MARKET TRENDS OF CANADIAN FIRST NATIONS PEOPLE: A CRITIQUE OF THE GROWTH PARADIGM BY THE SOCIAL WELLBEING OBJECTIVE

Masudul Alam Choudhury
Professor and International Chair of the Post-Graduate Program in Islamic Economics and Finance
Faculty of Economics, Trisakti University, Jakarta, **INDONESIA** &
Visiting Professor, Social Economy Center, Ontario Institute for Studies in Education
University of Toronto, Ontario, **CANADA**

ABSTRACT

The advance of capitalism and the growth paradigm have not always been to the benefit of target groups in the national labor market. The relative status of such target groups to the total labor force has not necessarily improved with the advance of economic growth. Consequently, sheer economic theory that is not embedded in social issues to improve the wellbeing of the underprivileged people in the labor force has not been useful to address the greater picture of wellbeing as the meaning of labor market adaptation of target groups. The concept of labor market adaptation is thus not limited to labor market efficiency. Instead, the complementary relations between improving social equity simultaneously with labor market efficiency define the comprehensive concept of wellbeing. The prevalent belief on the optimal concept of economic growth with technological change and productivity gained by human resource inputs is examined for relevance when applied to the actual and estimated perspectives of the labor market problems of target groups.

Keywords: Economic growth; economic development, social change; Canadian Aboriginals' wellbeing, labor market adjustment.

BACKGROUND

The social wellbeing of target groups in the labor force has become an important issue of labor market adaptation. Issues of social equity and labor market efficiency have occupied dominant concern in every country. The intensity of such problems appears to be deepening along with expanding global capitalism, which has its own demands on efficiency. Economic efficiency is found to override equity questions. The demographic, social and economic problems of labor market adaptation of target groups of labor force are found to result in unequal growth and development and loss of social wellbeing for such target groups. Thus the target groups of population in every country today find themselves adversely poised in economic competition with social wellbeing problems of labor market adaptation.

Such problems require analytical investigation both in the conceptual sense of economic theory and factual statistical analysis to study the conjoint problems of labor market adaptation with endowed human resource development as means for attaining social wellbeing. The issue of efficient labor market adaptation and the social equity issue of productively and social assimilation of target groups into efficient labor market while also increasing social wellbeing, remains an important research issue.

Here then is a tripartite problem for systemic integration. These are namely, (i) attainment of social wellbeing by promoting social equity; and (ii) attainment of economic efficiency. (iii)

The policy-theoretic issues are carried out within this integrated and interactive tripartite design of analysis.

The span of last twenty years has seen a great transformation in the labor market trends of target groups. It is surmised that the endogenous theory of economic growth or new growth theory (Romer, 1986; Turnovsky, 1995) can explain the influence of human resource development that has been induced in labor market trends. Also parallel to endogenous growth model as an explanatory conceptual approach there is the Solow growth model (Solow, 1980). It aims at capturing the effects of technological change in factor inputs. It is surmised that the result then would be accelerated economic growth.

However, the applicability of such aggregate models is questionable in the case of attaining social wellbeing of the national target groups. The underlying conceptual studies that arise from such investigations may be empirically criticized in respect of trends in critical labor market indicators. Thus a validation of the conceptual growth models is investigated and critically analyzed and explained in reference to statistical facts. The underlying policies and strategies concerning the kinds of labor market indicators and their possible improvements can be formalized.

The focus in respect of the policy-theoretic and statistical analysis of critical labor market indicators will be carried out in reference to Canada's First Nation People on the issues of their labor market adaptation within the national perspective. Thereby, issues of economic efficiency and social equity involving the labor market adaptation of such target groups ought to be studied.

The questions to be examined will then be as follows: To what extent the boom in human resource development along with technological change in economic growth, as explained by Romer and Solow and their prototypes, can stand up to evidence on labor market adaptation of target groups. Within the human resource development we will consider the impact of formal education and vocational (trades) training of the First Nations People in comparison to non-Aboriginal labor force in Canada.

Technological change will mean relative shift in the labor/capital ratio by major sectoral and occupational categories that receive the impact of human resource development. Thus we will use information from the following trends in labor market indicators to study the issue of labor market adaptation with social wellbeing and economic development: Trends in social wellbeing variables; policy and strategic variables; the gap between economic efficiency and social equity, and its social reconstruction.

Idea of social wellbeing as the objective criterion

The idea of social wellbeing arising from such relations means the degree to which the state (socioeconomic) variables, and policy and strategic variables show appropriate complementarities for establishing the effectiveness of economic and social benefits on target groups in the labor market. The equity-efficiency gap is explained by shortfall in attained levels of social wellbeing. The failure in attaining complementarities between the economic and social parts of the total social wellbeing is the meaning of ineffective labor market adaptation.

Next, following upon the actual state of affairs the normative simulation approach is to reconstruct desired levels of appropriate complementarities between the variables as the criterion of social wellbeing. This results in deriving alternative strategies and policies for social reconstruction to combat the labor market problems of target groups (Canadian Aboriginals). Thus there is a conceptual research here followed by empirical estimation of prevailing conditions in the target labor market. The reconstructed prescriptive strategies and policies ensue.

The social wellbeing meaning of labor market adaptation

The conceptual and policy-theoretic issues on choice of technology by sectoral and occupational shifts; educational and human resource development affecting First Nation labor force in comparison to the non-Aboriginal labor force; and the First Nation People's inequity gap and their efficient labor market adaptation problems, are addressed. This total evaluation is carried out by a policy-theoretic empirical evaluation of the total social wellbeing function in the critical variables that represent the economic, social, and strategic and policy parts of the total social wellbeing criterion for Canadian First Nation People. This approach also comprises the topic of labor market adaptation as synergy between economic growth and social equity explained by the social wellbeing criterion.

In the end, by its interactive study on the objectives and indicators of labor market adaptation, meaning simulated levels of social wellbeing, this study turns out to be a policy-theoretic one on the theme of explaining prevalent and reconstructed scenarios of equitable labor market adaptation of Canadian Aboriginals. The historical and provincial/regional cross-sectional lessons of the labor market trends of target groups are examined.

Selected indicators for studying labor market adaptation of Canadian First Nation people

The following labor market indicators to be used in this study are taken from the First Nation census studies 2006 -- Gionet (for Statistics Canada, 2009); the empirical data are of the cross-sectional kind and limited indicators due to paucity of data. The socioeconomic variables (state variables) are as follows: Size of First Nation People and non-Aboriginal labor force (L, L', resp.); unemployed (employed) labor force (L_u, L_u' resp.); employed labor force (L_e, L_e'); unemployment rates of First Nation People relative to non-Aboriginal people (u, u' resp.); labor force participation rate (r, r' resp.); occupational distribution of the labor force (O, O' resp.); sectoral distribution of the labor force (L_s, L_s' resp.); educated and skill-trained labor force (L_e, L_e' resp.); and expenditure per capita in formal education and training (E, E' resp.). Technological variable will be (labor/capital)-ratio (l, l' resp.). Labor productivity variable will be denoted by (output/labor)-ratio (q, q' resp.).

The equity variables will be denoted by (employment/population)-ratio (e, e' resp.), earnings (w,w' resp.), and the indicator suggesting the crowding state of housing indicator (h,h' resp.). The vector of variables is denoted by,

$$\{(L, L_u, L_e, u, r, w, q, O, L_s, L_e)^1, (E, e, h, l)^2\} \qquad (1)$$

In this vector the superscript (1) denotes the sub-vector of economic variables. Superscript (2) denotes the combination of social variables [(e,l)]; and policy variables [(E,h)].

It is likewise the case for non-Aboriginal People.

$$\{(L', L_u', L_e', u', r', w', q', O', L_s', L_e')^1, (E', e', h', l')^2\} \qquad (1')$$

These vectors can be further disaggregated by gender, provinces and regions, and sectoral and occupational details across Canada. The data in either case of comparative movements of the critical variables and their statistical study will be across censuses or cross-sectional by provinces/regions, subject to availability of data of the secondary type from Statistics Canada. Or the data can be taken on regional cross-sectional basis, or in any other respect. Besides, the range of variables can be expanded into much broader sets, depending upon the availability and explanatory relevance of the additional variables.

