CHAPTER III
CONCEPTUAL FRAMEWORK AND METHODOLOGY

3.1. Introduction

In this chapter, the theoretical background for the study is discussed. Since the study evaluates how welfare reform policy affects economic growth, a review of some relevant regional economic growth theories is provided. Although there is no unified theory on economic growth, the theories in this section provide some contribution to the framework upon which the study is based. The conceptual framework discussed in this chapter also serves as the basis for the hypotheses. Various economic processes explain the link between economic growth and decentralisation. Governmental processes or policies such as decentralisation affect wellbeing of populations. Fiscal decentralisation is state finance pare the ways of social and economies Development of the state. This diversity in the list of factors that have contributed the interest in decentralisation reflects institutional differences across countries. Institutional factors, such as political, social, legal, and economic conditions, are generally important for the analysis of public finance issues, but they are especially important for the analysis of fiscal decentralisation. The institutional context of fiscal decentralisation entails the overall economic development, the nature of the legal system, ongoing process of economic and political reform, the organization of monetary and financial institutions, and tensions arising from ethnic, religious, or
economic differences (Wildasin, 1997). This institutional background determines the design of intergovernmental financial system and ultimately affects the outcome of fiscal decentralisation reform process. The best starting-point for a discussion about decentralisation-centralization debate is the structural arrangement of government. In the centralist structure decision-making power concentrates in the hands of central government bureaucrats whereas in a decentralized system sub national governments have decision-making power on issues that effect their citizens’ life. Although decentralisation takes different forms, as discussed in the fourth section, political and economic dimensions of centralization-decentralisation debate are inexorably linked to each other. In order to have economic gains to be realized from decentralisation, it is necessary to have decentralisation of political decision-making authority. This logic suggests that the greater the number of political units to which political authority is decentralized, economic gains are likely to be maximized. This is because large numbers of political units mean more choice to individuals to find a community that provides the level of outputs best suited their tastes (Tiebout, 1956). Therefore, there are two dimensions of the decentralisation of public management system: economic and political. The standard economic dimensions of a public finance policy are macroeconomic stability, equity and efficiency (Musgrave and Musgrave, 1984). The efficiency aspect of the economic dimension is the economists. Since individual preferences for
public goods differ, in a fiscally decentralized system individuals choose to live in a community that reflects their preference, which in return maximizes social welfare. The economic argument of efficiency stems from the fact that due to closeness to the citizens, local governments are able to meet different views and interests of people and allocate resources more efficiently than a central authority. However, efficiency aspect is not the only one in evaluating economic dimension of fiscal decentralisation. Intergovernmental fiscal design has important implications on macroeconomic stability and equity. Before starting discussions on political dimension of fiscal decentralisation, the researcher discuss issues related to each aspect of the economic dimension of fiscal decentralisation in turn.

3.1.1. Efficiency

The fiscal federalism literature argues that there are efficiency gains from decentralisation. According to Stigler (1957) a representative government works best when it is closer to the people. In his seminal work on the theory of public finance, Musgrave (1959) separates the functions of government into three: macroeconomic stabilization, income redistribution, and resource allocation. With respect to resource allocation function, Musgrave (1959) argues that policies of subnational branches of governments should be permitted to differ in order to reflect the preferences of their residents. Carrying Stigler’s and Musgrave’s arguments further, Oates (1972) formulated the decentralisation theorem as "each public service should be
provided by the jurisdiction having control over the minimum geographic area that would internalize benefits and costs of such provision." The decentralisation theorem is based on the assumption that central government can only provide goods and services uniformly across jurisdictions. Therefore, according to the argument, there are potential efficiency gains from fiscal decentralisation.

3.1.1.1. Efficiency gains from decentralisation can be allocative and managerial:

a) Efficient Allocation of Resources
Decentralisation will increase efficiency because local governments have better information about their residents’ needs than the central government. Decisions about public expenditure that are made by a level of government that is closer and more responsive to a local constituency are more likely to reflect people’s choices than decisions made by a remote central government.

b) Competition Among Local Governments
If public goods are financed by local taxes that reflect costs, people will shop around for the community that best fits their preferences (Tiebout, 1956). Therefore fiscal decentralisation will increase competition among the local governments for better use of public resources. Thus, by serving as a constraint on the behavior of the revenue-maximizing government, fiscal decentralisation promotes interjurisdictional competition that limits
excessive taxing power of the governments (Brennan and Buchanan, 1980).

While there are potential gains from decentralisation, the primary reasons for decentralisation in most countries have been political, not economic. For example, in Latin America, centralization has been an integral part of programs to restore and deepen democracy (Rojas, 1999). In other countries, the poor performance of the central governments in achieving macroeconomic stability, sustainable growth, and adequate level of public services has fueled the interest in fiscal decentralisation. In some developing countries, decentralisation reforms are carried out without institutional and legal support mechanisms and appropriate intergovernmental fiscal arrangements to support decentralized system. In these countries, subnational governments fell short of meeting the expectations and decentralisation has been blamed for macroeconomic instability, regional inequalities and inefficiencies in the public sector. Some macroeconomists argue that in a decentralized system, since policymaking becomes a responsibility shared by different levels of government, circumvention of central control over monetary and fiscal policies may have aggravated macroeconomic problems in these countries (Prud’homme, 1995; Tanzi, 1996). According to them, central governments are better equipped in dealing with spillover effects of local spending, inflationary pressures of monetization of local debt and cyclical shocks. To the extent that this line of argument highlights the potential problems arising from decentralisation
when checks and balances of intergovernmental relations system are not in place, decentralisation can make matters worse. A good decentralisation policy is not easy to design; clearly, it can be done well or badly (Bird and Vaillancourt, 1999).

