at rates near the risk free rate so as to live off passing or more stable market investment opportunities which explains the Piketty - Zucman line of argumentation as to why the rich get richer and hide so much of their wealth away. Because the value system they develop to correspond to the realities of their lives is to conserve and protect their entrenched privilege. Their derived public policy preferences would be to secure their wealth as best they can and reduce taxes by opposing public goods and maximize very privatized gains.

2.4 Theoretically driven empirical derivatives

In many ways, the theoretical model outlined above is over determined. It is not entirely clear to us at this point if and in what way we can adjudicate the relative merits of each of the theories outlines above, relative to the others. Nor do we pretend to have exhausted all possible theoretical explanations of what distinguishes the middle class from the other two generic groups in societies and what explains its unique contribution to political stability and to long-term economic prosperity. As in any over identified model, the components of the three theories may have multi-collinear correlate. This may pose several problems in the statistical analysis of the data that we turn to next, but the predictive derivatives of this over identified model are clear to see. In this paper we test two generic hypotheses that immediately follow from our analysis:

**Hypothesis 1:** The features that distinguish the middle class from the rich above must be found in terms of assets and consumption patterns while the features that distinguish the middle class from the poor must be found in terms of investment in long-term health and education.

**Hypothesis 2:** Income should correlate with class lines but can be shown to be a derivative rather than the determinant cut point separators between the different classes.

It is useful to note that our theoretical conclusion, if corroborated by the data, suggests different causes and therefore different remedies for the decline of the middle class. Our analysis suggests that the accumulation of the wealth at the top and the decline of the middle class are only partially explained by the Piketty – Zucman arguments. Our theory provides an important complement to theirs. Their observation that cheap credit and tax shelters give significant advantages to the rich explains the ever growing capacity of the very rich to accumulate wealth. But the decline of the middle class, by our argument, emanates mostly from the erosion in the property rights institutions that protect the values, life style and, most importantly, the wealth accumulation capability, or shared of the middle class.
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The policy recommendations that may be derived from these complementary arguments are clearly distinguished. While the Piketty and Zucman argument implies policies of taxation and other redistributive measures side by side with some constant chase after tax evasions and shelters, our argument suggests policies geared at granting broad property rights toward access to cheap and high quality health care, education, pensions housing and job security. They endorse capture and redistribution, while we endorse protection of a bundle of property rights to protect the middle class intrinsic values assets and life style rather than chase after lost fortunes.

3. Method

Traditionally, the middle class has been thought of in relative terms and conceptualized as the middle portion of the wealth distribution. In this paper, the middle class is defined as a class of people, who are not only in the middle distribution of income or wealth, but who also benefit from a bundle of property rights that protect their access to education, pension, health care and economic assets. Such conceptualization presents numerous measurement challenges. A major challenge is how to develop a standardized measure of the middle class that is valid across space and over time and captures the essence of our definition as derived from our theory.

3.1 Previous attempts at defining the middle class for empirical studies

The typical approach in the economic literature to the definition of the middle class has been nicely summarized by Atkinson and Brandolini (2011) who write:

"…economists… think of classes… as income groupings. …the middle class has been identified by setting limits either in the people space, F(y), or in the income space, y. While in the former the size of the middle class is fixed and attention is focused on the evolution of the income share, in the latter population size is the main concern. This approach provides an interesting complement to analyses that focus on the bottom or the top of the income distribution".

In the ‘people’s space’ approach, Levy (1987b) defines the middle class as the middle three quintiles of the family income distribution. Hisnanick (2010) looks at five income deciles ranging from the 25th to 35th to the 65th to the 75th. The ‘income space’ variant takes the median income and then multiplies it by two factors to generate an upper and lower cut point in the income space and then either calculates the percentage of households that fit within that segment (a growing middle class means more people in that segment) or calculates the income share of the households within that segment (a thriving middle class means that a larger share of income flows to those in that segment). Thurow (1984), for example, defines a middle-class household as one with an income between 75 percent and 125 percent of the median household income. Pressman (2007) employs the same definition. Bluestone and Harrison (1988) define the middle based on a low-wage cutoff at 50 percent of this median and a high-wage cutoff at 200 percent of the median. Davis and Huston (1992) define the middle class as those families with incomes between 50 and 150 percent of the current-year median income.