The approach in this paper is firstly conceptual, which incorporates the broad picture of economic theory, model, and analysis. Secondly, limited but illustrative empirical work is carried out to evaluate the degree of validity of the conceptual theory. Thereby, new perspectives in policies and strategies are derived. This part forms the policy-theoretic study of labor market problems of Canadian First Nation People.

Research problem and objective

With the above background in view, the principal objective of the study can now be laid down. The emergent research problem of this study may benefit those researchers who would like to expand on the suggested theme.

This study examines the variations in the historical evolution of critical indicators of Canadian First Nation labor force over the census time periods. But in this paper provincial cross-sectional data are used. In examining the variations of indicators this research study will identify the factual and theoretical explanation on why such labor market trends for Canadian Aboriginals happened over census time-periods. A historical policy-theoretic and statistical meaning is given to explain the causes of the trends in the labor market indicators of Aboriginals in comparison to non-Aboriginal labor force with the focus being on the efficiency and equity issues involving the vector of variables shown in expressions (1) and (1') or a part thereof in the following perspectives: The conceptual expectations and the empirical evaluation of the social wellbeing objective comprising economic and social wellbeing components.

The theoretical background will focus on the implications of Romer's endogenous theory of economic growth, and Solow's growth model with embodied technological change. The other side of the development arguments is that offered by Myrdal (1957. 1958). We highlight the last case for its relevance to development and social wellbeing of the Canadian Aboriginals as target group.

Upon this theoretical study furthermore, conceptual precepts of social wellbeing will be undertaken Rawls (1971), Nozick (1974), Sen (1990), and Arrow (1951). Other equity issues on the impact of human resource development will be invoked (Porter, 1965), (Helmes-Hayes and Curtis, 1998), Choudhury (1997), and Choudhury and Noor (1997). The immanent theories are thus critically reviewed in respect of the problems of labor market efficiency and equity issues. These goals comprise the total picture of labor market adaptation according to the social wellbeing criterion in respect of appropriate complementarities between the critical indicators.

It is expected from such a study pf Canadian Aboriginals as our target group in comparison to non-Aboriginal indicators given by (1') to bring out the factual impact of strategies and policies. Such new perspectives can bring about desired future labor market structures in the context of social wellbeing. The social wellbeing criterion is explained by appropriate complementarities between the labor market indicators as in (1); and in respect of bridging the gap between equity and efficiency goals.

Interactions between the critical indicators are empirically investigated ideally by time-series data on the variables, or by provincial and regional cross-sections in our case due to paucity of time-series data. The regression equations in the empirical work take structural forms. Subsequently, based on the empirical results and their desired social and economic reconstructions, the theoretical models of Romer, Solow and Myrdal are critically examined. Policy-theoretic conclusions and prescriptions are derived from such theoretical, quantitative, and prescriptive results.

REVIEW OF THE LITERATURE

Is Solow's (1980, Mankiw, 2003) technological change model of economic growth applicable for understanding endogenous change at the level of target groups in the labor force?

Solow's growth model is based on exogenous effects of technological change on productive inputs that in turn shift output in Solow growth model in per-capita form. The detailed formulation is well-known. The consequences of Solow growth model for our particular study of social wellbeing can now be noted.[1] The important fact to note is that amelioration of the predicaments of social wellbeing of Canadian Aboriginals as target groups in the labor force needs a participatory mechanism of economic and social decision-making in the national and sub-national space.

This approach is also implicative of empowerment and decentralization within the discursive totality of economic and social complex. In the case of the social wellbeing of Canadian Aboriginals the issue of participation in decision-making within the discursive totality involving public and private authorities with First Nation People as stakeholders would

---

[1] Let the growth model (F) in output (Q) and inputs (L,K) be in the general form, $Q = F(L,K)$, with $L = L_0\exp(n_1+n_2)$, $K = K_0.\exp(m_1+m_2)$. n_1 denotes the natural rate of growth of labor; n_2 denotes rate of growth of technological effect on labor input; m_1 denotes natural rate of growth of capital; m_2 denotes rate of growth of technological on capital. By taking the growth model in the Solow technologically induced Cobb-Douglas form we obtain, $g(Q) = \alpha g(L) + \beta g(K)$; α,β being the elasticity coefficients of Q with respect to factor inputs (L,K), respectively. Furthermore, $g(L) = (n_1+n_2)$; $g(K) = (m_1+m_2)$. Thereby, $g(Q) = (\alpha n_1+\beta m_1) + (\alpha n_2+\beta m_2)$. We can write this expression in the weighted average form as follows: $g(Q) = (\alpha+\beta)(g_1(L) + g_2(K))$. Here $g_1(L)$ denotes the total growth rate of labor as a result of natural rate and technological rate). Likewise is the definition of $g_2(K)$.

The above expression implies that, not only technology is exogenously induced into factor inputs but also they remain independent between them. Consequently, also any increasing returns to output (i.e. $(\alpha+\beta) > 1$) is received from the exogenous input of technological factors, i.e. compounded by $(g_1(L) + g_2(K)) > 0)$. Along the golden path of economic growth the natural growth rates of productive inputs and the rate of technological change must be externally assigned. These are not left to regeneration by the continuous internal dynamics of growth and factor interrelations. In this latter case there is no golden path of evolution over time and by the dynamics of internal relations between factors and output. These interrelations otherwise form the dynamic forces of economic change.

determine the critical collective choices for securing social wellbeing. The result then would be autonomy and self-determination of social wellbeing of and by the Aboriginal People, but keeping the total Canadian discursive picture in sight.

The discursive picture of coordinated decision making determines the endogenous economic and institutional interaction and integration. They together in the vector of indicators, now endogenously affected as in (1), form the collective social wellbeing as an endogenously determined cause and effect of self-reliant participation. In what follows we will denote such inherent participatory epistemic knowledge by (θ). θ is endogenously embedded in the participatory process as an epistemic groundwork of self-reliance but is evolved by the discursive totality (Foucault, quoted in Dreyfus & Rabinow, 1983)[2].

The endogenous picture of participatory consequences has not been incorporated in Solow's growth model at any level of its aggregation. Even if such participatory dynamics were to be included along with technological change and population change in Solow's growth model, they retain their exogenous nature. Hence 'θ', denoted also by k, is not a result of participation in a discursive model of empowerment and change. The latter otherwise is the model of social wellbeing in a discursive society.

An example of a concept of social wellbeing premised on moral grounds is given by Rawls (op cit, p. 14-15): "… inequalities of wealth and authority are just only if they result in compensating benefit for everyone, and in particular for the least advantaged members of society." Such moral aspirations of social contract remain foremost in the case of social wellbeing for the Canadian Aboriginals as an essential target group of the Canadian nation.

Is Romer's (1986) technological change model of economic growth applicable for understanding endogenous change at the level of target groups in the labor force?

Romer's model considers endogenous technology to be embedded in interrelated multi-sectoral growth model. But on further analysis, the endogenous nature of technology embedding -- say studied by the Cobb-Douglas form of the growth model, or Solow's growth model -- provide a perspective in treating technology independently, such as human resource development that, then feeds into the growth model. As a result of this methodology, a dichotomy is created by the way technology is interacted with inputs and output, that is with growth, social wellbeing and social change.

Technological change is treated exogenously by way of endowing it by its independent adaptive process. It is then brought into economic change. Such a dichotomous way of treating technology and growth does not serve the purpose of invoking critical institutional and organizational factors that continuously regenerate knowledge by interaction and reproduction. The knowledge of the economic system as an endogenous process of systemic

---

[2] Foucault (Dreyfus and Rabinow, 1983, p. 19; 1; see) defines the word episteme as follows: "By *episteme* we mean … the total set of relations that unite, at a given period, the discursive practices that give rise to epistemological figures, sciences, and possibly formalized systems … The episteme is not a form of knowledge (*connaissance*) or type of rationality which, crossing the boundaries of the most varied sciences, manifests the sovereign unity of a subject, a spirit, or a period; it is the totality of relations that can be discovered, for a given period, between the sciences when one analyses them at the level of discursive regularities."

learning is not interactive with the total state of the economy and society.[3] This characteristic is exhibited by the footnoted simplified Romer's endogenous growth model. It is explained by the missing complementary technological effect that should otherwise *simultaneously* affect both L and K, and thereby, regenerate the economy-wide effect of such recursive complementarities.