3.1.1.2. Stability

Empirical research on decentralisation and macroeconomic governance gives little a priori support to the concerns that decentralisation is inherently destabilizing. Recent studies on the relationship between fiscal federalism and macroeconomic governance find that decentralized fiscal system offers a greater potential for improved macroeconomic governance than centralized fiscal systems. In fact, highly decentralized federal countries, such as Switzerland, Germany, Austria, and USA, have very stable macroeconomic performance and low rates of inflation (Shah, 1997).

3.2. Macroeconometric Modelling in General

Lawrence Klein reckons a macro econometric model as a schematic simplification of the inner-working and the shape of a more complicated macroeconomic system. As he notes, modelling is an art which requires a set of scientific procedures (see Klein (1969, 1983)). Klein (1993) further notes that a large, detailed and complicated macroeconometric system is necessary for interpreting complex economic behaviours and issues. According to Pesaran and Smith (1985), modelling provides explanations of some
particular set of variables in concern as a result of a clear understanding of the links behind them. Hendry (2001) views a macroeconometric model as a system of inter-linked macroeconomic equations which are estimated from time series data.

Based on the above views, a macroeconometric model can be defined as a set of stochastic equations and definitional and institutional relationships representing the behaviours of economic agents, thus of the whole economy. Behavioural relationships can be empirically quantified by econometric techniques. The resulting model could be used to evaluate the economic structure (or theory), to examine the impact of certain policy changes (such as fiscal and monetary) and other disturbances (such as terms of trade, supply-side shocks, demand-side shocks), and to forecast the future values of variables concerned. The nature, the structure and the size of a macro econometric model depend particularly on the interest of the model builder, the purpose of its construction and information, financial and time constraints available to the researcher. Pesaran and Smith (1985) note that any macro econometric model should constitute three basic characteristics; relevance, consistency and adequacy. Relevance implies that the model should be well-suited to the purpose for which it is designed. Though macro econometric modelling kicked off in the late 1930s, it owed largely to the early developments in economic theory and empirical literature. Bodkin, Klein and Marwash (1991) note four important such early contributions: (i)
General equilibrium models developed by Walras and Pareto; (ii) Mathematical models of business cycles developed in the early 1930s; (iii) Economic structure proposed by Keynes (1936); and (iv) Empirical verifications of the Keynesian structure in the late 1930s. Though (i) and (ii) contributed significantly towards a need for empirical counterparts for economic parameters, it was the publication of Keynes’ The General Theory which gave birth to macroeconometric modelling. Concepts of consumption, investment, money demand, money-wage and prices with supporting identities provided a structure for the economy. At the onset, macroeconometric models were designed to implement this Keynesian system with many endogenously and exogenously determined variables. It is often viewed that the advances in the Keynesian theory in the late 1930s and 1940s and improvements in national income accounting and input-output tables had a profound influence on macro econometric modelling (Klein (1993)).

