A Model of Uniformity in a Preference Function

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Abstract

In recent development of the choice functions many investigators accept that social preferences maintain usually non-uniformity. This paper tries to establish the nature of non-uniformity that it mixes up with two distinct properties of preferences: immobility and steadiness. It is shown here that steadiness and immobility together imply uniformity but the converse does not hold. Now if steadiness be disposed of from the preferences of a firm, firm cannot obey the rule of immobility but may follow the rule of uniformity. It indicates that social choices of a firm must maintain uniformity and steadiness.

Keywords: choice function, uniformity, immobility, steadiness

JEL Classifications: D69; D71; F13

1. Introduction

Since the purpose of the important decisions in trade and industry of a firm necessitate varied preferences to apply expenditure plan only if the set of choice function is not empty. This is the existence problem to what firms must decide on the effect of aging on savings and inter temporal choice of consumption, associates in a firm must decide how to allocate expends to themselves and assets, associates with assets rights over a natural resource must decide on an withdrawal plan, and resource rich countries must decide how to get through the proceeds from their self-governing capital stocks. All that has to be added is the obvious fact that capital is held in common and is consumed energetically over time, and the collaborators in the decision very often have varied time preferences. How should such decisions be taken and fabricated, given the partner's of a firm different attitude to time?

The argument presented in this paper is based on three preference factors. The first is that uniformity - improvement in the technology by mixing together steadiness and immobility – lies at the heart of choice theory. The above process initiates into preference theory the factor of technological uniformity; better preference rules provide earlier one outdated. Antiquation illuminates a significant common point of the choice theory; explicitly that advancement generates failures along with a new direction of earnings. It also represents a relation among unpredictability, reasoning and dissatisfaction. Our thinking assumes, following the path paved by Epstein and Hynes (1983) that the multiple steady states are possible with the help of marginal product and time preference and it is adequately significant to influence the economy. Steadiness is maintained at the time of research and development and population growth. The properties of cooperation, sincerity and dependability of the workers and managers of a firm are also the quintessence of steadiness (Owen et. al 2017). It shows that the nature of technological innovations with stochastic nature do not affect steadiness in a certain period of time and cannot be modelled as deterministic. The model assumes that role of immobility in social media, information and communication technologies are sufficiently important to affect the economy according to Smets (2019). To describe the term immobility and its effects on different social areas such as migration, he coined the term affective and symbolic immobility to realize the different properties of media and communication technologies.

The differences between steadiness and immobility with respect to time are very subtle and typical because the managers' social preferences are associated with qualitative characteristic of improvement of financial information which is called comparability. Here steadiness and uniformity are the similar properties based on the preference of firm manager. If the factors and social preferences are marked as comparable and non-dictatorial by the managers then these choices may obey uniformity or may be immobile but not both. These preferences are one and the same for comparability framework but not for social choices. The preference to enforce one or the other property at the

social level is ultimately a normative one. The choice is not more or less uniform with managers' preferences. The argument is that steadiness is a challenging aspect of social preferences both normatively and illustratively for within firm choice.

In our model preference of uniformity is constructed with the two distinct preferences that are steadiness and immobility. Since steadiness depends on self-regulating choice function but immobility depends on future choice function and technological development. Steady growth of different firms allocate the coming revenues on resource investment among the workers and investors of capital; and also sketch the amount of extraction of resources and build up a consuming plan by studying the dynamics of uniformity, steadiness and immobility of choice functions. The properties of uniformity and steadiness are fine when firms' choices are functional in the preference functions. We connect these observations that search for examination the uniformity property of different firms' behaviour and give the result that this property is restricted.

2. Literature Review

Recent advancement of academic and functional work (Strijboss 1997; Henriksen et al.2002) proposes that it is possible to construct a technological culture between the growing uniformity and plurality. Henriksen et al. (2002) studied the behaviour of uniformity strategy of PharmCo multinational company and observed that uniformity played an important communication role between project managers and the grass root workers. Multidimensional uniformity in a geo-scientific model with many input variables showed efficiency and effectiveness for large multivariate problem according to the study by Deutsch and Deutsch (2012). Their researches and ideas on the activities of uniformity and its relations with input and output variables lead to the important decisions that firms necessitate varied time preferences to implement a plan. Partners in a firm must take the decisions about the distribution of profits between payouts to themselves and capital investments. Now, it is recognised that time preferences is a central idea to the overall design of decisions of economic development. How should such decisions be estimated and completed?