In the case of studying the problem of economic and social wellbeing of Canadian Aboriginals, indigenous technological change by participation and empowerment within a total discursive model[4] of the complementary nature is not explained by the ultimately non-interactive nature of Romer's growth model. In the essentially complementary and interactive case in the endogenous growth model for a participatory future of Canadian Aboriginals there ought to be positive interaction between all the variables that represent their respective discursive agencies.

For instance, interaction for complementarities ought to be established between capital investment and labor qualified by human resource development, and the effectiveness of training programs. Capital investment is managed by the private sector and the government in cooperation with the private sector. Interaction between qualified labor and technologically induced capital expenditure means new organizational forms based on participatory interaction between these two factors. Likewise, effectiveness of human capital investment along with technological advance means collaborative on-the-job training programs that are appropriate to sustain a participatory form of empowered social wellbeing for the Canadian Aboriginals.[5]

Is Gunnar Myrdal's (1958) cumulative causation model of economic development applicable for understanding endogenous change at the level of target groups in the labor force?

Myrdal was an exception to thinking on optimal calculus that otherwise is used for explaining economic phenomenon in every neoclassical economic field. The dynamics of social embedding of economic reality cannot be explained by economic theory as it presently rests

---

[3] Take the following simplified form of the endogenous growth model (Mankiw,): $Q = F(K, vEL)$ be the growth model in which v denotes the proportion of the labor force out of university engaged in manufacturing activity. E denotes human resource development expenditure on labor L. Furthermore, the rate of change in E is given by $g(u) = dE/E$. Furthermore, $dK = sQ - \delta K$ denotes net investment.

Now if we take F(.) in the Cobb-Douglas form, $Q = A*K^{\alpha}.(vE.L)^{\beta})$. From this form we obtain,
$g(Q) = \alpha g(K) + \beta\Sigma[g(v) + g(E) + g(L)] = [\alpha g(K) + \beta g(L)] + \beta.[g(v) + g(E)] = (\alpha + \beta).[\alpha g(K) + \beta g(L)]/((\alpha + \beta) = (\alpha+\beta).g(K,L) + \beta.g(E,v)$.

This result has a conclusion that is similar to that for Solow's model. That is technology e.g. human resource development is not generated endogenously by interaction between the system of equations of the simplified growth model. Rather, it is injected and exogenously made to impact upon economic growth.

[4] The total discursive model is dynamic model of extended partnership for attaining a common social wellbeing in respect of any target group within the national and sub-national framework.

[5] The total direction of interaction in a truly endogenous growth model would establish the following kinds of interrelations: $Q \leftarrow (K,v.EL)$; $K \leftarrow (Q,v.EL)$; $v \leftarrow (Q,K,EL)$; $E \leftarrow (Q,K,v.L)$; $L \leftarrow (Q,K,v.E)$. The institutions and management departments for each of these dependent variables need to participate in the total discursive model of social wellbeing. Besides all these, the saving ratio 's' should be operationalized as resource mobilization rather than with-holding in bank savings as withdrawal (Ventelou, 2005).

on optimal calculus for attaining social reality. Social reality combined with economic reality presents a completely new shift in thinking (INET, 2011). Myrdal (1957, p. 9) writes on such limitation of economic theory while offering his profound social view of economics in the following words: "Stable equilibrium is one such unrealistic assumption. In its uncomplicated form it implies the notions that every disturbance provokes a reaction within the system, directed toward restoring a new state of equilibrium, and that action and reaction will meet in one and the same time space."

Myrdal's disequilibrium states caused by interruption in social reality are based on cumulative causation of social disturbances. Myrdal explains such social reality by his example of the factors adversely faced by the Blacks in America. He explained such social reality by his evolutionary model of development change. In such evolutionary process of change, factors like technology, productivity, and organization of institutions together with choices among so many other factors define development change in its social embedding. Although Myrdal did not proffer an analytical model for articulating his theory of circular causation feeding into cumulative causation, yet such a model can be conceptualized to bring out the nature of dynamics in Myrdal's evolutionary social embedding of economics. In this dynamics, institutions and organization, values and interactions between diverse factors of change count contribute by their complementary relations.[6]

Besides Myrdal and his prototypes (Boulding, 1971; Young, 1928), recent revival in evolutionary economic thinking is manifest in Dosi's (2011) words: "Telegraphically, such a perspective attempts to understand a wide set of economic phenomena – ranging from microeconomic behaviors to the features of industrial structures and dynamics, all the way to the properties of aggregate growth and development - as outcomes of far-from-equilibrium interactions among heterogeneous agents, characterized by endogenous preferences, most often "boundedly rational" but always capable of learning, adapting and innovating with respect to their understandings of the world in which they operate, the technologies they master, their organizational forms and their behavioral repertoires."

While Myrdal and his prototypes in the area of evolutionary economic thought go a good way towards integrating values, productivity, and technological change as dynamic factors of learning in the growth model, there is still the trace of discontinuity between productivity and technology and values. Myrdal otherwise refers to the integration by interaction between the diverse factors as the wider field of valuation (Myrdal, 1958).

Yet Myrdal's idea of circular causation and cumulative causation incorporating social values with economic values comes nearest to explaining the development plight of Canadian Aboriginals. Data narrative and empirical estimation will show that unemployment rate of Canadian Aboriginals in comparison to the total unemployment of non-Aboriginal labor force

---

[6] $Q = F(L,K,k)$, k as value (dis-value) denotes values that affect all of Q, K, L. With k can be included technological change, productivity, and social consequences. Let F be in the Cobb-Douglas form. Now the following expression holds: $g(Q,k) = \alpha.g(K,k) + \beta.g(L,k) + (\gamma/k)$, where $g(.,k)$ denotes the k-induced other variables (Q,L,K). γ is the coefficient of k in the k-induced Cobb-Douglas form of the growth model. According to Young there must be increasing returns to scale associated with output (Q) (Toner,). Therefore by further writing down the expression we obtain, $g(Q,k) = (\alpha+\beta)[\alpha.g(K,k) + \beta.g(L,k)]/(\alpha+\beta) + (\gamma/k) = (\alpha+\beta).Avg(g(K,L,k)) + (\gamma/k)$, $(\alpha+\beta) > 1$. This is the productivity and technological effect. Besides, $(\gamma/k) > 0$, for both positive and negative effects of k on (Q,K,L). This is because the two parameters move in the same direction. Yet the productivity and technological effect appear as separate factors affecting (Q,K,L). This hides the interaction between k as values and its influence through productivity and technology on (Q,K,L).

is not lowered on a cross sectional basis for the year 2001. This is despite an increasing trend in labor force participation rate for such a sample. Educational input in Canadian Aboriginals has deepened, which is a sign of better cause for productivity and technological change. Yet unemployment remains precariously high. See Statistical Appendix for data on these cross-sectional trends. Such trends show a low degree of interaction between the productivity and technology components and the other social values such as empowerment by participation and endogenous policy effects caused by indigenous policies, strategies, and labor market choices.

The efficiency and equity questions in the empirical policy-theoretic study

Firstly, the theoretical perspectives of the underlying social wellbeing model of labor market adaptation are explained here. The interrelated issue of labor market efficiency and social equity concerning labor market adaptation perspectives of labor market adaptation of Canadian Aboriginal labor market adaptation as defined earlier in terms of total social wellbeing by inter-indicator complementarities is studied in the conceptual framework. The labor market adaptation goals of total social wellbeing would be studied by first 'estimating' the social wellbeing function in terms of the actual indicators as stated in (1) and (1').

The next stage would be to simulate the same system of structural regression equations by selecting new sets of the 'estimated' coefficients according to the normative demands of policies and strategies, and labor market reconstruction. Through this kind of approach: firstly of 'estimation', and secondly by 'simulation' of the 'estimated' results, the equilibrating demand for labor (employed labor force) to the supply of labor (labor force) can be studied by simulating policy-theoretic effects that can be introduced for reconstruction of labor market futures towards attaining social wellbeing. Labor market inefficiency and inequity are denoted by the differences between labor demand and labor supply. These arise from comparisons within and between the target groups in respect of the vectors (1) and (1'). Thereby, the nature and causes of divergences between the various component variables as mentioned above are analyzed in the policy-theoretic sense of the past, present and future labor market trends for Canadian Aboriginals.

