Essays on Indian household savings, poverty and inequality within the context of economic growth

Submitted by

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Declaration

I, Angeliki Dimopoulou, hereby declare that Chapters I, II, III, IV and V of this thesis are entirely my own research work.

Signed…….(Angeliki Dimopoulou)

Date:

Abstract

This thesis addresses Indian household behaviour towards savings and explores the effects of economic growth on poverty and inequality.

In the second chapter, using data from the Indian Household Consumer Expenditure survey, I show that vulnerable Indian households do not treat gold jewellery as a luxury good, but as a substitute to for savings. Households in rural locations, with irregular income, with illiterate heads and with casual or agricultural labour as the main source of income have higher expenditures on gold. This can be explained by the Permanent Income Hypothesis. Households mitigate future uncertainty by accumulating gold to smooth out future income shocks. I test two alternative hypotheses for high levels of spending on gold in India. I find limited support for an alternative hypothesis that high levels of gold expenditure simply reflect expenditures on dowries, a form of cultural preferences stemming from religion. I find no evidence of a second alternative hypothesis, namely that intra-household bargaining power, measured by the by wife's relative education level, influences gold purchases. Finally, using Engel curves, I examine whether these results are due to anomalies in the Indian data by examining expenditures on food, a normal good.

In the third chapter, I deal with non-random sampling of the Indian Household Consumer Expenditure Survey, by adjusting the median annual per capita consumption. While comparing absolute and relative methodologies for calculating poverty rates in India, I show that the World Bank methodology produces higher absolute poverty rates than the relative 60% of the median annual consumption methodology; spatial analysis used for robustness, confirms that neighbouring states present very different poverty rates, emphasising the effects of local legal and welfare systems in every Indian state. I then use a logit maximum likelihood model to show how 5-Year Indian GDP growth, preceding the 2009-2010 Household Consumer Expenditure Survey used for this chapter, has had a lagged effect on enhancing the chances of poverty in Indian households. This is more prominent in the case where the relative methodology is used for estimating poverty. Furthermore, I show how households in Indian

states that have experienced Services-led GDP growth in particular, are more prone to be poor, both in the case of 5-year and 3-year growth, where the absolute methodology is used to draw poverty lines. Where the relative methodology is used, shorter-term Services-led growth seems to benefit Urban households only, in relation to poverty.

In the fourth chapter I use the economic growth observed in India in the 2000s, to assess its impact on inequality amongst urban households. I also deal with non-random sampling in Round 66 of the Household Consumer Expenditure surveys, by assigning probability weights. I find that inequality has decreased overall from 1994-95 to 2009-10, while the difference in inequality between the bottom and top of the expenditure distribution amongst urban population has increased. Using intra-decile analysis, I find that inequality within the bottom 10% of the urban population has decreased, while at the same time inequality within the lower middle class has increased. I test the effect of economic growth on inequality, within the Marginal Productivity Theory model; I find no support at State level. I find that States with high percentage of casual labour, as part of their urban population, are more likely to experience in increase in inequality, while there is also some support around growth in the Services sector to have a positive effect on increasing inequality, within the 5-year time frame. Finally, I find no support for Social Security and Welfare government spending to have an impact on inequality, at State level.

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Chapter I

Introduction

This thesis addresses questions concerning household savings behaviour, poverty and inequality in India within the context of economic liberalisation in the 1990s and high growth rates experienced in late 2000s. Indian economic liberalisation was aimed at moving away from government control of the economy and towards free markets. During the economic reforms, import duties were relaxed and non-tariff barriers, such as restrictions on the type and amounts of products that could be imported, were removed. Foreign direct investment, which had been capped to 40% of foreign ownership before 1990, became progressively uncapped after 2000. Control of production and manufacturing monopolies was allowed to pass to the private sector. Finally, banking, which was previously mainly state-owned, was also liberalised, although at a much slower pace than other reforms. Gross domestic product growth (henceforth GDP) was high in the years following the economic liberalisation, averaging 6.6% between 1990 and 2010 and ranging between 5.53% (in 1990) and 10.25% (in 2010).[1] During the 2008 world economic slowdown, India experienced lower GDP growth compared to earlier years; however, it continued to grow at a faster rate than developed countries. This is shown in figure 1.1, which compares the growth rates of India, China, the developed countries and a set of less developed countries. GDP growth in India had recovered by 2010, while developed and other developing countries still experienced lower growth rates. By the late 2000s, India had experienced 20 years of economic reforms and stable GDP growth rates.