To improve understanding of how steadiness will have an effect on growth rate in Canada and Switzerland between 2006 and 2018 is studied by Holston et al. (2017) and also the growth rates of global financial crisis in most of the countries is observed by Kohlscheen and Nakajima (2021). When the impacts of monetary policy do analyze the unconventional economic policy functioning near the zero lower bound for interest rates well, the effect of different model choices in lowering the unemployment rate are greatly attenuated (Wu and Xia 2016).

Studies on capital mobility (Sulaiman and Moosa 2020) establish that though capital mobility provides benefits and it is low in low income group of countries, it encourages the imposition of capital controls. The main barriers of capital flow are financial intermediaries because investors are trained from the performance of intermediaries (Moreira 2019).

In our paper we show that if firms have heterogeneous concessional factors, and social choices are useful and non-dictatorial, these choices may obey time uniformity or time invariant, but not both. Since these properties are impossible to differentiate for concessional useful firms, but not for social choices, the preference to impress one or the other property at the social stage a normative one – neither preference is more or less uniform with firms' choices. We argue however that time steadiness is probable to be a difficult characteristic of social choices – both normatively and descriptively for within firms' inter temporal preference. Time steadiness may but be more descriptively reasonable for among firm preferences, as might happen in intergenerational decision - making. These investigations provoke why uniformity, steadiness and immobility in choice function are needed that control the futuristic plan of a firm. Generally that are not given importance at all, for what are evident to managers often simply escape their attention. We share these examinations to the empirical literature cited above that seeks to test the time uniformity of firm behaviour, proposing that the definition of time uniformity it utilizes is also restricted.

Model 1:

Let $X = (x_\tau)_{\tau \in N,}$ denote streams of different inputs in a time τ, where N is the set of non-negative integers, and x_τ takes values in a set C. Let P (X) denote the set of all nonempty subsets of X. It is known that there are two types of preferences such as weak preferences and strict preferences. Weak preferences obey the relations of complete and transitive binary relations whereas strict preferences maintain complete, transitive and anti symmetric relations. Let the set of all preferences be denoted by B^X whereas the set of all strict preferences be stand for S^X. This implies that $S^X \leq B^X$ for all $X \in P(X)$.

Let Y (X$^/$) be output at evaluation period $\tau \geq 0$ when input X$^/$ is chosen, and define Y$_\tau$ to be the set of all possible outputs at τ. So y$_\tau \in$ Y$_\tau$ = {y$_0$, y$_1$,..., $y_{\tau-1}$}and define y$_0$ means no new technology is applied. We can also define the set of all possible outputs by Y = u$_{\tau=0}^{\infty}$ Y$_\tau$, with element of y$_\tau$. A future output stream $Y''$with a future output y$_\tau$ is also incurred from future output streams.

The preferred technology T ϵ T$_N$, is given by P$_T$ (x, y) = {(x, y) such that x can produce y by using technology T}. T$_N$ is the set of all preferred technological set. We can make the following assumptions on T:

Assumptions:

a) Technological uniformity:

For all T ϵ T$_N$, x ϵ X, y, y$^/$ ϵ Y,

$$P_T \ (x, \ y) \ \geq \ P_T \ (x, \ y^/) \ \Leftrightarrow \ P_{(T, \ x)} \ (y) \ \geq \ P_{(T, \ x)} \ (y^/). \tag{1}$$

b) Technological steadiness:

For all T ϵ T$_N$, x ϵ X, y, y$^/$ ϵ Y,

$$P_T \ (y) \ \geq \ P_T \ (y^/) \ \Leftrightarrow \ P_{(T, \ x)} \ (y) \ \geq \ P_{(T, \ x)} \ (y^/). \tag{2}$$

c) Technological immobility:

For all T ϵ T$_N$, x ϵ X, y, y$^/$ ϵ Y,

$$P_T \ (x, \ y) \ \geq \ P_T \ (x, \ y^/) \ \Leftrightarrow \ P_T \ (y) \ \geq \ P_T \ (y^/). \tag{3}$$

Technological uniformity is a relationship between preferences of different technologies. In relationship (1) it discards preference problems, and entails that if a best possible technology and its related system is taken today, it will stay on best technology to follow it tomorrow. Technological steadiness also relays on choices at different technologies, but is an overall different property from technological uniformity. An outcome of technological steadiness means preferences are independent of technology. It has no effect on future inputs also. Technological immobility is a self-determination property of preferences at each fixed technology. It is a separate feature from steadiness and has no necessary implications of time uniformity of preferences.

It is easily observed in our proposition that any two of the three properties in Assumptions show that this observation holds in general.

Proposition 1.

Any two of the three properties: Immobility, Steadiness and Uniformity, imply the third.

Proof: Immobility and Steadiness imply Uniformity: P$_T$ (x, y) $\geq$ P$_T$ (x, y$^/$) that is P$_T$ (y) $\geq$ P$_T$ (y$^/$) if and only if (by Steadiness) P$_{(T, x)}$ (y) $\geq$ P$_{(T, x)}$ (y$^/$) if and only if (by Uniformity) P$_T$ (x, y) $\geq$ P$_T$ (x, y$^/$).

Immobility and Uniformity imply Steadiness: P$_T$ (x, y) $\geq$ P$_T$ (x, y$^/$) if and only if (by Uniformity)

P$_{(T, x)}$ (y) $\geq$ P$_{(T, x)}$ (y$^/$) if and only if (by Steadiness) P$_{(T, x)}$ (y) $\geq$ P$_{(T, x)}$ (y$^/$).

Uniformity and Steadiness imply Immobility: P$_T$ (x, y) $\geq$ P$_T$ (x, y$^/$) if and only if (by Steadiness)

P$_{(T, x)}$ (y) $\geq$ P$_{(T, x)}$ (y$^/$) if and only if (by Immobility) P$_T$ (x, y) $\geq$ P$_T$ (x, y$^/$).

It is observed here that the Proposition 1 holds in general.

To establish a relation with the definitions of uniformity, steadiness and immobility we propose that preferences are time separable. It can be related as,

$$P_T \ (y) \ = \ \sum_{t=0}^{\infty} Y_t^T \ (y_t) \tag{4}$$

where the sequences of output functions {$Y_t^T(y_t)$}are provisional on technology T. Under this constraint, the definition of steadiness taken up by us diminishes to the conjunction of Immobility and Steadiness.

It is known that social choices cannot be immobile since the choices of firms possess heterogeneous concession factors. Koopmans (1960) established the result in his classic paper. Borrowing from his result it is easy to find a relation of the constraints on the successions of output functions {$Y_\tau^T(y_\tau)$} as,

$$Y_t^T(y) \ = \ Y^T \ (y) \ (\theta_T)^t \tag{5}$$

for technology dependent output functions Y^T (y) and concession factors $\theta_T \in [0, 1]$. According to the presentation here a solo concession factor θ_T is legitimate at each technology T as social choices cannot be immobile if organizations have choices of the form (5) with the concession factors θ_T are heterogeneous. This indicates the property of heterogeneity in firms' choices which is not allowed by the immobility condition.

We can easily check the conflict of condition as we have already observed that,

Uniformity and Steadiness $\Rightarrow$ Immobility.

Taking the contra positive property of the above conclusion,

Not Immobility $\Rightarrow$ Not Steadiness OR Not Uniformity.

Since non – social choices do not obey the property of immobility and the property of uniformity supposes steadiness, leads to a conflict of uniformity. It is also suggestive from above implication that a substitute option subsists. If the steadiness property of social choices is discarded, the option of uniformity remains open.