In 1950s, model building for policy evaluation and forecasting was a leading economic research project. Enormous individual and team efforts laid on it yielded a large number of divergent (small or large scale) models. The Klein interwar model, the Klein-Goldberger model, the Wharton model, the Data Resource Inc. model, are few examples of such early models for the U.S. economy (see Bodkin, Klein and Marwash (1991), Intriligator, Bodkin and Hsiao (1996)). During this period, macroeconometric modelling was popular
in other developed countries such as the U.K., Canada and the European
countries and in some developing countries too. There was a strong
consensus regarding the general paradigm of economic decision rules (Klein
(1969), Challen and Hagger (1983)). Models built in this line were routinely
used for policy analysis and forecasting. The first critique on macro
econometric modelling was made by Keynes (1939) commenting on the Jan
Tinbergen’s the League of Nations model for the U.S. economy. Keynes
believed that Tinbergen’s attempts to verify the structural parameters as a
system would lead to misleading outcomes. He, therefore, commented that
Tinbergen was largely wasting his time or practicing statistical alchemy (see
also Klein (1951), Hendry (1980) Bodkin, Klein and Marwah (1991)). Some
admit that issues raised by Keynes (1939) are quite applicable to even
modern-day empirical econometrics (see Patinkin (1976), Hendry (1980,
2000a)). According to Hendry (1980, 2000a), Keynes’ worries pointed to
issues such as omitted variable bias, estimating with unobserved variables
(involving expectations), measurement errors and incorrect data filtering,
co-linearity and simultaneity, misspecification of dynamic reaction
functions, inclusion of lags and the lag length, predicting inaccurately with
non-constant parameters and failing to relate economic theory to
econometrics. Though macro econometric modelling was not deterred by the
Keynes’ critique, it faced with further criticisms in the late 1960s and 1970s.
There were many reservations regarding the lack of solid theoretical
underpinnings for Keynesian structural equations. In particular, adhoc treatment of sticky prices and the inclusion of lagged variables and deterministic time trend in behavioural equations were often questioned. Second, with the advent of rational expectations, the naïve nature of expectations in the Keynesian structure was severely criticized (see Sargent and Wallace (1975)). As Bodkin, Klein and Marwah (1991) note, the Lucas critique has done the most serious damage to macro econometric modelling. The Lucas (1976) argued that if policy change is anticipated, it would have no real effect on the economy as agents change their reaction parameters when the policy is implemented. The Lucas critique maintains that the coefficients of a macro econometric model will change when there is a change in the policy rule because agents are fully aware of it. Thus, the use of large-scale simultaneous equation models and their impulse response functions for policy changes are inappropriate. If expectations are rational, the Lucas critique is not applicable as agents form decision in a dynamic optimization framework. Though the theoretical reputability of the Lucas critique is indisputable, many find very little evidence supporting the empirical relevance of the Lucas critique (see for example Fischer (1983), Hendry (2000b), Evans and Ramsey (2004)). In an extensive survey on empirical relevance of the Lucas critique, Erricsson and Irons reckon that the Lucas critique as a “possibility theorem, not an existence theorem” (Erricson and Irons (1995, p.301)). One testable implication of the Lucas
critique is the invariance of estimated parameters which implies the super-
exogeneity of the policy variable (see for example Hendry (1995)). Thus,
testing stability of estimated parameters should be a natural diagnostic test
for the reliability of estimated equations in the face of possible policy
changes (Li(2004)). Abeysinghe and Choy (2007, forthcoming) demonstrate
a simple framework that remedies the issue of changing parameters. As they
document, quite often changing parameters result from misspecification of
the model. Thus, test for regression misspecification is another way to
address the Lucas critique. Doan, Litterman and Sims (1984) argue that
policy changes are like the drawings of residuals under a given policy rule.
If the change in the policy is small, the Lucas critique amounts at most to
small non-linearities in variables. These non-linearities can be easily
addressed in a Bayesian vector autoregression (BVAR), in which forecasts
are conditional on future paths of variables, accommodating time-varying
coefficients (see also Sims (1986)). Hendry (2000b) argues that rational
expectations are not robust in the face of unanticipated deterministic shifts.
Estrella and Fuhrer (1999) show that models with forward-looking
behaviour are less stable than models with backward-looking behaviours.
Macro econometric models came under stern attacks because of their poor
predictive performance in 1970s too. In particular, they failed to predict the
simultaneous presence of high inflation and unemployment which
contradicts the inflation-unemployment trade-off embedded in the
Keynesian structure. Recently, Clements and Hendry (1996, 1998, 1999) and Hendry and Clements (2003) propose deterministic shifts (in means or slopes) in variables as the major source of forecast failure in macro econometric models. Stock and Watson (1996) also documented the pervasiveness of structural changes in macroeconomic models that are used for policy evaluation and forecasting. Sims (1982) interpreted large predictive errors as large random shocks to the equations, not mainly as the effects of parameter changes. Further, Hendry and Mizon (2000a, 2000b) admit that structural breaks can lead to misleading policy advice as they often lead parameters to change. If a break influences dynamic reaction parameters, it would yield false impulse responses. One could argue that macro econometric models failed in policy evaluation and forecasting in 1970s and 1980s not solely because of weaknesses in their structure but because of some external factors such as deterministic and/or non-deterministic structural shifts. Some candidate examples for structural breaks in 1970s and 1980s are the devaluation of the U.S. dollar, introduction of floating exchange rate system, resulting capital transaction between countries, oil price shocks and the slowdown of economic growth and high unemployment.

For neoclassical economists, the traditional Keynesian demand-driven structure cannot explain business cycle fluctuations well because it lacks proper mechanisms to incorporate supply-side fluctuations. The failure to
incorporate supply-side shocks such as oil price hikes and technological shocks led macro econometric models to be inappropriate in 1970s. Neoclassical economists believe that the economy is in a dynamic stochastic nature where representative agents form decisions optimally and rationally under given preferences and technologies (see Lucas and Prescott (1971), Lucas (1972), Prescott (1986)). The Lucas critique is no longer valid in such a dynamic optimization framework in theory too. Kydland and Prescott (1982) used dynamic stochastic general equilibrium (DSGE) models to show that a neoclassical model driven purely by real technology shocks could explain business cycle fluctuations well. Later work extended the approach to allow for various market imperfections. The followings are few such extensions: sticky wages and monetary shocks (see for example Bordo et al. (2000)), credit market frictions (Bernanke and Gertler (1989), Carlstorm and Fuerst (1997), Bernanke, Gertler, and Gilchrist (1999)), non-monetary factors such as government consumption, trade unions and antitrust policy shocks (Cole and Ohanian (1999, 2004), Prescott (1999)), time-varying wedges on productivity, labour and investment taxes, and government consumption (Chari, Kehoe, and McGrattan (2006)). These DSGE models which often involved in non-linear quadratic forms were not empirically estimated but often calibrated (Kydland and Prescott (1996)). Parameters of the simulated model are chosen based on statistical properties of variables or steady-state values or by appealing to previous empirical
estimates. However, DSGE models that used linear-quadratic preferences with linear production technology are akin to VAR models subject to restrictions arising from theory. As Hansen and Sargent (1980) note, maximum likelihood methods provide powerful tools for solving and analysing linear-quadratic models and forecasting with them. There are also arguments that shrinkage, which refers to the coaxing parameter estimates towards prior mean, emerges as a main estimation technique for linear-quadratic DSGE models (see Doan, Litterman, and Sims (1984)). One apparent drawback of DSGE models is that their highly stylized nature and irrelevance to empirical data. As Mankiw (1989) notes, the nature of preferences and production technology, clearing markets, perfect competition, dynamic optimization behaviour are quite far from reality. It is also revealed that aggregate functions may not be structural with respect to policy interventions. This has the meaning that DSGE models may not fully overcome the Lucas critique (see Diebold (1998)). Calibration method also does not provide a reasonable assessment between the model and the empirical data (see Sims (1996)). For Klein (1993) DSGE models are less data intensive than macroeconometric models and rely more on priori judgements about parameter values.