The effects of the Indian economic liberalisation and growth have been discussed extensively in the broader academic literature (Ravallion 2001, Dreze & Sen 2013, Squire 1993, Sen 1998). However, there remain open questions as to

[1] Source: World Bank Economic and Growth Indicators, GDP growth (annual %), accessed 07 October 2018

whether the Indian population as a whole, has benefitted from these changes. World Bank poverty estimates have shown Indian poverty rates to have dropped from 46.1% in 1993 to 31.4% in 2009 (World Bank, 2009). Figures on the poverty headcount ratio from the Indian Planning Commission are similar, showing a fall from 45.3% in 1993 to 29.8% in 2009 (Indian Planning Commission, 2011). Some academic work has shown positive effects on household income (Kotwal et al 2011, Deininger & Squire 1996, Ravallion 2001). Dreze and Sen (2013) discuss how improvements in education and public health, as a result of economic growth, benefit the poor. Labour intensive growth has also been found to contribute to poverty alleviation (Ravallion 1995, Shultz 1998). There is also evidence to suggest that income inequality between rural and urban population has decreased at the lower and top end of the population distribution, while income inequality has increased for the middle quintiles (Chamabagwala 2010, Zacharias & Vakulabharanam 2011).

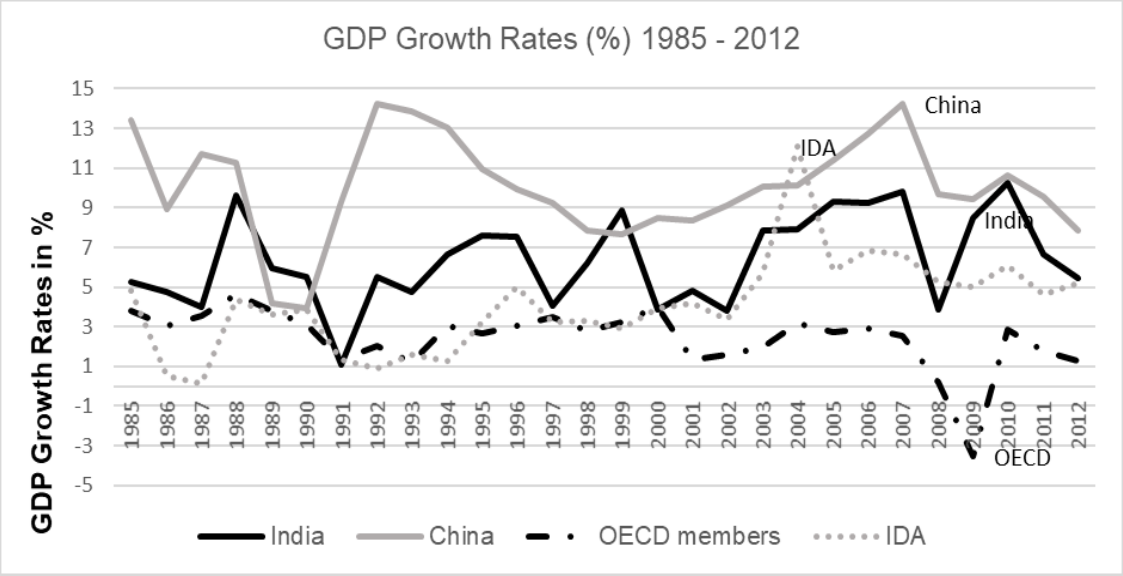


Figure 1.1: Comparison of GDP growth rates between India, China, developed countries (OECD) and developing countries (IDA) [2]

[2] Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. Source: World Bank Economic and Growth Indicators, GDP growth (annual %), accessed 07 October 2018.
For a full list of OECD countries see http://www.oecd.org/about/membersandpartners/list-oecd-member-countries.htm accessed 07 October 2018
For a full list of IDA countries see http://ida.worldbank.org/about/borrowing-countries accessed 07 October 2018

However, scholars have put forth arguments to suggest that Indian households have not benefited from economic growth, due to a lack of well-functioning markets, access to credit and information (Banerjee and Duflo 2005) and lack of protection for casual and regular workers in smaller production units that do not fall within the scope of government welfare schemes (Kotwal et al 2011). Price disparities between rural and urban markets and across different states, create geographic poverty traps that prevent the uniform functioning of markets and the benefits of GDP growth to be passed to the end consumer (Dalton et all 2012). Corruption and bureaucracy are found to act as impediments to equal access to information and slow down access to state benefits. While policies are formed for the benefit of the poor, corruption distorts their effective implementation (Gupta, 2012). Additionally, despite the economic reforms and partially due to lack of primary education, 40% to 60% of the population remains unbanked, thus restricting the population's access to credit (Chakrabarty 2013, Anson et al 2013).[3] Pre-existing disparities amongst existing castes and socioeconomic differences were amplified as a result of GDP growth enhancing inequality (Assouad et al 2018). Chauhan & Mohanty (2016) use the National Sample Survey datasets, which are also used in this paper, to show that inequality has increased between 2% and 9% for 64 regions from 1993 to 2012.