Another economic approach is based on consumption regularities. Wheary (2005) lists home ownership, college education, assets, and health insurance as key determinants of membership in the middle class. The Office of the Vice President (2010) states that “Middle-class families are defined by their aspirations more than their income,” and make speculations as to who could reasonably aspire to home ownership, college education for the children, health and
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retirement security, and occasional family vacations. Many, however, cast doubts as to the reasonableness of these aspirations. “Homeownership, for years the badge of membership in the middle class, has become a nearly impossible feat for those who do not have a house already” Kuttner (1983). While this approach has been around for decades, few attempts at rigorous empirical research have tried to test its merits, which is what we contribute with our current effort.

Finally, some economists differentiate the middle class based on income cut points derived from the poverty level. Harrison et al (1986) use multiples of the official government poverty line as a proxy for minimal income needs and defines the middle class as those with annual income between two and seven times the poverty line. Eisenhauer (2008) regards the government’s official poverty line as the demarcation between the poor and the middle class. He separates the middle class from the wealthy by computing the wealth an individual would have to accumulate to quit work and rely on the interest to get an income above the poverty line in perpetuity. Banerjee and Duflo (2008) look at household surveys from 13 developing countries and define the lower and upper middle class, respectively, as those households whose daily per capita expenditures valued at purchasing power parity are between $2 and $4, and those households between $6 and $10.

Sociological definitions of the middle class focus on social characteristics such as occupations, political or moral values, and aspirations. Three sociological approaches to defining the middle class are worth distinguishing. The first, found most notably in Weber (1947), conceptualizes the middle class as those who are neither rich nor poor. Members of the middle class do not struggle to meet their basic needs, nor do they own the means of production. They possess job security and opportunities to become rich. The second approach (Goldthorpe et al. 1976) defines the middle class as those who save and invest and have an orientation toward the future. The poor lack the resources to invest in education or in a business and the rich already have the resources to meet many of their material desires. The middle class is uniquely positioned in that its members can fulfill their material desires, but can only do so patiently, by saving and investing. Finally, the third approach separates the poor, the middle class, and the rich by referencing occupational groups (Mills 1956, Giddens 1973, Gerteis 1998). Members of the middle class are not manual laborers like the poor, nor are they business owners like the rich. They are professionals and white collar workers.

3.2 A New Measurement Strategy

Our measurement model has the distinctive advantage that it allows all of those multiple factors to co-define the middle class and test the importance and the precise effect of these multilateral aspects of what it means to be in the middle class as an empirical question. The statistical analytical model treats social class as underlying (latent) construct that is not observed directly. The observed indicators such as wealth, health, education, and property rights are assumed to be the reflection of unobserved class status that may emanate from any of the multiple approaches we have surveyed.

We use an Israeli data set to illustrate how the Israeli society is stratified in groups that are clearly defined by a multitude of variables such as income, education academic degree, employment status, housing (home owner and value), private health insurance, general expenditure, private expenditure on education, pensions, socio demographic features and others.

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The Israeli data set is far richer than what we can summarize here. For the sake of parsimony and focus, in this paper we use the "Household Expenditure Survey of 2012" data set with 8696 observations. We thank the central bureau of statistic in Israel for providing us with access to this excellent research asset and helping us to navigate through its system. We use Latent Class Analysis with both categorical and continuous outcomes to identify the class structure of the Israeli society and find some interesting results that support both our theoretical expectations and our measurement strategy.

### 3.3 Review of Important Statistical Concepts for LCA

A **latent class model** relates a set of observed multivariate variables to a set of latent variables. It is a type of latent variable model. It is called a latent class model because the latent variable is discrete. A class is characterized by a pattern of conditional probabilities that indicate the chance that variables take on certain values. LCA with continuous outcomes has been traditionally referred to as a ‘finite mixture modeling’, particularly in applied statistics. Similarly, it has been known as latent profile analysis (LPA) in the social sciences.