Two approaches are thus adopted to study the labor market adaptation of Canadian Aboriginals in respect of their comparative labor market adaptation and thus social wellbeing. Firstly, policy-theoretic explanations are generated by statistical 'estimation'. Secondly, this is followed by simulation of trends in the critical indicators over the census time period. These trends will indicate how the economic, social, policy, strategic and technology issues have proceeded since the past. Thirdly, a historical narrative is derived from statistical trends and estimation to chart out how critical variables as mentioned above have moved on a comparative basis with the non-Aboriginal labor market over the assigned time-period.

The 'estimated' and 'simulated' trends in the labor market indicators are studied in the light of the theories of endogenous growth and technologically induced growth models, plus social issues of social wellbeing with the presence of the 'estimated' and 'simulated' values for the indicators in the social wellbeing function. The normative simulated search is for degrees of complementarities that might or may not exist between economic efficiency and equity in terms of the variables of social wellbeing criterion function.

In conclusion, the policy-theoretic explanations based on the examination of historical narratives of the labor market trends are invoked for studying these results against those of

the structural statistical regression system. The principal focus in such 'simulation' of 'estimated' results in the light of the simulated values of the indicators will be on developing a methodology that can prescribe appropriate complementary (linkage) possibility between the labor market indicators and the prescription of policies. The goal would be for generating better outlook of complementarities. This would implicate better efficiency and equity situation for Canadian Aboriginals in comparison to the non-Aboriginal labor force indicators.

Methodology: a model of circular causation to study endogenous effects of state and policy variables on labor market adaptation of target groups (canadian aboriginals)

Our critical review of the literature on the effectiveness of endogenous technological, productivity, and value effects in growth and development brings us to investigate the strongly endogenous nature of interaction between all variables towards attaining social wellbeing. By doing so we are extending the idea of endogenous growth to areas of endogenous development on the scale of sustainability of the participatory process, and into sustainability of social wellbeing as the measure of labor market adaptation.

Here is how we realize these extended versions of the endogenous formalism. The theoretical social wellbeing function with the expected signs of appropriate direction of complementarities between variables is written down as follows:

$$\text{Estimate/simulate } W = W(\mathbf{x},\mathbf{s},\mathbf{P}) = W_1(\mathbf{x}).W_2(\mathbf{s}).W_3(\mathbf{P}), \tag{2}$$

subject to circular causation between the vector of variables as indicated by the appropriate relations expected between them.

We then say that such appropriate directions of complementarities between the indicators imply systemic learning. The emergent process conveys the endogenous nature of the inter-variable results. We treat the social wellbeing function in the same way as those in our comparative and critical review of the literature to establish the strongly interactive and appropriately complementary nature of the indicators in the social wellbeing function.[7]

The objective social wellbeing criterion is firstly 'estimated' on the basis of actual data; and then 'simulated' on the basis of the estimator values of the critical variables. Such variables are generated by incorporating changes in the coefficients in the light of desired changes to yield a factual, as against the normatively desired perspective of endogenous social change. Such a change is expressed by assigning appropriate new signs of the coefficients, which are set by policy and behavioral constructs in the light of desired perspectives of labor market adaptation.

---

[7] By converting into log-linear form and then differentiating we obtain,
$dW/W = \Sigma_{i=1}^{3}[dW_i/W_i] = \Sigma_{i=1}^{3}\Sigma_{j\in\mathbf{x}}(\partial W_i/\partial\mathbf{z}).(d\mathbf{z}/d\theta) = \Sigma_{i=1}^{3}\Sigma_{j\in\mathbf{x}}\mathbf{a}.(W_i/\mathbf{z}).(d\mathbf{z}/d\theta) = \text{Avg.}(W_i).\Sigma_{j\in\mathbf{x}}\mathbf{a}.g(\mathbf{z},\theta)$. All multiplications in bold symbols noted here denote vector-multiplication. The total social wellbeing W is thus strongly interactive and hence endogenous by interrelationship with appropriate complementarities between the list of **z**-variables. Each growth rate in respect of the **z**-variables is appropriately complementary with the rest of the growth rates of the variables. θ-variable denotes the learning variable towards establishing appropriate complementarities between the **z**-variables. Since each variable of the x-vector is simulated by normative change of the 'estimated' coefficients including the connecting θ-variable, therefore there is endogeneity by learning between the state variables, social variables, and policy variables.

We now recall the vectors (1) and (1') to formalize the objective goal of attaining social wellbeing in terms of the economic indicators representing efficiency aspects; the socioeconomic indicators representing equity aspects, and the policy variables. In expression (2) we symbolize the vector of indicators as follows:

$\mathbf{z}$ = (L, L_u, L_e, u, r, w, q, O, L_s, L_e, E, e, h, l).
In $\mathbf{z}$ we denote $\mathbf{x}$ = (L, L_u, L_e, u, r, w, q, O, L_s, L_e) as the vector of socio-economic indicators.
$\mathbf{s}$ = (e,h) denotes social indicators.
$\mathbf{P}$ = (E,l) denotes policy variables.

Endogenous interrelations between the complete vectors of variables are conveyed by inter-variable appropriate complementarities between the indicators. The reading of degrees of complementarities between the indicators is explained by the system of circular causation relations. The following equations comprise such a circular causation system. By using them we study (1) 'estimated' statistical results; (2) the 'simulated' statistical results; and (3) evaluate the estimator results on the basis of the 'simulated' forms.

The first step: 'estimation' method of structural circular causation relations

$$L = f_1(L_e, r, w, E, h) \tag{3}$$
$$Le = f_2(L, r, w, E, h) \tag{4}$$
$$r = f_4(L, L_e, w, E, h) \tag{5}$$
$$w = f_5(L, L_e, r, E, h) \tag{6}$$
……………………………………………………
$$E = f_{11}(L, L_e, r, w, h) \tag{12}$$
$$h = f_{12}(L, L_e, r, w, E) \tag{13}$$

The inter-indicator relations convey the meaning of complementarities and circular causation. All the inter-variables estimates can be estimated by (3)-(13). But each of these variables is technologically induced by the endogenous nature of circular causation relations, meaning systemic learning.

Furthermore, by using the Productivity Method of allocating labor force (employed labor force) it is possible to estimate L_s, O, and L_e.[8] Each of this estimation is carried out by the above-mentioned structural equations of circular causation.

We note as well that, the policy variable like E is endogenously related and estimated in relation to the rest of the variables. Such an interrelationship means that, E is generated by learning (discursive mechanism) in complementary ways with the other variables and their

---

[8] Estimated sectoral distribution $Ls^\wedge$ = $(Q_s/L_s)^{-1}*Q_s^\wedge$, where (Q_s/L_s) denotes sectoral (s) productivity computed for a reference year (e.g. census year). $Q_s^\wedge$ is sectoral output estimated for a given projected year.

   Furthermore, $O^\wedge$ = $(O/L_s)*L_s^\wedge$, where (O/L_s) denotes the occupational distribution for a reference year (census year).

   $Le^\wedge$ can be further estimated by $L_e^\wedge$ = $(L_e/O)*O^\wedge$. for different skills and educational or trades categories of labor force on the basis of the computed occupational distribution of L_e in the labor force.

   One notes however that, the productivity parameter based on a reference year is technologically induced. The rest of the estimates of respective parameters follow from the technological induction of the productivity measure of the reference year. This can be seen from the expression,

   (Q_s/L_s) = $(Q_s/K_s)*(K_s/L_s)$ = $q_s*(Q_s/K_s)$, but qs is seen to be endogenously technologically induced from the circular causation equation for it.

representations by the respective set of indicators. The variable on expenditure in human resource training and tertiary education for Canadian Aboriginals is related to the total list of other variables that ought to complement with E through the productivity and technology effects of the learning parameter (say θ) that enables inter-variable complementarities to happen.

Finally, the social wellbeing function of the 'estimated' circular causation system ('as is' situation of the endogenous inter-variables relations) is given by,

$$\theta = A * \Pi_{i=1}^{13} x_i^{\alpha i} \qquad (14)$$

Here x_i denotes given indicator variables of the vector (1). The social wellbeing function is defined by the Cobb-Douglas multiplicative form in order to be conformable with the desired objective of complementarities between the variables.