As an alternative to large-scale system equation models, some researchers focused on non-structural modelling (see for example Sargent and Sims (1977)). Box and Jenkins (1976) showed that simple linear difference
equations with moving average components, called ARMA or ARIMA models, as a convenient and powerful framework for modelling economic time series. These non-structural models were initially used for forecasting. Since univariate ARMA model forecasts are unconditional they do not fall into the Lucas critique. Subsequently, these ARMA models are extended to policy or impact analysis in the names of intervention analysis and transfer function analysis (see Enders (2004)). Thus, the emergence of non-structural econometric modelling also had a role in making macroeconometric models hopeless in 1970s (Diebold (1995)). However, the dearth of cross-variable relationship in ARMA models is a major macroeconomic concern. Klein (1993, 2002) noted that ARMA forecasts are reliable in the short-run (up to 3-6 months) because of inherent serial correlation in data. But they do not accurate in the long-run.

Since ARMA models are inappropriate for impact analyses and conditional forecasting, Sims (1980) by extending ARMA models to multivariate case introduced a new modelling approach known as vector autoregressive (VAR) models as an alternative to structural macroeconometric models. This follows the Sims’ (1980) critique on the identification of the short-term dynamics of behavioural relations. To address the endogeneity issue, Sims treated all variables in the system as endogenous. A set of equations is estimated simultaneously treating each variable as a function of its own lags and lags of other variables. The use of VAR models is greatly supported by
the fact that either exact or approximate solutions of many DSGE models comes in the form of a restricted VAR models (see Hansen and Sargent (1980), King, Plosser, and Rebelo (1988)). By construction, VAR models captures interlinks and dynamics of the system quite well. The derivation of structural VAR in which each variable depends on its own lags and contemporaneous and lags of other variables from restricted VAR in which each variable depends only on its own lags and lags of other variables, however, raise several concerns. Restricted VAR models are often criticized on the lack of economic content for lagged variables. The selection of ordering for innovation accounting is generally adhoc. Unless the structural VAR is identified from the reduced from, the innovations in Choleski decomposition do not have direct meaning (see Enders (2004, p. 291)). This procedure is very complex if the number of variables in the system becomes large. Sims (1986) and Bernanke (1986) propose that modelling of innovations should be done by appealing to economic theory. An alternative approach to obtain the structural form is to use long-run restrictions on impulse response functions to exactly identify structural innovations (see Blanchard and Quah (1989)). Thus, it seems that the lack of theoretical support for the specification of VAR models doubts their results on policy simulation and forecasts.

Following the neoclassical critiques and in the face of weaknesses in DSGE models, macroeconometric modellers tend to modify the Keynesian
structure. Supply factors are incorporated into the model structure (see for example Klein (1983), Challen and Hagger (1983), Ball and Holly (1991)). Rational expectations are incorporated (often, through model consistent expectations) into the model structure and rigorous tests on goodness-of-fit and forecast performances are conducted. Stochastic equations are designed by appealing closely to theory. Many models developed in the last two decades encompass these views of macroeconomics and advances in econometric methods (see for examples, Fair (1984, 1994), McKibbin and Sachs (1991), Taylor (1993), Wallis (1993), Powel and Murphy (1995), Crowder, Hofmann, and Rasche (1999), Garratt et al. (2003, 2006)). These new Keynesian and neoclassical ideological mixture models are found performing well even in modern-day analyses (see Valadkhani (2003)). An alternative modelling approach, which is originally developed at the London School of Economics, suggests modelling endogenous behavioural equations using general-to-specific modelling strategy. The essence of this approach is the recognition that potentially valuable information for the analysis of any economic problem can come from numerous sources. Prior to the estimation, this methodology concerns largely on underlying economic theory, available sample observations on the potentially relevant variables, knowledge of the economic history of the period under study, and knowledge of the way in which the observed data are defined, measured and their relationship to theory variables (see Mizon (1995)). The approach
recommends extensive tests on the model relevance and robustness. As per this methodology, a model which adequately describes historical data, encompasses previous findings, derives from well based theories and passes rigorous tests for model robustness could be used for policy analysis and for forecasting with greater accuracy (Hendry (2000)).

3.3. An emerging second generation approaches to fiscal decentralisation

Oates’ Decentralisation Theorem has laid a strong foundation for the study of fiscal federalism and decentralisation, all of which developed from the general literature on public economics. The result was what is now called the first generation theory of fiscal decentralisation. However, towards the end of the last decade of the twentieth century, a “second” generation theory of fiscal decentralisation has begun to emerge, which draws on ideas from outside the public finance literature. As Oates (2005, p.356) has highlighted, this second generation began investigating fiscal decentralisation by drawing on notions from the theory of the firms, the economics of information, principalagent problem, and the theory of the contract.

Two main considerations underlie the development of the second generation theory (Oates, 2005, p. 356). The first concerns the political processes and the behavior of political agents in which participants may have their own objective functions. Governments officials may not need to seek the common good as assumed in the first two main considerations underlie the
development of the second generation theory (Oates, 2005, p. 356). The first concerns the political processes and the behavior of political agents in which participants may have their own objective functions. Government officials may not need to seek the common good as assumed in the first generation theory, rather, they may not act to maximise the welfare of their constituencies. This consideration has obvious links to public choice theory—which was the main “non-core” stream of the first generation theory of fiscal decentralisation. The second concerns the issue of asymmetric information and political agents. Some particular participants have more knowledge of local preferences and tastes and cost structure compared to the others. To examine these influences, fiscal federalism is examined from the perspective of a framework on industrial organisation and microeconomic theory. Much of this work by the second generation theorists concerns the issue of balance between the degree of fiscal centralisation and fiscal decentralisation. While the general support for fiscal decentralisation in the first generation theory is acknowledged, the dangers of going too far in the fiscally decentralised system are a feature of the second generation theory.