We take $C$ to be the random variable that is defined as class membership, with range 1, 2, ..., $k$. $Y$ is an observed response variable and $y$ is the observed response on $Y$. We get the following equation ($j$ next ranges from 1 through $k$):

$$P(Y=y | C=j) = \sum_j P(C=j | y)$$

$P(Y=y | C=j)$ = the probability of a response $y$ by a subject who belongs to Class $j$ ($j = 1, ..., k$). We are usually interested in a set of interrelated observed variables, $Y_1, Y_2, ..., Y_l$ in studies of diverse populations. We get the equation ($Y=y$ is the vector notation):

$$P(Y=y) = \sum_j P(C=j) \cdot P(Y=y | C=j)$$

= $\sum_j P(C=j) \cdot P(Y_1=y_1 | C=j) \cdot P(Y_2=y_2 | C=j) \cdots P(Y_l=y_l | C=j)$.

Based on the **local independence assumption**: Within each class, the random variables, $Y_1, Y_2, ..., Y_l$ are independent of one another.

In LCA, we explain individual differences in response patterns in (i) the individual differences in class membership, and (ii) the cross-class differences in conditional (i.e., class-specific) item response probabilities – the probabilities for individual **possible responses on the items**.

LCA is fundamentally based on the concept of **likelihood** and related notions that are especially relevant in the context of applying LCA in empirical social research. The parameters of the model are estimated by using the method of maximum likelihood (ML), a popular approach to parameter estimation, in particular in LCA utilizations in empirical research. Part of the reason is that, with large samples, the resulting ML estimates possess optimal and desirable statistical properties – **unbiasedness, consistency, normality, and efficiency** (Rakov, 2008).

In addition, ML estimates (estimators) enjoy the very helpful invariance property – the ML estimate of a parameter that is a function of an ML estimate(s), is that same function of the individual parameter ML estimate(s). The maximum likelihood (ML) value obtained via the expectation-maximization (EM) algorithm.

The first step in the mixture model estimation consists of choosing a suitable model with an appropriate number of classes (sub-populations).
Choosing the model with an appropriate number of classes is a crucial stage. The commonly used methods for selecting the best fitting approach are likelihood ratio test statistic, the Akaike (and Consistent Akaike) information criterion, the Bayesian information criterion and others (Fraley and Raftery, 1998; Biemanki et al., 2000; Andrews and Currim, 2003; Pittau and Zelli, 2006).

In the current research the models are compared using the Bayesian information criterion (BIC) developed by Schwartz (1978). The BIC enables the comparison of more than two models at the same time if the models that are not nested. The applicable BIC is:

\[ \text{BIC} = -2 \hat{l}^* + \sqrt{n \cdot q} \]

Where \( q \) is the number of independent parameters to be estimated in the model, \( \hat{l}^* \) denotes the maximized log-likelihood under a considered model (e.g. with \( k > 0 \) latent classes) and \( n \) is the sample size. Among a set of competing models, fitted to the same data set and resulting from the same observed outcome variables, the preferred model is the one associated with the smallest BIC (Hancock & Samuelson, 2008). We regard differences of less than 2 as weak evidence, differences between 2 and 6 as positive evidence, differences between 6 and 10 as strong evidence, and differences greater than 10 as very strong evidence (Jeffreys, 1961, Kass and Raftery 1995).

Having carried out LCA and decided for a certain number of classes, we will proceed with ‘assigning’ studied subjects to these classes, answering the question of who belongs where.(which of the classes). This question can be answered by using in an instrumental way the concept of conditional probability. This is the probability of an event on the assumption that another event (with positive probability) has actually occurred.