The statistical estimate of expression (14) depends on the signs and statistical significance of the coefficients[9], α_i i = 1,2,…,13, given the observations on ranked θ-values according to the observed levels of complementarities or departure from this state by the sets of variables in (1). The assignment of θ-ranked values is a discursive undertaking at best (Choudhury, Hossain and Hossain, 2011). But such assignments of θ-ranked values can also be done by suitable algorithmic choice of an assignment method. The simplest of these is to generate the θ-ranks in terms of interpolated values of the groups of variables in (1), and then averaging these ranked values.

The second step: 'simulation' method of structural circular causation relations

In order to establish desired levels of the estimator values of the indicators in (1) the simulated values for α_i, i=1,2,..,13 are introduced in the structural 'estimated' equations (3)-(14) to yield the 'simulated' estimator values of the variables in (1).

The estimator values in the second step are next used variable-by-variable along with a new set of ranked θ-values connected to the simulated estimator values of the variables. The estimator variables and the corresponding data on θ-ranked values are used to re-estimate the same system (3)- (14). The 'simulated' social wellbeing result then is denoted by,

$$\theta^\wedge = A^\wedge * \Pi_{i=1}^{13} x_i^{\wedge \alpha i \wedge} \qquad (15)$$

The (^)-values are the simulated estimator variables.

The simulated results implicate the policy and knowledge induction in the learning system of circular causation interrelations to form the appropriate degrees of complementarities between the indicators. The expressions (14) and (15) are the 'estimated' ('as is' or prevailing) and the 'simulated' (ought-to-be or normatively desired) social wellbeing indexes, respectively. Through the improvised degrees of complementarities between the indicators in the process of social reconstruction from expression (14) on to expression (15) new future policy perspectives are opened up for study against the prevailing policy perspectives that form narratives of the past and present situations.

---

[9] α_i, i = 1,2,…,13 are elasticity coefficients of θ to specific x_i. That is, $\alpha_i = \partial log\theta/\partial log x_i$. So it is desired from the normative and policy perspectives that α_I should be as positive a value as possible, subject to resource possibilities.

The question of comparative levels of social wellbeing is thus addressed by expressions (14) and (15). This exercise addresses the labor market adaptation issue. It is a topic on social equity. Under this perspective the inter-variable circular causation results are analyzed, explained, and policy and strategic possibilities are developed. On the other hand, the labor market efficiency is explained by the trend towards realizing L (labor force supply) x r = L_e (employed labor force demand). Thereby, the wage rate is determined from the simulated relations, $L = f_1(L_e, r, w, E, h) = L_e = f_2(L, r, w, E, h)$. Whereby, $w = F(L, L_e, r, E, h)$ with $L_e \approx L$. Thus labor market efficiency is attained by convergence of $L_e \approx r.L = L^*$ and social equity is gained by $w = F(L^*, r, E, h)$. The complementarities between labor market efficiency and social equity are thus examined.

The third step: 'estimation' leading to 'simulation of structural circular causation relations comparing vectors (1) and (1')

The method thus far explained can be applied separately to Aboriginal labor and non-Aboriginal labor market indicators as in the vectors (1) and (1'). But as it is done with some of the data for Canadian Aboriginals, the variables representing ratio comparisons between the Aboriginal and non-Aboriginal labor force in various aspects can be utilized and integrated into one set of circular causation relations and the 'estimated' and 'simulated' empirical work can be carried out by their prototypes of the entire system of structural equations and the social wellbeing function with comparative variables replacing the separately included variables as in (1) and (1').

Empirical work: illustrative and cross-sectional for canadian aboriginals

Note that this is an illustrative case of setting up the trends in selected-only critical indicators, leaving out the much greater possibility of time-series analysis for the census time-period. Furthermore, here we show only the cross-sectional data by provinces and regions for 2001 (Mendelson, 2004). This is a great simplification for exhibiting an illustrative case. We also undertake simply the 'estimation' stage. The total work is a substantive undertaking beyond the illustrative case given here.

By using the third case mentioned above with cross-sectional data by provinces and territories for Canadian Native labor market the circular causation results with a limited set of indicators are given on illustrative grounds only. With more data for indicators available, more robust estimation, simulation and inferences can be undertaken. For this particular illustrative example on estimation and interpretation of results to expound on the empirical results, and thereby carry out a critical examination of the endogenous growth model in its social wellbeing equivalence, we select the following labor market indicators for Canadian Aboriginal labor force:

Labor force (L); employment (L_e); comparative unemployment rate to the total non-Aboriginal labor force (u*), labor force participation rate (r); ranked θ-values to measure the degree of complementarities for attaining social wellbeing (θ). θ-values are computed as average between the following two ranked θ-values: $\theta_1 = (258\text{-Actual } u^*)/258$; $\theta_2 = =[(0.664\text{-actual } r)/0.664 - 1.00]$; $\theta = (\theta_1+\theta_2)/2$. Since u* and r are intrinsic in L and Le through their respective circular causation relations, therefore all the variables are induced by θ in the simulation stage following estimation stage. Detailed empirical work is shown in the appendix.

An explanation of the much simplified cross-sectional circular causation relations follows in respect of the various circular causation relations. The meaning of appropriate complementarities is relevant here to explain. Positive coefficient values are expected or can be simulated for change for every variable, except for the relations with u*. In this latter case the expected sign should be negative unless there are perverse results for the labor market indicators of Canadian Aboriginals.

$$\ln (L) = a_1 + a_2 * \ln(L_e) + a_3 * \ln(u^*) + a_4 * \ln(r) + a_5 * \ln(\theta) + \upsilon_1 \qquad (16)$$

$$\ln (L_e) = b_1 + b_2 * \ln (L) + b_3 * \ln (u^*) + b_4 * \ln (r) + b_5 * \ln (\theta) + \upsilon_2 \qquad (17)$$

$$\ln (u^*) = c_1 + c_2 * \ln (L) + c_3 * \ln (L_e) + c_4 * \ln (r) + c_5 * \ln (\theta) + \upsilon_4 \qquad (18)$$

$$\ln (r) = d_1 + d_2 * \ln (L) + d_3 * \ln (L_e) + d_4 * \ln (u^*) + d_5 * \ln (\theta) + \upsilon_3 \qquad (19)$$

$$\ln \theta = e_1 + e_2 * \ln (L) + e_3 * \ln (L_e) + e_4 * \ln (u^*) + e_5 * \ln (r) + \upsilon_4 \qquad (20)$$

Increasing levels of L_e must necessarily mean increasing stock of L_e. But the relational explanation in this regard is that increasing employment causes encouraged worker hypothesis to induce household members to increase their labor market participation. Hence $L_e\uparrow \Rightarrow L\uparrow$, and we expect a_2 to be positive. a_3 is expected to be negative again by reason of discouraged worker hypothesis as high unemployment compared to the rest of the population unemployment rate causes withdrawal from labor force participation. a_4 is expected to be positive. a_5 is expected to be positive by virtue of the appropriate complementarities between the indicators that we are looking for.

Likewise, b_2 is expected to be positive. b_3 is expected to be negative, and this is an appropriate complementarity between L_e and u*. For b4 the normative expectation is that, this will be positive. By the same argument of desired complementarities, b_5 is expected to be positive.

c_2 and c_3 are expected to have negative signs. Although c_4 ought to be negative, yet this may be otherwise if increasing labor force participation does not add to more employment. Thus u remains high. c_5 is expected to be negative in the presence of effective labor market adaptation.

d_2 and d_3 are expected to be positive if higher employment affects positively the labor force results along with heightened labor force participation rate. d_4 is expected to be negative by the discouraged worker hypothesis, unless there is an aggressive labor market that actively looks for jobs even when 'u' remains high. d_5 is expected to be positive.
e_2, e_3 and e_5 are expected to be positive by the relationship of (L, L_e, r) with social wellbeing (θ). For the same reason e_4 is expected to be negative.

In the 'estimated' first round, the structural equations (16)-(20) can yield perverse results on the expectations of social wellbeing. That is, the explanation of labor market conditions and policies regarding labor market adaptation, effectiveness of policies and the strength of endogenous relations in respect of appropriate complementarities between the indicators with θ remain perverse.

The efficiency and equity goals are read off the relations: $u \rightarrow 1$; $r.L \approx L_e$; $w \rightarrow$ national average.