The emerging second generation theory has been characterised in terms of two motivating issues: incentives and knowledge (Garzarelli, 2004, p. 11). Both motivations have contributed to an increased economic efficiency: incentives are required for SNGs to do a better job to avoid outward migration of people and firms; and knowledge of local preferences and
tastes is crucial to achieve economic efficiency when local public goods and services are provided by SNGs. The contributions of the second generation theory are mainly drawn from the economics of transaction cost, incomplete contracts and principal-agent perspectives (Garzarelli, 2004). Leading studies that have been classed as parts in the emerging second generation theory, are associated with Weingast (1995), Seabright (1996), Lockwood (2002) and Besley and Coate (2003).

Weingast (1995) introduced the notion of market preserving federalism to investigate how competing jurisdictions create incentives for credible commitment and lower transaction costs. Assuming a hierarchy of governments (at least two levels of government rule the same land and people) with autonomy of each level of government institutionalised, Weingast modelled the market preserving federalism in which: (i) SNGs have regulatory responsibility over the economy; (ii) a common market is ensured so that SNGs are unable to prevent trade in goods and services from other jurisdictions; and (iii) SNGs face a hard budget constraint. The main findings, for the UK and the US are: (i) federalism provides the political basis for the common market; (ii) the prohibitions against the national government’s exercise of economic regulation greatly reduced the government’s political responsiveness to interest groups; and (iii) the prohibitions on internal trade barriers allowed entrepreneurs, new
enterprises, and new economic activities to emerge in new areas that could outcompete interests in older areas (Weingast, 1995, p.25).

In contrast, Seabright (1996) introduced the notion of “incomplete contract” to the analysis of fiscal federalism. The author presents elections as incomplete contracts in which some information, in the “contract”, is unverifiable. Political accountability can be an organisational motivation for decentralisation. In contrast, centralisation could be more preferred when the mechanisms associated with incomplete contract provide greater scope for policy cooperation between different levels of government to internalize interjurisdictional fiscal externalities. As a consequence, the decision on preferred mechanism depends on the relative magnitude between benefits from internalisation of interjurisdictional fiscal externality and costs arising due to a reduced accountability under fiscal centralisation.

The starting point for Lockwood (2002) and Besley and Coate (2003) is Oates’ Decentralisation Theorem, but these authors correctly pointed out that goods and services provided by the national government are not necessarily homogenous, as Oates had originally assumed. Once it is recognised that national provision of public goods and services is possible on a differential basis between regions, a different fiscal framework is needed from that developed by Oates. In their frameworks, output provided by the national government consists of locally-designed outputs which are
determined by the central legislation. This is feasible because the national government body always consists of locally elected representatives from local regions. Nevertheless, the broad thrust of Oates’ findings on the efficiency of decentralised fiscal arrangement is reproduced in models in which interjurisdictional externalities are small and regions are heterogeneous.

Another contribution to second generation theory of fiscal decentralisation is evident from recent studies of Australian fiscal equalisation by Petchey and Levchenkova (2002 and 2004), which pointed out that equalisation grants are not determined exogenously. This is because equalisation is undertaken with respect to a fiscal standard that is determined in relation to actual fiscal behaviour. In this circumstance, there is an incentive for the states to behave strategically in their fiscal decisions. This provides the basis for an “equalisation game” which takes into account states’ strategic behaviour and provides a basis for developing proposals which enhance efficiency. The generally accepted view now is that the presence of the second generation theory of fiscal decentralisation classifies, rather than contradicts, the validity of the first generation, including the Decentralisation Theorem: “although the models under the second generation theory umbrella differ in fundamental ways from the first generation theory, many of them produce a trade-off between centralisation and decentralisation that is in a somewhat similar spirit to their earlier counterparts” (Oates, 2005, p. 357).
Finally, a second generation of public choice theory is also emerging. This is mainly associated with the work of Richard Wagner (2007), which shifts attention away from “tiers” of government, and assignment of powers and responsibilities across tiers, to focus on the competing “polycentric” character of government. This is associated with a focus on the process by which diverse centres of government respond to demands for publicly provided services in a manner that is integrated within the market economy. Wagner’s basic view on the evolutionary character of polycentric government is more important than the hierarchical aspect of government in which the questions of which functions to be provided at the national and subnational levels of government are addressed (Wagner, 2007, p.164-5), as it is in the conventional approach to fiscal decentralisation. The process by which governments respond to emerging demand from the community is directly linked to the capacity to raise their own revenue in an innovative way. Moreover, the focus is on government “enterprise”, in which some government units fulfil the role of public service producers and some take on the role of the articulators of the public services (Wagner, 2007, p.166).

3.4. Methodology
The proposed research is basically a census method on the mediating effects of fiscal decentralisation in state finance of Tamilnadu. The data used in this research all are secondary in nature which is frequently accepted by Institute of Charted Accountants of India, Security Exchange Board of India, Income

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Tax and Sales Tax Authorities etc. The study has been conducted for the period of ten years from 1999-00 to 2008-09. The Secondary data have been collected from books, journals, published and unpublished Annual Reports and Web sites etc. Since the research is constructed on the basis of Formative research model for developed by Arulraj and Senthilkumar (2009), Arulraj and Prabaharan (2010), and Arulraj and Parthiban (2010).