To choose the best fitting for every period, the Bayesian information criterion (BIC) was used. The smallest the value of the BIC, the stronger the evidence for the model is. One should note however that a difference smaller than 10 in the BIC values between models with \( c \) and \( c+1 \) number of components should not be considered as a very strong evidence of relevance to add an additional component to number \( m \) (Jeffreys (1961), Kass and Raftery (1995))

4. Preliminary Empirical results

4.1 List of Variables Included

1. Income - Most of the research on the subject defines the middle class in terms of income, one way or another. More often than not, researchers study the Middle-Class on the basis of this feature alone. Income is certainly a good proxy for the level of living of the individual. However, this variable as a central feature in this type of research is often misguided and misleading in view of the existence of several factors. First, the black economy often overshadows unreported income. Estimates of the black economy in Israel are high, relative to other OECD countries and put it at about 25% of GDP. Second there are Inter Generational transfers that are usually not taken into account household income surveys. Many households in Israel manage to keep a high standard of living with very modest incomes. They manage to buy a house with the help of the parents, siblings, inheritance, etc. Thus, income can and should indeed be included in the analysis but must be complemented by other variables we include in the analysis and list below.

2. Housing - If one owns a home and if the value of the home is above 1.5 million shekels. (Categorical)
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3. Academic degree – if the head of the household has an academic degree. (Categorical Variable)
4. Private health insurance – if the household expend on private health services is a good measure for
the social and economic status of the household. It should also give us important insight of the
consumption habits of the middle class and whether we find similar findings to Benerji and Duflu
(2008) and others. (categorical variable)
5. Education expenditure - how much the household spends on the family education. Should also
provide us with insight on consumption habits of the middle class and help corroborate, or
question, findings to Benerji and Duflu (2008) and others. (categorical and continuous variable).
6. Employment status - if the head of the household is working or not - is a good measure that can
make distinction between lower and middle–upper middle classes. (categorical variable).
7. Pension expenditure - Household investment in retirement funds – may be understood as another
consumption variable but is also a very important proxy to measure the propensity of the house
hold for long term savings – a critical element in the equation in its own right. (continuous).
8. General household expenditure – Standardized per person in the household.
9. Religion - of the head of household. This variable distinguishes between households headed by
Jewish and households headed by an Arab. Israeli society is extremely polarized religiously. We
decided to put this variable in order to examine where the Arab minority class divisions in relation
to the Jewish majority.
10. Number of persons in household.

4.2 Results

According to the data and the BIC criterion the four classes solution seemed most suitable. In
addition the p – value on the Lo-mendell-rubin test showed support for the 4 class solution. The
groups can be interpreted as “lower” (poor), “middle class”(or lower-middle) “upper-middle
class” and “upper” (rich) in the case of four classes and as “lower”, “middle class” and “upper”
in the case of three classes.

Because we have a multivariate analysis, analyzing the results of a single variable does not give
us a clear picture of who is in the middle class. Tables 2 and 3 provide us with a much more
complete picture. In this more comprehensive analysis, the lower class numbers 48% of the
sample, 43% of the sample seems to populate the middle class, 4% populate the upper middle
class and the rich upper class number 3.4% of the sample. This division is consistent with state
of the art estimates in other research, which gives it a significant boost in construct validity.

Table 2: Class proportions to the four classes' solution and results in probability scale

| Source: Data from household expenditure survey 2012, Central bureau of statistic in Israel |

| Table 2: Class proportions to the four classes' solution and results in probability scale |
|---|---|---|---|---|
| | lower | Middle class | Upper-middle | Upper |
| size | 49% | 43% | 4% | 3.4% |
| Home owner | 58% | 80% | 71% | 85% |
| Home value (above 1.5 m) | 4.8% | 35% | 45% | 62% |
| employment | 52% | 73% | 87% | 65% |
| Academic degree | 15% | 40% | 71% | 67% |
| Private health | 8% | 46% | 66% | 63% |
| Religion-jewish | 71% | 96% | 97% | 96% |
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Table 2 and 3 speak directly to our argument. Most importantly, they show that the income variable does not distinguish well between the middle class and the upper class. It does a better job at distinguishing between the lower class the middle class, but it is certainly not a single variable story. General expenditure, not surprisingly, gives us very similar results as it is highly correlated with the income variable, but has a significant independent effect. Figures 1 & 2 provide a graphic summary of the income variable. They illustrate the shortcomings of the income variable at separating the upper and upper middle classes from the middle class and to some extent even the poor from the middle class.