Estimated circular causation system of regression equations

The cross-sectional data for Canadian Aboriginal labor market indicators given in the statistical appendix were used to estimate equations (16) – (20). The following results are obtained:[10]

$\ln L = 0.210 + 0.0129 \ln u + 0.999 \ln L_e + 0.0017 \ln r + 0.0004 \ln\theta$ **(21)**
t-stats   1.38   0.48   768.71   0.02   0.02
Adjusted R-square = 0.9999; se = 0.00505715; Durbin-Watson statistic = 2.65536

$\ln u = 4.68 + 3.47 \ln L - 3.45 \ln L_e + 1.94 \ln r - 0.819 \ln\theta$ **(22)**
t-stats   2.26   0.48   -0.48   2.63   -5.59
Adj.R-square = 89.7%; se = 0.0830604; Durbin-Watson statistic = 1.48090

$\ln L_e = - 0.211 + 1.00 \ln L - 0.0128 \ln u - 0.0018 \ln r - 0.0004 \ln\theta$ **(23)**
t-stats   -1.38   768.71   -0.48   -0.03   -0.02
Adj.R-square = 0.9999; se = 0.00506155; Durbin-Watson statistic = 2.65024

$\ln r = - 1.91 + 0.07 \ln L + 0.299 \ln u - 0.07 \ln L_e + 0.301 \ln\theta$ **(24)**
t-stats   -2.45   0.02   2.63   -0.03   3.95
Adj.R-square = 59.9%; se = 0.0325870; Durbin-Watson statistic = 2.44814

$\ln\theta = 6.11 + 0.15 \ln L - 1.05 \ln u - 0.14 \ln L_e + 2.51 \ln r$ **(25)**
t-stats   3.19   0.02   -5.59   -0.02   3.95
Adj.R-square = 91.9%; se = 0.0941561; Durbin-Watson statistic = 1.79702

Expression (25) is the same as,

$\theta = \log (6.11).\exp(L^{0.15}).(u^{-1.05}).(L_e^{-0.14}).(r^{2.51})$ **(26)**

This is the estimated form of the social wellbeing function in the critical variables. The simulated results were not obtained, this being a substantive empirical exercise.

There are several perverse relations here for the labor market social wellbeing estimation, hence labor market adaptation of Canadian Aboriginals as explained earlier: L_e has a negative relationship with social wellbeing indicator. Besides, although the coefficient of r bears the correct sign with 'θ', yet an increasing r-indicator ought to increase employment that is L_e. This is not the case in the social wellbeing function and by the estimation of circular causation equations.

The positive relationship between u, r and L points out that the labor force is increasing by the effort of increasing participation rate of Aboriginals, but not having sufficient employment. The equity question is thus adversely affected. This fact is further confirmed by the negative relationship between u and L_e; and the negative relationship between L_e and r. Yet there is positive relationship between r and u and negative relationship between r and L_e.

The above kinds of perverse relations between the critical indicators as noted are principally responsible in reducing the social wellbeing levels. Thus simulation is needed to improve the relationships by improving the elasticity coefficients into positive or near positive values, except for the relationship with u. Here the coefficient ought to be negative and declining in relation to the other variables. How much this simulation impact is possible will depend upon the choice of policies towards labor market efficiency and social equity. These goals are implied by $L.r \approx L_e$; $u \to 1$; and w $\to$ national wage rate. w is solved for by using the labor market efficiency relation, $r.L \approx L_e$. These equations imply simultaneous relationship between the goals of labor market efficiency and social equity in the social wellbeing criterion of labor market adaptation. Subsequently, such changes cause the social wellbeing level to turn into positive relationship or less negative relationship with all the relevant variables.

Statistical analysis of the empirical results

Our critical relationship in the estimated circular causation system is between L, L_e, r and u*, given a stock of human resource expenditure and development in the Canadian Aboriginals. The inter-variable causality between these indicators was explained above. The strength of these results can be further observed by 95% level of significance of the regression coefficients of the interrelations between the following inter-variables relations: L $\leftrightarrow$ L_e; r $\leftrightarrow$ u*. For the case of θ-induced relations the following are significant results at the 95% level of significance: θ$\leftrightarrow$(r,u*). Hence, the overall strong causality according to the 95% level of significance is summarized as follows. Signs indicated are for the regression coefficients in the estimated circular causation equations.
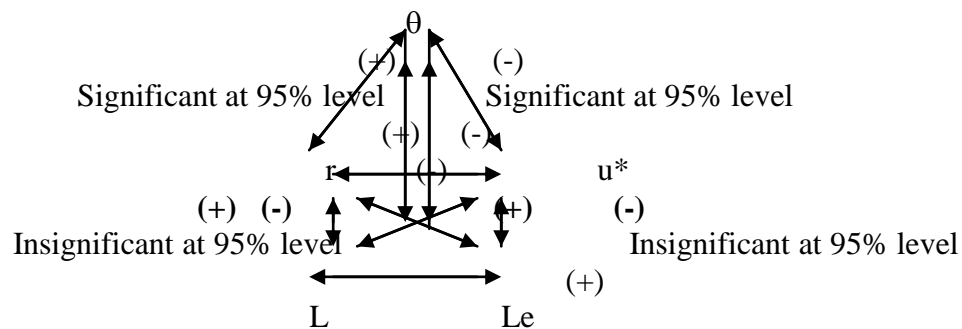

Figure 1: Statistical results of the circular causation model of participation and social wellbeing summarized: Canadian Native labor market

The statistical analysis points out that there is strong reason to focus labor market policy change in the direction of improving the relationship between r and L_e, r and u; r and L_e; and u and L. The signs of inter-causality between social wellbeing (θ) and the indicators are perverse with respect to the elasticity coefficient of L_e. Different levels of significance apply. These results point to a strong presence of equity-efficiency gap in the Canadian Aboriginal labor market. To bridge this unwanted gap along with human resource development by way

of educational expenditure on the education and training of Canadian Aboriginals there is strong need for adapting the technological and productivity gains into indigenous kinds that would heighten the participation of Aboriginals in their indigenous development regime of social and economic change. This kind of policy and institutional undertaking means social wellbeing generated by appropriate complementarities between the critical labor market indicators. Thus simulation of the estimated equations by change in elasticity coefficients, particularly in respect of Le and u* are issues to investigate in the policy simulation of the equations.

Such results were pointed out to be the inter-causal participatory model of development in this paper. The results of this paper both by the criticism of theory and concepts and social reconstruction in reference to factual and empirical facts establish the tripartite model that we set out to study:
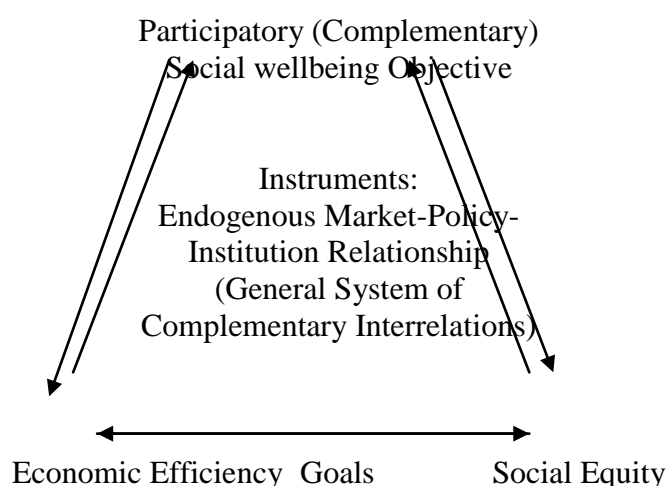
Participatory (Complementary)
Social wellbeing Objective

Instruments:
Endogenous Market-Policy-
Institution Relationship
(General System of
Complementary Interrelations)

Economic Efficiency Goals   Social Equity

Figure 2: Tripartite circular causation complementary relationships for the Canadian Native labor market

Some empirical facts in support of the estimated results for Canadian Aboriginal labor market (2006)

Unemployment situation

In 2006, the employment rate of First Nations people living on reserve was 51.9%. Those living off reserves recorded an employment rate of 66.3%. First Nation People living off reserve, but who were registered for Aboriginal status recorded 71.4% employment rate. In 2006, on-reserve Aboriginal had an employment rate of 51.9% compared with 50.0% in 2001. First Nation people living off reserve but without registered status had an employment rate of 64.0%.This was up from 58.2% in 2001.