The three research chapters, included in this thesis, will address gaps in literature around matters of gold being used as alternative to savings within vulnerable households, how poverty rates have been affected by India's high GDP growth in the end of 2000s and finally, how urban inequality has been affected by economic growth. Additionally, I employ different approaches in dealing with the non-random sampling of the National Sample Surveys, which are widely used for poverty and inequality research, as well as for setting poverty lines at a national level, in India (Chauhan & Mohanty, 2016).

[3] Source: World Bank 2017, Oxford Poverty & Human Development Initiative 2012

In the second chapter, I investigate the “gold paradox”. Indian households traditionally own relatively large amounts of gold, especially in the form of jewellery. Research on Indian gold ownership explains why Indian households hold gold, although research is usually done on a small scale, producing results that can only be explained on a localised level and is often related to the use of gold jewellery in weddings and dowries (Caldwell & Reddy 1988, Arunachalam 2008, Duflo & Udry 2004). There has been relatively limited research aimed at explaining how lower income households can afford a high, in comparison, ownership rate of gold. Using data from the Indian Household Consumer Expenditure survey, I show that vulnerable Indian households do not treat gold jewellery as a luxury good, but as a substitute to for savings in traditional financial institutions, such as banks. Households in rural locations, with irregular income, with illiterate heads of household and with casual labour as the main source of income, have higher expenditures on gold, all else equal. This can be explained by the Permanent Income Hypothesis. Households mitigate future uncertainty by accumulating gold to smooth out future income shocks. I test two alternative hypotheses for high levels of spending on gold in India. I find limited support for the alternative hypothesis that high levels of gold expenditure simply reflect cultural preferences stemming from religion, in the form of dowries. Hindu and Muslim households spend more on gold jewellery, all else equal. I find no evidence for the second alternative hypothesis, namely that intra-household bargaining power, measured by the by wife’s relative education level, influences gold purchases. Finally, I examine whether these results are due anomalies in the Indian data by examining expenditures on food, a normal good. I find that food expenditure broadly conforms to patterns observed in other countries, thus the high levels of expenditure on gold is unlikely to be due to an anomaly of the Indian data.

In the third chapter, I examine the extent of poverty in India using expenditure data from the 2009-2010 Household Consumer Expenditure Survey. I also deal with non-random sampling of the Indian Household Consumer Expenditure Survey, by adjusting the median annual per capita consumption for the urban sample. I calculate poverty lines based on absolute and relative methodologies

and use these to construct poverty rates. I use the World Bank's $1.90 per person per day threshold, as an absolute measure of poverty, which utilises purchase power parity rates to convert expenditure from Indian rupees to US Dollars. I then set the poverty line at 60% of median household expenditure, which is a relative measure of poverty, widely used in developed countries because it implicitly takes into account local community expenditure levels, culture and lifestyle, beyond the household. I show that the World Bank methodology produces higher absolute poverty rates than the relative 60% of the median annual consumption methodology. Spatial analysis shows that neighbouring states have very different poverty rates, regardless of whether poverty is measured in absolute or relative terms. I then examine the link between GDP growth and poverty reduction. I use a logit maximum likelihood model to show that 5-Year state-level GDP growth prior to 2009-2010 has had a lagged effect on poverty in Indian households. Where consumption has been converted from Indian rupees to US dollars by using 2011 PPP exchange rates and the poverty threshold is set at $1.90 per person per day, as 5-year GDP growth rates increase, they also increase the likelihood of households being poor. Using 60% of the median expenditure to draw poverty lines and where the entire sample is used, including the median-adjusted urban sample, as 5-year and 3-year GDP growth rates increase, the households' chances of being poor also increase. Where the relative methodology of setting poverty lines is used, urban households are more likely to be poor, all else kept constant. This is one of the main differences to the results produced when using the World bank's absolute methodology to draw poverty lines, where urban households are less likely to be poor, all else kept constant. Finally, I show that households in Indian states that have experienced GDP growth due to expansion in the services sector, are more likely to be poor.