**Figure 1:** Income Distributions by Class and Overall.

![Figure 1: Income Distributions by Class and Overall.](image1)

**Figure 2:** Income Distributions by Class and Overlap.

![Figure 2: Income Distributions by Class and Overlap.](image2)

Figures 1 & 2 clearly establish the weakness of the income variable in distinguishing the very rich from the middle class. This variable does not distinguish sharply between the middle class and the lower class either. This finding lends significant support to our theoretical and measurement strategies as they suggest that to have clarity in studying the challenges the middle class or the better off among the poor class face, the income distribution variable must be supplemented with variables estimates of health, education and home values.

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Going back to Tables 2 & 3 and consistent with our expectations, we see that education and pension savings fare remarkably well in separating all three class (lower, middle and upper middle) by two much sharper cuts. In the Israeli case, the expenditure on education seems to materialize in that the ['resulting'] academic degree variable also separates the poor from the middle class and again the upper classes from the middle class quite sharply. It is hard to assign causality here, as it may very well be that wealth breads education rather than the other way around but the sharp cut lines are clear to see in the analysis.

The upper class differs from the upper middle class mainly on general expenditure, but employment rate are lower than the middle and upper middle class groups, also spending on pensions is relatively lower than the middle and upper middle class groups. These finding, together with the number of persons in the household can attest to households concentrated in older age groups. It seems that the upper class is affluent enough so as not to need to continue and invest in spending any further on pension saving and to have remarkably enough resources to spend on luxury and other general spending a whole lot more than the upper middle class and the rest of society.

Another interesting finding of our analysis is that contrary to common perceptions, at least in Israel, home ownership distinguish well between the poor and the middle class but not between the middle class and the upper classes.

Controlling for religion, the Arab minority is concentrated in the poor group. Almost 30% percent of the lower class are Arab household and their weights in all three other groups is less than 4%. This finding illustrates well the advantage of our inquiry strategy. The barriers baring the Arab minority from entry to the middle class cannot be understood in terms of income alone. Actually judging by income alone the Arab minority does a lot better and constitutes almost 10% of the three higher classes. The right way to interpret this finding is to ask the question in terms of probabilities. While the chances of a member of the Arab minority to earn higher salaries are not that slim. However, the chances of a member of the Arab minority to earn a higher salary, own a home, have education, private health care insurance and a significant pension are very slim indeed.

**Table 3: Model Results**

Means expenditures per capita in households in thousand of shekels except for income deciles

<table>
<thead>
<tr>
<th></th>
<th>Lower class</th>
<th>Middle class</th>
<th>Upper middle</th>
<th>Upper class</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Expenditure</td>
<td>3.56</td>
<td>6.79</td>
<td>8.36</td>
<td>17.25</td>
</tr>
<tr>
<td>Education exp</td>
<td>0.17</td>
<td>0.31</td>
<td>0.54</td>
<td>0.56</td>
</tr>
<tr>
<td>pension</td>
<td>0.06</td>
<td>0.14</td>
<td>1.14</td>
<td>0.112</td>
</tr>
<tr>
<td>Income deciles</td>
<td>3.1</td>
<td>7.6</td>
<td>8.53</td>
<td>9.4</td>
</tr>
<tr>
<td>Number of persons in HH</td>
<td>3.6</td>
<td>3.01</td>
<td>3.5</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Data from household expenditure survey 2012, Central bureau of statistic in Israel
Note: all values are significant in 0.05.
To sum up, to move up from the class of the poor, one seems to need to have employment, education, health care savings and real estate. But what makes one move to the higher, upper middle group is spending yet more money on private education, have significantly much more private health care services and having hefty savings in pension funds. This seems to suggest in general that the very rich are not that different from the middle class. They simply do a whole lot more of the same.