The unemployment rate among First Nation people aged 25 to 54 living on reserve was 23.1%. By comparison, 12.3% of Aboriginal people living off reserve and 5.2% of non-Aboriginal people were unemployed. Among Aboriginal people living off reserve, unemployment rates for people with Registered Indian status was 13.7% in 2006 compared to 9.4% of people without Registered Indian status.

These trends show that there is universal need for improving the employment situation and reduce employment for reserve Aboriginals. The problem abounds for all categories of Aboriginals.

Median income profile of First Nation People

In 2005, the median annual income of the Aboriginals aged 15 and over in Canada was lower than that of the non-Aboriginal population. The median income of Aboriginal people in 2005 was $14,517 (w), about $11,000 lower than the figure for the non-Aboriginal population ($25,955) (w'). This gap was similar in 2000; both groups experienced an increase in median income of approximately $8009 between 2000 and 2005. But the ratio of Native wages and non-Aboriginal wages remained almost unchanged between 2001 and 2005.

Overall, Aboriginal people living on reserve had a lower median income ($11,224) than those living off reserve ($17,464). Off-reserve Aboriginal people with registered Indian status had a similar median income to people without registered Indian status ($16,771 versus $18,969). Among those living off reserve, the gap between median incomes of Aboriginal men and women was wider for people without registered Indian status. In 2005, the median income of off-reserve Aboriginal men without registered Indian status ($23,221) was $6,537 higher than that of their female counterparts ($16,684). The median income of off-reserve Aboriginal men with Registered status earned an annual income of $18,732 in 2005.

CONCLUSION

Growth and development according to the trends in the labor market of Canadian Aboriginals

In spite of the substantive amount of human resource expenditure of the Canadian Government on Aboriginals (Sharpe and Arsenault, 2009), their unemployment plight and earnings point to a low level of social wellbeing because of the perverse relationship between L, L_e, u^*, and r, as explained above. Although such human development expenditure is expected to heighten productivity and technological advance of the Aboriginal people to contribute to growth and development, this is not an empirical fact. That is true both by examining raw data and by empirical estimation.

Therefore, the optimality conclusions of Solow growth model and Romer's endogenous growth model do not lend evidence of their theoretical expectations of the labor market (or labor input in the growth models) of Canadian Aboriginals within the Canadian First Nation. Myrdal's theory of circular causation and cumulative causation can be extended on a disequilibrium scale to explain the low level of social wellbeing and labor market adaptation of Canadian Aboriginals.

The fourth kind of model used is the circular causation of simulated complementarities of appropriate types between the critical labor market indicators that explain social wellbeing, and hence labor market adaptation. In this alternative approach that we have introduced, Myrdal type disequilibrium arising from cumulative causation is recognized to explain the low status of social wellbeing of Canadian Aboriginals. But a further simulation feature of policy and strategic changes is invoked to turn the perverse labor market situation into evolutionary learned complementarities of appropriate type between the critical indicators. This is the way to social reconstruction.

Productivity effects of increasing educational expenditure on economic growth by Canadian Native labor market projection (Sharpe and Arsenault, op cit)

Projections between the years 2006 and 2026 under the assumption of Aboriginal people catching up with the educational levels of non-Aboriginal People in 2006, show the following trends: Labor force participation rate of Aboriginal People will change by rates between 9.50 per cent to -7.02 per cent according to the best and lowest projection scenarios, respectively. This compares with a percentage change of -9.59 for non-Aboriginal People for the same time period. Percentage change in employment for Aboriginal people to those for non-Aboriginal people between 2006 and 2026 will stand at 347206/1225071 = 28.34 per cent; or 155857/1225071 = 12.73 per cent on the basis of best or worst scenario of projection, respectively. Contribution to productivity in the best scenario of projection by 2026 is expected to be between 0.007 per cent and 0.014 per cent in 2026. Additional growth contribution to output is expected to be 0.015 per cent of GDP. Additional employment growth would be between 0.008 and 0.016 per cent by 2026.

These labor market trends further reinforce our inference that the economic growth paradigms in the literature do not apply to the study of the social plight of target groups. Besides, there is much need for focusing not simply educational and human resource expenditure in Aboriginals but also to develop them within their own indigenous technological environment and empowerment.

Policy analysis

Several levels of policy analysis in reference to the socioeconomic trends affecting employment and unemployment trends are carried out: Firstly, the historical trends are examined in the perspective of labor market variables of Canadian Aboriginals. The model of circular causation and social wellbeing to study labor adaptation, efficiency and social equity is the overarching issue of their interconnectivity. Secondly, the statistical estimation is examined in order to infer from the estimators for unemployment variable on the extent of empirical validity of the various model of economic growth and efficiency yet without social wellbeing and social equity. Thirdly, the simulated estimators of employment and unemployment rates in relation to revised coefficient values of the estimated equation form the comparative future trends in the socioeconomic and policy and strategic variables arising out of the historical record. This is explained.

At the end, the predominant policy issue turns on improving the employment situation even while the labor force participation remains good. Towards attaining such a goal more pronounced effect of human resource development in indigenous technology and collective participation for social choices of and by Canadian Aboriginals within the national framework of stakeholders is required.

Contribution and Significance of the Research

The significance and contribution of this research is in the area of explaining historical trends in critical indicators of labor market adaptation by total social wellbeing for Canadian Aboriginals over the census time-period. Then by such empirical exercise in the 'estimated' followed by the 'simulated' case of the structural regression equations interrelating the critical indicators and the ensuing social wellbeing index for comparisons between Aboriginal and non-Aboriginal labor force, a policy-theoretic study is invoked.

Simultaneously, by doing this part of the research a new critical and analytical perspective is contributed in the area of endogenous growth with technological change, productivity and social wellbeing. Thereby the theoretical explanations are critically studied for their validity by using the above-mentioned statistical analysis.

The emergent methodology integrating the two above-mentioned parts invokes a circular causation approach like the one that was pioneered by Myrdal (1957, 1958, Toner, 1999). Yet the empirical validation of the circular causation model for studying the policy-theoretic nature of structural 'estimation' and 'simulation' of the system of regression equations in critical indicators is a contribution in all the following areas:

Firstly, a policy-theoretic area of labor market adaptation with economic and social wellbeing goals of efficiency and equity for Canadian Aboriginals is evaluated and is found to be a pressing issue. Secondly, from such a policy-theoretic study emerge new future policy perspectives while learning on simulation from the narratives of the past and present policy-theoretic facts. Thirdly, new views emerge from the policy-theoretic study on expanding the conceptual field of technologically induced endogenous economic growth models by incorporating social wellbeing.

Thus in all, the important contribution of the research is in the area of projecting the future potential of policy development and theoretical reconstructs involving the critical indicators of labor market adaptation of Canadian Aboriginals in comparison to the non-Aboriginal case. The deficiencies and structural problems of the labor market for Canadian Aboriginals in the historical past is studied in reference to the historical policy-theoretic background. Labor market theory and policy applications are thus rendered to critical evaluation. Emergent alternatives for Aboriginals are provided in relation to historical realities and conceptual background. Policy-theoretic possibilities of future forecasts and reconstruction are derived by applying a prescriptive theory of sustaining good inter-variable complementarities. The inference is that the problem of labor market adaptation of Canadian Aboriginals is a socially sensitive and sticky one.

Such a study of facts against theory and the critical reconstruction of labor market adaptation will serve as guide to academia, students, policy-makers, and practitioners in appraising the emergent Aboriginal possibilities of efficiency and equity in the labor market of Canadian Aboriginals within a fast changing labor market situation for non-Aboriginal case.

REFERENCES

Arrow, K.J. (1951). *Social Choice and Individual Values*, New York, NY: John Wiley & Sons.

Boulding, K.E. (1971). "Economics as a moral science", in F.R. Glabe Ed. *Boulding Collected Papers Vol. 3*, Boulder, CO: Association of University Press.

Card. D. & Freeman, R.B. (1993). *Small Differences that Matter, Labor Markets and Income Maintenance in Canada and the United States*, Chicago, ILL: Chicago University Press.

Choudhury, M.A. (1997). "The concept and measurement of social wellbeing: the case of Canadian Native Indians", *Socio-economics of community development in global perspectives Part I*, as special issue of *International Journal of Social Economics*, 24:11, pp. 1256-1289.