3.4.1. Procedure for Data Analysis
The data collected were analyzed for the entire sample. Data analyses were performed with Statistical Package for Social Sciences (SPSS) using techniques that included descriptive statistics, Correlation analysis and AMOS package for Structural Equation Modeling (SEM) and Bayesian estimation and testing.

3.4.2. Structural Equation Modeling
The main study used Structural Equation Modeling (SEM) because of two advantages: “(1) estimation of multiple and interrelated dependence relationships, and (2) the ability to represent unobserved concepts in these relationships and account for measurement error in the estimation process” (Hair et al., 1998, p. 584). In other words, a series of split but independent multiple regressions were simultaneously estimated by SEM. Therefore, the direct and indirect effects were identified (Tate, 1998). However, a series of separate multiple regressions had to be established based on “theory, prior
experience and the research objectives to distinguish which independent variables predict each dependent variable” (Hair et al., 1998, p. 584). In addition, because SEM considers a measurement error, the reliability of the predictor variable was improved. AMOS 18.0, a computer program for formulating, fitting and testing Structural Equation Models (SEM) to observed data was used for SEM and the data preparation was conducted with SPSS 18.0.

Linear Structural Equation Models (SEMs) are widely used in sociology, econometrics, management, biology, and other sciences. A SEM (without free parameters) has two parts: a probability distribution (in the Normal case specified by a set of linear structural equations and a covariance matrix among the “error” or “disturbance” terms) and an associated path diagram corresponding to the causal relations among variables specified by the structural equations and the correlations among the error terms. It is often thought that the path diagram is nothing more than a heuristic device for illustrating the assumptions of the model. However, in this research, the researcher will show how path diagrams can be used to solve a number of important problems in Structural Equation Modeling.

Structural Equation Models (SEM) with latent variables are more and more often used to analyze relationships among variables in marketing and consumer research (see for instance Bollen, 1989; Schumacker& Lomax,
1996, or Batista-Foguet & Coenders, 2000, for an introduction and Bagozzi, 1994 for applications to marketing research). Some reasons for the widespread use of these models are their parsimony (they belong to the family of linear models) their ability to model complex systems (where simultaneous and reciprocal relationships may be present, such as the relationship between quality and satisfaction) and their ability to model relationships among non-observable variables while taking measurement errors into account (which are usually sizeable in questionnaire data and can result in biased estimates if ignored).

3.5. Hypotheses Development

Mediation refers to a process or mechanism through which one variable (i.e., exogenous) causes variation in another variable (i.e., endogenous). Studies designed to test for moderation may provide stronger tests of mediation than the partial and whole covariance approaches typically used (e.g., Baron & Kenny, 1986; Bing, Davison, LeBreton, & LeBreton, 2002; James & Brett, 1984). It is useful to distinguish between moderation and mediation. Moderation carries with it no connotation of causality, unlike mediation which implies a causal order. Based on the arguments discussed in the previous chapters and this chapter the researcher formulated the following hypotheses.
3.1 Hypotheses of Mediated Model for Tamil Nadu State Finance Expenditure (TNSF – Expenditure)

Fig. 3.1: Mediated Hypothetical Model for Tamilnadu State Finance Expenditure (TNSF-Expenditure)

**Hypothesis 1:** The Total Expenditure dimension ECS positively influences the Total Expenditure (TE) to the Tamilnadu State Finance.

**Hypothesis 2:** The Total Expenditure dimension GLS positively influences the Total Expenditure (TE) to the Tamilnadu State Finance.

**Hypothesis 3:** The Total Expenditure dimension CAS positively influences the Total Expenditure (TE) to the Tamilnadu State Finance.

**Hypothesis 4:** The Total Expenditure dimension ECS is mediated by Social Services (SLS) towards attainment of Total Expenditure (TE) to the Tamilnadu State Finance.

**Hypothesis 5:** The Total Expenditure dimension GLS is mediated by Social Services (SLS) towards attainment of Total Expenditure (TE) to the Tamilnadu State Finance.
Hypothesis 6: The Total Expenditure dimension CAS is mediated by Social Services (SLS) towards attainment of Total Expenditure (TE) to the Tamilnadu State Finance.

Hypothesis 7: The Total Expenditure mediating dimensions SLS, positively influence the Total Expenditure (TE) to Tamilnadu State Finance.

Hypothesis 8: Including the interaction between dimensions of the Total Expenditure and Social Services (SLS) will explain more of the variance in Total Expenditure (TE) than the direct influence of dimensions of Total Expenditure and Social Service on their own.
3.2 Hypotheses of Mediated Model for Development Expenditure Economic Services of Tamilnadu State Finance (TN-DEES)

![Diagram](image)

**Fig. 3.2**: Mediated Hypothetical Model for Developmental Expenditure on Economic Services of Tamilnadu State Finance (TN – DEES)

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GES</td>
<td>General Economic Services</td>
</tr>
<tr>
<td>RUD</td>
<td>Rural Development</td>
</tr>
<tr>
<td>SAP</td>
<td>Special Area Programme</td>
</tr>
<tr>
<td>IAM</td>
<td>Industry and Minerals</td>
</tr>
<tr>
<td>IFC</td>
<td>Irrigation and Flood Control</td>
</tr>
<tr>
<td>ENG</td>
<td>Energy</td>
</tr>
<tr>
<td>AAS</td>
<td>Agriculture and Allied Services</td>
</tr>
<tr>
<td>DEES</td>
<td>Development Expenditure on Economics Services</td>
</tr>
</tbody>
</table>

**Hypothesis 1**: The Development Expenditure on Economics Services dimension GES positively influences the DEES to the Tamilnadu State Finance.
Hypothesis 2: The Development Expenditure on Economics Services dimension RUD positively influences the DEES to the Tamilnadu State Finance.