Relation between output and uniformity:

To demonstrate that social preferences can be time uniform, we assume that each organization i in a group G have technology choices as

$$P_T^i \ (y) = \sum_{\tau=0}^{\infty} Y^i \ (y_t) \ (\theta_i)^{\tau}. \tag{6}$$

These choices are immobile and steadiness and hence uniform. It reveals that open choices cannot unravel uniformity and steadiness for practical choices.

Though uniformity and steadiness are inseparable for practical agents, this is not applicable for collective choices that are sensitive to the heterogeneity in agents' choices. As input streams are common to all organizations, we assume that output are also time separable. We define it as,

$$Y_{T_\tau} \ (y) = \sum_{i \in G} \alpha^i(T_\tau) \ P_{T_\tau}^i \ (y)$$
$$= \sum_{i \in G} \alpha^i(T_\tau) \ \sum_{\tau=0}^{\infty} Y^i \ (y_t) \ (\theta_i)^t, \tag{7}$$

where $\alpha^i \ (T_\tau)$ is the weight assigned to organization i when the technology input at time τ is T_τ, and we assume that $\alpha^i \ (T_\tau) \geq 0$, and $\sum_{i \in G} \alpha^i(T_\tau) = 1$ for all T_τ.

Proposition 2.

Assume that there exist indices i, j such that $\alpha^i \ (T_\tau) > 0$, $\alpha^j \ (T_\tau) > 0$ for all $T_\tau \in T_N$ and $\theta_i \neq \theta_j$. Then
1. Output preferences (7) obey uniformity if and only if the weights are of the form:

$$\alpha^i \ (T_\tau) = \frac{\alpha_0^i \ (\theta_i)^\tau}{\sum_{j \in G} \alpha_0^j (\theta_j)^\tau}, \tag{8}$$

where $\alpha_0^i \geq 0$, $\sum_{i \in G} \alpha_0^i = 1$.
2. Output preferences (7) obey steadiness if and only if the weights are of the form:

$$\alpha^i \ (T_\tau) = z_i, \tag{9}$$

where $z_i \geq 0$, $\sum_{i \in G} z_i = 1$.

Proof. 1. The definition of uniformity in (1) requires

$$Y_{T_\tau}(x, \ y) \geq Y_{T_\tau}(x, \ y^{\prime}) \Leftrightarrow Y_{(T_{\tau,x})} \ (y) \geq Y_{(T_{\tau,x})} \ (y^{\prime}) \tag{10}$$

for any T_τ, x, y and $y^{\prime}$. Substituting (7) into the left hand side of (10), it becomes

$$\sum_i \alpha^i(T_\tau) \ Y^i \ (x) \ + \ \sum_i \sum_{i=0}^{\infty} \alpha^i \ (T_\tau) \ Y^i \ (y_t) \ (\theta_i)^{t+1} \geq \sum_i \alpha^i(T_\tau) \ Y^i \ (x) \ + \ \sum_i \sum_{i=0}^{\infty} \alpha^i \ (T_\tau) \ Y^i \ (y_t^{\prime}) \ (\theta_i)^{t+1}$$

$$\Leftrightarrow \sum_i \sum_{i=0}^{\infty} [\alpha^i \ (T_\tau) \ \theta_i] \ Y^i \ (y_t) \ (\theta_i)^t \geq \sum_i \sum_{i=0}^{\infty} [\alpha^i \ (T_\tau) \ \theta_i] \ Y^i \ (y_t^{\prime}) \ (\theta_i)^t$$

The right hand side of (10) is equivalent to

$$\sum_i \sum_{i=0}^{\infty} [\alpha^i \ (T_\tau, \ x)] \ Y^i \ (y_t) \ (\theta_i)^t \geq \sum_i \sum_{i=0}^{\infty} [\alpha^i \ (T_\tau, x)] \ Y^i \ (y_t^{\prime}) \ (\theta_i)^t.$$

Comparing the expressions for the left and right hand side of (10), we see that uniformity holds if and only if for all $T_\tau \ \varepsilon \ T_N$ and x ϵ X,

$$\alpha^i \ (T_\tau, \ x) \propto \theta_i \ \alpha^i \ (T_\tau),$$

This can only occur if

$$\alpha^i(T_\tau) = K \; \alpha_0^i \; (\theta_i)^t$$

for some constants α_0^i, $K > 0$. Imposing the constants $\sum_{i \in G} \alpha^i(T_\tau) = 1$ yields the result.