As for the poor, the story here seems a whole lot more nuanced than commonly thought. The poor class suffers from spending less on education, having much lower pension savings, and lower income but on all of those dimensions their numbers are about half of the middle class. A much bigger gap opens in home values – 15% of the middle class; private health care – 17% of the middle class and degree attainment which stands at 37% of the middle class. This picture suggests straightforward, non market, policy solutions in the general support for health care, education and neighborhood improvement. ‘Affordable housing’ may not provide as much help as is often prescribed if it maintains the low values of where the poor end up living and if it is not supplemented by subsidies for education and better health care provision.

5. Mobility and Vulnerability

In the end, the main concern of any study of the middle class is the issue of the vulnerability of this class and the possible upward mobility of the poor that may provide it with the reinforcement it may need to fare well in the long run. Figure 3 is a rather remarkable testimony to this aspect that our study allows and other methods simply do not provide us with. It shows the Average Latent Class Probabilities for Most Likely Latent Class Membership by latent class. In other words, it summarizes the computation the model estimates of what the average probability for lower, upper, upper middle or middle class households to be in (‘move into’) any other class than the one the model assigns them to. We can see that middle class household has 6 % probability (average) to be in the lower class and 0.6% percent to climb into the upper middle or upper classes. The highest class has a probability of almost 8% to ‘decline’ to the middle class and zero probability of belonging to the poor. Finally the poor have only 5% probability of ascending to the middle class and zero probability of belonging to the highest class and the upper middle class.

Figure 3: Average Latent Class Probabilities for Most Likely Latent Class Membership by latent class

Source: Data from household expenditure survey 2012, Central bureau of statistic in Israel
Two important conclusions should be derived from Figure 3. First, unlike measures based on income, our multidimensional measure does an exceptional job at distinguishing among four classes. Second, the figure gives us a first cut at estimating the upward mobility of the poor, which is quite low at 5% and the vulnerability of the middle class that is significantly higher at 6%. The fact that the rich are very unlikely to fall to poverty may not be that surprising. But the close to zero probability of the middle class to move up to the higher classes is somewhat striking. This interpretation of Figure 3, is somewhat of a stretch and we hope to be able to do more with the data and the methods we developed to come to a much more adequate and nuanced analysis of the upward mobility options of the poor and the risk associated with the vulnerabilities of the middle class which are at the heart of the research we are conducting and hope to further develop in the future.

5. Concluding Remarks

We believe to have established the shortcomings of the scholarship on the middle class due to a thin theoretical articulation and the rather arbitrary measurement strategies used to estimate the size and strength of the middle class that are commonplace in this literature.

It is way too early to declare victory (it usually is) but we hope to have illustrated the merits of our approach based on a more substantial theoretical foundations and a multidimensional latent class analysis measurement strategy that seem to capture much better the mechanism needed to develop a rigorous research strategy for the study of the middle class. Mechanisms that allow, by multidimensional measurement tools and reasonably articulate theory, a much more refined study that leads to much clearer understanding and may enable much more careful and nuanced policy recommendations.

Our preliminary results are encouraging but it will take a lot more work and significantly more, comparative cross nation and time series data bases to establish the extent to which it is viable and useful as a research and measurement strategy and the resolution with which it may endow us when we come to devise public policy solutions.

Having recognized the significant work that lies ahead, our research seems to have given us enough encouragement as to its potential at helping us gain significant and important insight into understanding the phenomenon we are researching. In particular, it seems that what the middle class needs to survive and what the poor need in order to be upward mobile, are not higher incomes and cheap housing but also education, health and higher home value, rather that affordable, housing. Employment and shelter may be necessary conditions but certainly not sufficient to move up into or maintain one’s status as a member of the middle class.

From a social welfare perspective and in terms of policy recommendation, to enhance and sustain the strength and viability of the middle class, access to supplementary health care services and higher education as well as pension savings and home values seems at least as important facets of any policy package that may protect or enhance the middle class, as minimum wages, employment and affordable housing.

Our future research will be dedicated to see how robust our findings may prove when we apply our theory, methodology and measurement tools to other data sets in other countries and what differences we may find in terms of the main determinants of membership in and vulnerability of the middle class in other case studies.
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