Hypothesis 3: The Development Expenditure on Economics Services dimension SAP positively influences the DEES to the Tamilnadu State Finance.

Hypothesis 4: The Development Expenditure on Economics Services dimension IAM positively influences the DEES to the Tamilnadu State Finance.

Hypothesis 5: The Development Expenditure on Economics Services dimension IFC positively influences the DEES to the Tamilnadu State Finance.

Hypothesis 6: The Development Expenditure on Economics Services dimension ENG positively influences the DEES to the Tamilnadu State Finance.

Hypothesis 7: The Development Expenditure on Economics Services dimension GES is mediated by Agriculture and Allied Services (AAS) towards attainment of DEES to the Tamilnadu State Finance.

Hypothesis 8: The Development Expenditure on Economics Services dimension RUD is mediated by Agriculture and Allied Services (AAS) towards attainment of DEES to the Tamilnadu State Finance.

Hypothesis 9: The Development Expenditure on Economics Services dimension SAP is mediated by Agriculture and Allied Services (AAS) towards attainment of DEES to the Tamilnadu State Finance.
Hypothesis 10: The Development Expenditure on Economics Services dimension IAM is mediated by Agriculture and Allied Services (AAS) towards attainment of DEES to the Tamilnadu State Finance.

Hypothesis 11: The Development Expenditure on Economics Services dimension IFC is mediated by Agriculture and Allied Services (AAS) towards attainment of DEES to the Tamilnadu State Finance.

Hypothesis 12: The Development Expenditure on Economics Services dimension ENG is mediated by Agriculture and Allied Services (AAS) towards attainment of DEES to the Tamilnadu State Finance.

Hypothesis 13: The Development Expenditure on Economics Services mediating dimension AAS, positively influence the DEES to Tamilnadu State Finance.

Hypothesis 14: Including the interaction between dimensions of the Development Expenditure on Economics Services and Agriculture and Allied Services (AAS) will explain more of the variance in DEES.
3.3 Hypotheses of Mediated Model for Development Expenditure Social Services in Tamilnadu State Finance (TN – DESS)

Hypothesis 1: The Development Expenditure on Social Services dimension MED positively influences the DESS to the Tamilnadu State Finance.

Hypothesis 2: The Development Expenditure on Social Services dimension FAW positively influences the DESS to the Tamilnadu State Finance.

Fig. 3.3: Mediated Hypothetical Model for Developmental Expenditure on Social Services in Tamilnadu State Finance (TN – DESS)

MED  :  Medical and Public Health  
FAW  :  Family Welfare  
WSA  :  Water Supply and Sanitation  
URT  :  Urban Development  
LET  :  Labour and Employment  
WSTO :  Welfare of SC, ST and OBC  
SSAW :  Social Security and Welfare  
EDU  :  Education  
DESS :  Development Expenditure on Social Services.
Hypothesis 3: The Development Expenditure on Social Services dimension WSA positively influences the DESS to the Tamilnadu State Finance.

Hypothesis 4: The Development Expenditure on Social Services dimension URT positively influences the DESS to the Tamilnadu State Finance.

Hypothesis 5: The Development Expenditure on Social Services dimension LET positively influences the DESS to the Tamilnadu State Finance.

Hypothesis 6: The Development Expenditure on Social Services dimension WSTO positively influences the DESS to the Tamilnadu State Finance.

Hypothesis 7: The Development Expenditure on Social Services dimension SSAW positively influences the DESS to the Tamilnadu State Finance.

Hypothesis 8: The Development Expenditure on Social Services dimension MED is mediated by Education towards attainment of DESS to the Tamilnadu State Finance.

Hypothesis 9: The Development Expenditure on Social Services dimension URT is mediated by Education (EDU) towards attainment of DESS to the Tamilnadu State Finance.

Hypothesis 10: The Development Expenditure on Social Services dimension WSA is mediated by Education (EDU) towards attainment of DESS to the Tamilnadu State Finance.

Hypothesis 11: The Development Expenditure on Social Services dimension LET is mediated by Education (EDU) towards attainment of DESS to the Tamilnadu State Finance.
**Hypothesis 12**: The Development Expenditure on Social Services dimension IFC is mediated by Education (EDU) towards attainment of DESS to the Tamilnadu State Finance.

**Hypothesis 13**: The Development Expenditure on Social Services dimension WSTO is mediated by Education (EDU) towards attainment of DESS to the Tamilnadu State Finance.

**Hypothesis 14**: The Development Expenditure on Social Services dimension SSAW is mediated by Education (EDU) towards attainment of DESS to the Tamilnadu State Finance.

**Hypothesis 15**: The Development Expenditure on Social Services mediating dimension Education (EDU), positively influence the DESS to Tamilnadu State Finance.

**Hypothesis 16**: Including the interaction between dimensions of the Development Expenditure on Social Services and Education (EDU) will explain more of the variance in the DESS.
3.4 Hypotheses of Mediated Model for State Own - Non Tax Revenue Tamilnadu State Finance (TNSF – SONTR)

**Fig. 3.4:** Mediated Hypothetical Model for State’s Own Non Tax Revenue of Tamilnadu State Finance (TNSF – SONTR)

<table>
<thead>
<tr>
<th>SONTR1</th>
<th>SONTR2</th>
<th>SONTR3</th>
<th>SONTR4</th>
<th>SONTR5</th>
<th>SONTR6</th>
<th>SONTR7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest Receipts &amp; Dividend and Profit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic Services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grants-in Aid from the Centre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Own Non Tax Revenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Own Non Tax Revenue + Grand in Aid from the Centre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total State Own Non Tax Revenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Hypothesis 1:** The Total State Own Non Tax Revenue dimension SONTR3 positively influences the TSONTR to the Tamilnadu State Finance.