The fourth chapter explores how urban inequality has been affected by Indian GDP growth. It has been shown that the gains from GDP can be shared across the income distribution either through government spending, access to global technology networks and returns on productivity (Madon and Sahay 2001, Friedman 2005). Within the marginal productivity theory, it is assumed that reallocating the benefits of GDP growth is done in an efficient way through

government channels. Literature has shown that due to time lags, negative trickle-down government spending and uneven welfare and labour frameworks, even redistribution of income is not always achieved (Stiglitz 2015, Greenwood 2010). India has experienced a surge of internal migration to urban areas, as a result of the economic liberalisation and growth in the industrial and services sectors. Inequality in India has been found to be primarily an urban phenomenon that has also contributed to the increase of urban slums (Cain et al 2014, Assouad et al 2018). I use data from the 2009-2010 Household Consumer Expenditure Survey to calculate state-level Gini coefficients. Due to the non-random sampling of the dataset, I am only able to adjust and utilise the urban sample, for this part of the analysis. An analysis of these Gini coefficients shows that overall inequality amongst the urban population of India has decreased from 1994-95 to 2009-10 and that the range of inequality across States has narrowed over the same period. I then explore inequality across the income distribution. I find that inequality within the bottom 10% of the urban population has decreased, while at the same time inequality amongst the lower middle class has increased. Additionally, I show that the difference in inequality between the bottom and top of the expenditure distribution amongst urban population has also increased. I also find that a high percentage of casual labourers is associated with increases in inequality, while there is also some support around growth in the Services sector to have a positive effect on increasing inequality, within the 5-year time frame.

Chapter II

1. Introduction

The price of gold increased from $614 in 1980 to $1,628.40 per ounce in 2011, while demand has remained strong. Starr and Tran (2008) and the World Gold Council (Gold Demand Trends, 2010), have found that jewellery is the largest component of demand for gold, worldwide, highlighting India as the main market with demand reaching 746 tonnes in 2010. Figure 2.1 classifies countries with the highest demand for gold jewellery in 2010 in ascending order according to their 2010 Gross National Income (GNI) per capita figures. A cluster of low-income countries emerges, including India, Vietnam Egypt, China and Turkey with high per capita demand for gold jewellery. These low-income countries display gold demand levels similar to those of developed countries at the higher end of the GNI distribution.

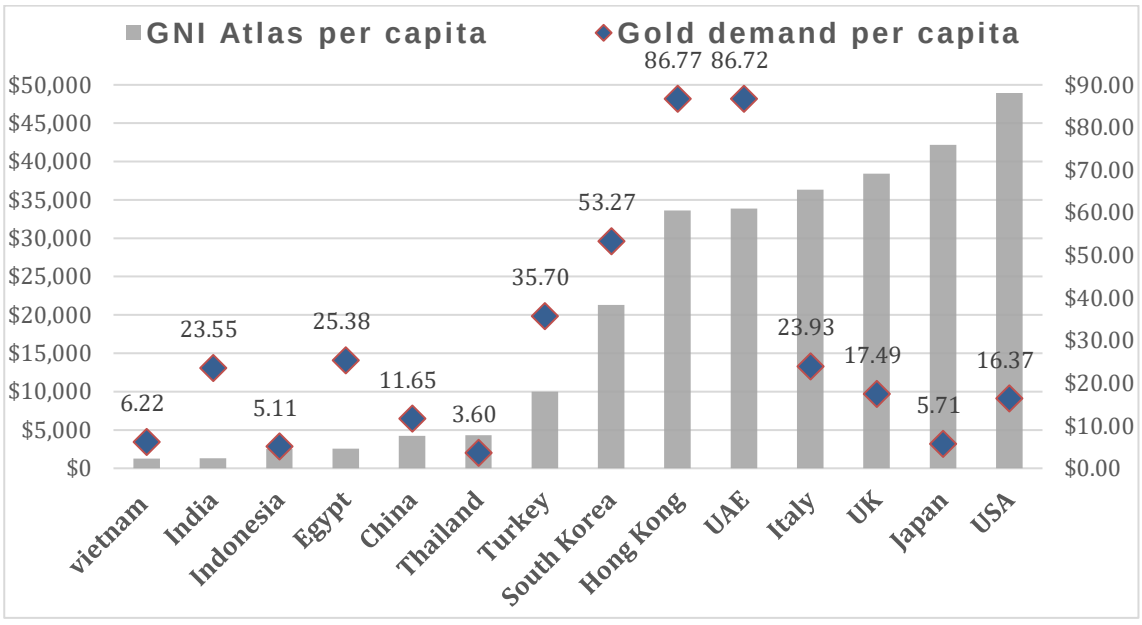


Figure 2.1: GNI per capita vs. Gold Jewellery demand Source: World Bank & World Gold Council