Choudhury, M.A. and Noor, H. M. (1997). "A policy-theoretic analysis of sample survey of

the Mi'kmaq People of Cape Breton in the light of the knowledge-based worldview|", *Socio-economics of community development in global perspectives Part I*, as special issue of *International Journal of Social Economics*, 24:12, pp. 1439-1469.

Choudhury, M.A. Hossain, M.Z. & M.S. Hossain (2011). "Estimating an ethical index of human social wellbeing", *The Journal of Developing Areas*, Vol. 45, pp. 376-409. *Dosi, G. (Nov. 18, 2011). "Economic Coordination and Dynamics: Some Elements of an Alternative "Evolutionary" Paradigm", INET Blog.*

Dreyfus H.L. & P. Rabinow trans. (1983). "M. Foucault: Beyond structuralism and hermeneutics, the archeology of the human sciences", pp. 16-43. See also, "The archeology of the human sciences", pp. 44-78, Chicago, IL: University of Chicago Press, 1983.

Gionet, L. (2009). *First Nations People: Selected Findings of the 2006 Census*, Ottawa, On: Statistics Canada.
INET Blog (No. 11, 2011). "Giovanni Dosi: A Response to John Kay: Elements of an Evolutionary Paradigm".

Mankiw, G. (2003). *Macroeconomics*, Chapter 8, pp. 222-224.

Mendelson, M. (2004). *Aboriginal People in Canada's Labor Market: Work and Employment Today and Tomorrow*, Ottawa, Ont: The Caledon Institute of Social Policy.

Myrdal, G. (1957). "An unexplained general traits of social reality", in his *Rich Lands and Poor, the Road to World Prosperity*, New York, NY: Harper & Row.

Myrdal, G. (1958). "The principle of cumulation", in Streeten, P. (ed.) *Value in Social Theory, a Selection of Essays on Methodology by Gunnar Myrdal*, pp. 198-205, New York, NY: Harper & Brothers Publishers

Myrdal, G. (1968). "The wider field of valuations", in *Asian Drama*, *an Inquiry into the Poverty of Nations, Vol. 1*, pp. 49-127, New York: Pentheon.

Nussbaum, M. (2011). *Creating Capabilities*, Belknap Press of Harvard University Press.

Nozick, R. (1974). "Distributive justice", *Philosophy and Public Affairs*, Vol. 3.

Porter, J. (1965). *The Vertical Mosaic*: *An Analysis of Social Class and Power in Canada* University of Toronto Press, Scholarly Publishing Division.

Rick Helmes-Hayes and James Curtis, editors (1998). *The Vertical Mosaic Revisited*. Toronto: University of Toronto Press.

Rawls. J. (1971). *A Theory of Justice*, Cambridge, Massachusetts: Harvard University Press.

Romer, P.M. (1986). "Increasing returns and long-run growth", *Journal of Political Economy*, Vol. 94, pp. 1002-37.

Sen, A. (1990). "Economic judgements and moral philosophy", in *On Ethics and Economics*, pp.29-34, Oxford, Eng: Basil Blackwell Ltd. 1990.

Sharpe, A. and Arsenault, J-F (2009). *Investing in Aboriginal Education in Canada: an Economic Perspective*, Ottawa, Canada: Canadian Policy Research Network.

Solow, R. (1980). *Growth Theory, an Exposition*, Oxford, Eng: Oxford University Press.

Toner, P. (1999). "Gunnar Myrdal (1898-1987): circular and cumulative causation as the methodology of the social sciences", in *Main Currents in Cumulative Causation, the Dynamics of Growth and Development*, Chapter 5, Houndmills, Hampshire: Macmillan Press Ltd.

Turnovsky, S. (1999). "An introduction to endogenous growth models", in his *Methods of Macroeconomic Dynamics*, pp. 391-426, Cambridge, MA: The MIT Press.

Ventelou, B. (2005). "Economic thought on the eve of the General Theory", in *Millennial Keynes*, Armonk, New York: M.E. Sharpe, Chapter 2.

Young, A. (1928). "Increasing returns and economic progress", *Economic Journal*, Vol. XXXVIII, pp. 527-542.

STATISTICAL APPENDIX

The data are reproduced from the source: M. Michael, March 2004. *Aboriginal People in Canada's Labor Market: Work and Unemployment, Today and Tomorrow*, The Caledon Institute of Social Policy, Ottawa, Ontario, Canada.

Table 1: Labor Market Cross-Sectional Data by Provinces and Region for Estimation, Canadian Aboriginals 2001

	Labor Force (supply)	Aboriginals unemployment rate/Native Unemployment Rate	Employed labor force	Labor force particiaption rate	ranked values
	L	$u^* = U_N/U$	Le	r	θ
NFld	12,850	154	9843	0.604	0.6564
PEI	825	180	631	0.603[e]	0.5668
NS	10,940	201	8282	0.606	0.5668
NB	11,345	225	8690	0.621	0.5316
QUE	51,350	224	39334	0.577	0.5004
ONT	124,035	240	95011	0.646	0.5214
MAN	90,445	314	68738	0.590	0.3354
SASK	74,440	362	56574	0.545	0.2089
ALTA	110,790	288	84200	0.642	0.4253
BC	4,225	264	3211	0.629	0.4620

Eastern Region = 23.4%; Western Region = 24.0; Prairies = 24.3
* 258 is the relative $u^* = U_N/U$; r = 66.4% for total non-Aboriginal labor force in 2001
e is estimated value of r.

Table 2: Aboriginal identity population, provinces & territories, 1996 and 2001

	Aboriginal Population	1996 total population	ratio (%)	Aboriginal population	2001 total population	rate (%)
NFld	14,200	547,160	2.6	18,770	508,080	3.7
PEI	950	132,855	0.7	1,350	133,385	1.0
NS	12,380	899,970	1.4	17,015	897,565	1.9
NB	10,250	729,625	1.4	16,990	719,715	2.4
QUE	71,415	7,045,080	1.0	79,410	7,125,580	1.1
ONT	141,520	10,642,790	1.3	188,310	11,285,550	1.7
MAN	128,680	1,100,295	11.7	150,050	1,103,700	13.6
SASK	111,245	976,615	11.4	130,185	963,155	13.5
ALTA	122,835	2,669,195	4.6	156,220	2,941,150	5.3
BC	139,655	3,689,755	3.8	170,025	3,868,875	4.4
YUKON	6,175	30,650	20.1	6,540	28,520	22.9
NWT & NUNAVUT	39,695	64,120	61.9	41,445	63,770	65.0

Table 3: Aboriginal unemployment rate and participation rate by region 1996 and 2001

	Unemployment Rate (%)		Participation Rate (%)	
	Actual	Relative (Native/Total)	Actual	Relative (Native/Total)
1996				
East Region (NFL & Ont)	23.4	229	59.1	94
West Region (Prairies, BC Territories)	24.3	291	57.9	85
Prairies Provinces	24.0	326	55.6	80
2001				
East Region (NFL & Ont)	17.8	232	62.3	95
West Region (Prairies, BC Territories)	19.8	288	60.9	89
Prairies Provinces	18.4	330	59.6	84

Table 4: 'Natural' growth rate in the Aboriginal workforce, 2001 to 2016

	2001	2006	2011	2016
NFld	12,850	14,245	15,385	15,703
PEI	825	955	1,030	1,098
NS	10,940	12,253	13,715	14,533
NB	11,345	12,253	13,475	14,180
QUE	51,350	56,483	61,870	64,828
ONT	124,035	136,385	150,575	157,278
MAN	90,445	103,818	119,095	130,443
SASK	74,440	88,613	103,810	115,658
ALTA	110,790	124,355	137,170	143,185
BC	4,225	4,693	5,160	5,463
YUKON	11,330	13,083	14,835	15,878
NWT & NUNAVUT	12,715	15,368	18,065	20,458

Table 5: Educational attainment of Aboriginal identity population and population 15 and over, 2001

	Aboriginal Identity Population (%)	total population (%)	ratio of Aboriginal to total population (%)
Less than high school graduation certificate	48.0	31.3	154
High school graduation Certificate only	9.9	14.1	70
Trades certificate or Diploma	12.1	10.9	112
College certificate of Diploma	11.6	15.0	77
University certificate or Diploma below	1.4	2.5	56
Bachelor's degree University degree	4.4	15.4	29