**Hypothesis 2:** The Total State Own Non Tax Revenue dimension SONTR2 positively influences the TSONTR to the Tamilnadu State Finance.
**Hypothesis 3**: The Total State Own Non Tax Revenue dimension SONTR1 positively influences the TSONTR to the Tamilnadu State Finance.

**Hypothesis 4**: The Total State Own Non Tax Revenue dimension SONTR4 positively influences the TSONTR to the Tamilnadu State Finance.

**Hypothesis 5**: The Total State Own Non Tax Revenue dimension SONTR5 positively influences the TSONTR to the Tamilnadu State Finance.

**Hypothesis 6**: The Total State Own Non Tax Revenue dimension SONTR7 positively influences the TSONTR to the Tamilnadu State Finance.

**Hypothesis 7**: The Total State Own Non Tax Revenue dimension SONTR3 is mediated by SONTR 6 towards attainment of TSONTR to the Tamilnadu State Finance.

**Hypothesis 8**: The Total State Own Non Tax Revenue dimension SONTR2 is mediated by SONTR 6 towards attainment of TSONTR to the Tamilnadu State Finance.

**Hypothesis 9**: The Total State Own Non Tax Revenue dimension SONTR3 is mediated by SONTR 6 towards attainment TSONTR to the Tamilnadu State Finance.

**Hypothesis 10**: The Total State Own Non Tax Revenue dimension SONTR4 is mediated by SONTR 6 towards attainment of TSONTR to the Tamilnadu State Finance.

**Hypothesis 11**: The Total State Own Non Tax Revenue dimension SONTR5 is mediated by SONTR6 towards attainment of TSONTR to the Tamilnadu State Finance.
Hypothesis 12: The Total State Own Non Tax Revenue dimension SONTR7 is mediated by SONTR6 towards attainment of TSONTR to the Tamilnadu State Finance.

Hypothesis 13: The Total State Own Non Tax Revenue mediating dimension SONTR6, positively influence the TSONTR to Tamilnadu State Finance.

Hypothesis 14: Including the interaction between dimensions of Total State Own Non Tax Revenue and SONTR6 will explain more of the variance in TSONTR than the direct influence of dimensions of Total Expenditure and State Own Non Tax Revenue on their own.
3.5 Hypotheses of Mediated Model for State Own Tax Revenue
Tamilnadu State Finance (TNSF – SOTR)

Fig. 3.5: Mediated Hypothetical Model for State’s Own Tax Revenue of Tamilnadu State Finance (TNSF – SOTR)

SOTR4 : Land Revenue
SOTR5 : Stamps and Registration Fees
SOTR6 : State Excise Duties
SOTR7 : Electricity Duty
SOTR8 : General Sales Tax
SOTR10 : Central Sales Tax
SOTR14 : Tax on Vehicles
TSOTR : Total Own Tax Revenue

**Hypothesis 1:** The Total State Own Tax Revenue dimension SOTR4 positively influences the TSOTR to the Tamilnadu State Finance.

**Hypothesis 2:** The Total State Own Tax Revenue dimension SOTR5 positively influences the TSOTR to the Tamilnadu State Finance.
Hypothesis 3: The Total State Own Tax Revenue dimension SOTR6 positively influences the TSOTR to the Tamilnadu State Finance.

Hypothesis 4: The Total State Own Tax Revenue dimension SOTR8 positively influences the TSOTR to the Tamilnadu State Finance.

Hypothesis 5: The Total State Own Tax Revenue dimension SOTR10 positively influences the TSOTR to the Tamilnadu State Finance.

Hypothesis 6: The Total State Own Tax Revenue dimension SOTR14 positively influences the TSOTR to the Tamilnadu State Finance.

Hypothesis 7: The Total State Own Tax Revenue dimension SOTR4 is mediated by SOTR7 towards attainment of TSOTR to the Tamilnadu State Finance.

Hypothesis 8: The Total State Own Tax Revenue dimension SOTR5 is mediated by SOTR7 towards attainment of TSOTR to the Tamilnadu State Finance.

Hypothesis 9: The Total State Own Tax Revenue dimension SOTR6 is mediated by SOTR7 towards attainment of TSOTR to the Tamilnadu State Finance.

Hypothesis 10: The Total State Own Tax Revenue dimension SOTR8 is mediated by SOTR7 towards attainment of TSOTR to the Tamilnadu State Finance.

Hypothesis 11: The Total State Own Tax Revenue dimension SOTR10 is mediated by SOTR7 towards attainment of TSOTR to the Tamilnadu State Finance.
**Hypothesis 12**: The Total State Own Tax Revenue dimension SOTR14 is mediated by SOTR7 towards attainment of TSOTR to the Tamilnadu State Finance.

**Hypothesis 13**: The Total State Own Tax Revenue mediating dimension SOTR7, positively influence the TSOTR to Tamilnadu State Finance.

**Hypothesis 14**: Including the interaction between dimensions of Total State Own Tax Revenue and SOTR7 will explain more of the variance in TSOTR.

### 3.6. Conclusion

In this chapter, The Conceptual Frame Work was explained with the research followed by the methodology, procedure for data analysis, literature related to the Structural Equation Modeling, hypothesis development and finally ended with hypothetical model with hypotheses. In the following chapter the developed hypothetical model empirically tested and proved with Structural Equation Modeling with Bayesian estimation and testing.