2. Since steadiness require $Y_{T_\tau}(y)$ to be independent of τ, the result follows.

Time uniformity and time steadiness are also a continuation of output preferences. The welfare weights go against steadiness since with this choice over future output differ with the evaluation time. A new climate of preferences of steadiness is created. And therefore, it is possible when there is a fixed origin of time $\tau = 0$. Similarly, steadinesses of output preferences are not uniform, as the weights of (9) are not of the form (8). In this case output preferences can exhibit with the time, even though firms' preferences cannot.

As it is observed that the conjunction of time

$$\tilde{Y}_{T_\tau}(y) = \sum_{t=0}^{\infty} [\sum_i \tilde{\alpha}^i Y^i (y_t)] \; \theta^t. \tag{11}$$

The subject of the observed behaviour of choice links the constraint on preferences with uniformity by observing the empirical tests. This is a more rigorous constraint than is required by uniformity. In examining the possibility of social preferences reflecting the heterogeneity in concession of a firm's output there is an attachment with the weights assigned to organization with the time dependent output of a firm.

We now make a study that elucidates the possible interpretations of time uniform social preferences when firms have heterogeneous concession factors. We will observe it with the following assumptions:

Assumption 2. Let us take a concessional output of a firm with preferences (6). Let M_τ be a measure of this firm's concession at time τ. We say that firm is:

(i) Advancing if $M_\tau = \sum_{t=\tau}^{\infty} Y (y_t) \; \theta^{t-\tau}$ for all τ.

(ii) Enjoying lifetime usefulness if $M_\tau = [\sum_{t=0}^{\tau-1} Y (y_t) \; \theta^t] + \theta^\tau \; [\sum_{t=\tau}^{\infty} Y (y_t) \; \theta^{t-\tau}]$ for all τ.

These two definitions of concession are obviously alike from the viewpoint of the firm's choices over upcoming output streams. The following result shows that firm's concession is underdetermined by their choices has results for the analysis of firm's output.

Lemma 1. If useful social choices obey time uniformity and societal, the following interpretations of (7) are equivalent:

a) Firms have advancing concessional measure, output of social choices have τ-dependent concessional weights (8).

b) Firms experience long-time usefulness of a product, and concessional weights are constant.

Proof. Take that firms enjoy long-time usefulness of a product, and that the concessional weights $\alpha^i(T_\tau)$ are constant and equal to α_0^i. Now social choices at any time τ are given by:

$$Y_\tau(y) = \sum_i \alpha_0^i \sum_{t=0}^{\tau-1} Y(z_t) \; (\theta_i)^t + \sum_i \alpha_0^i \sum_{t=0}^{\infty} Y(y_t) \; (\theta_i)^{t+\tau} \tag{12}$$

for z_t are values of output of a product in the previous years and y_t are the output of a product in the following years. As the z_t cannot be changed and have no influence on choices over following streams, these choices are equivalent to

$$Y_\tau(\vec{y}) = \sum_i \alpha_0^i \; (\theta_i)^\tau \sum_{t=0}^{\infty} Y(y_t) \; (\theta_i)^t \tag{13}$$

which are equivalent to time uniformity social choices with concessional weights (8).

The ambivalence in the presentation of social choices is a result of the fact that it is not possible to tell whether firms with concessional choices have advance – mode concessional measures, or enjoy lifetime usefulness.

3. Conclusion

The article looks exclusively at the effect of steadiness of firm which is not only a questionable expressive property in between collective preferences but also our result focuses on within firm choice. Our conclusion that uniformity, non – steadiness, social choices are probable to succeed gets uphold from the pioneering study of firm performance. Since all firm performances are not negative, our result shows effective support for the deduction that firm performance can be lessened by uniformity social choices with varying weights as proposed in proposition 2. The understanding of these decisions is that united preferences can frequently be lessened by a uniform useful model, endowed with that the choice of the firm relates its experience.

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