For example, although India, United States and United Kingdom have similar levels of gold demand per capita (as per figure 2.1), the ratio of household expenditure on jewellery over the total durables purchased per household was

2.63% in 2010 in USA households and 2.57% in UK households.[4] These figures are substantially lower than in India where the ratio of jewellery over total durables bought, was 6.2% (Household Consumer Expenditure data analysis in 2009-10). It seems plausible that gold may be treated as something other than a luxury good in the cluster of "low income-high demand for gold" countries. The Permanent Income Hypothesis (PIH) explains this pattern of behaviour in terms of *future uncertainty and attitudes to risk.* Increasing gold values over the past four decades could imply that holding gold could be interpreted as a long-term means of protection against inflation and a sound return to investment for Indian households. Figure 2.2 shows the price of gold, in relation to Indian inflation and interest rates. Overall the lower volatility of gold prices relative to real interest rates could explain why Indian households have high levels of gold holdings.

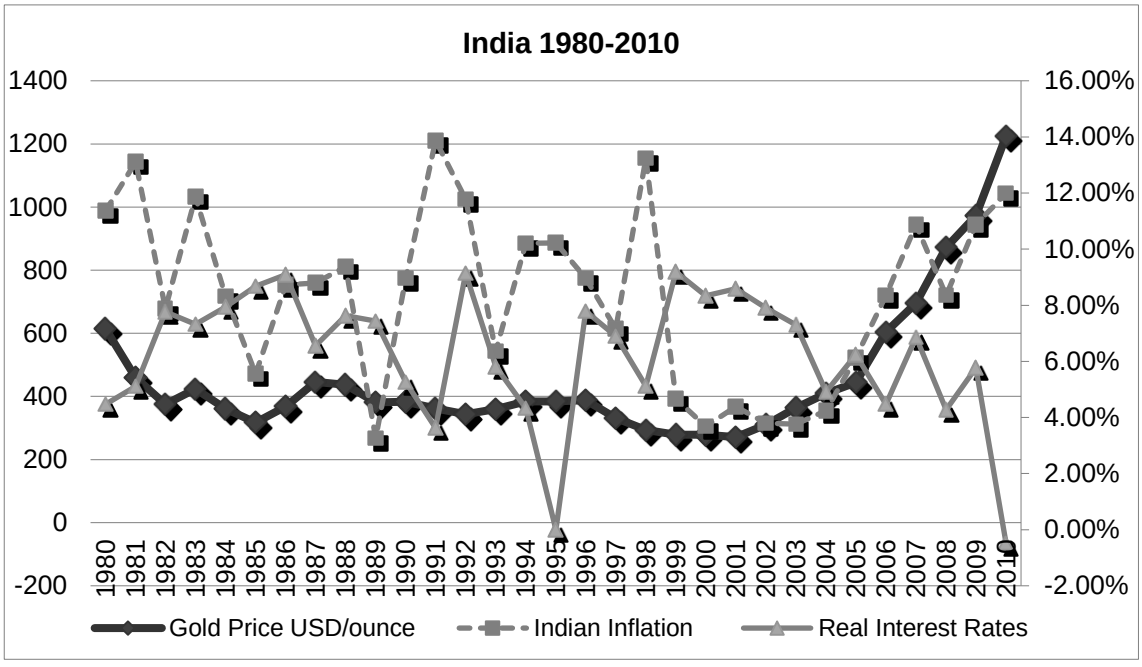


Figure 2.2: Historic comparison between Indian inflation, Indian real interest rates adjusted for inflation and gold price % change per annum. Source for Indian Inflation & Real Interest Rates: World Bank Country Data. Source for Gold Prices: World Gold Council.

[4] See Appendix A.3 to Chapter II for full tables of items included in both sets of calculations. Figures provided by the "Household Expenditure Survey, 2010" published by the UK National Statistics Office and "Consumer Expenditure Survey, 2006-2011" published by the U.S. Bureau of Labour Statistics

Gold may be an attractive investment for Indian households for several reasons. Firstly, Indian inflation and interest rates have historically been volatile, while gold prices have remained relatively stable. Gold prices increased by 100.10% in US Dollars[5] in the decade 2000-2010, while interest rates have decreased. Long term, gold price appreciation has outperformed Indian inflation-adjusted, real interest rates which have increased 6.44% on average for the same period. Gold has been a good store of value. Secondly, the Reserve Bank of India (Chakrabarty, 2013) and the World Bank (Anson et al, 2013) both estimate that in India 35%-40% of urban and 60% of the rural population do not have bank accounts, while only 14% and 9% of adult population have loan accounts in urban and rural areas respectively. Thirdly, gold is attractive because of easy access to the second-hand gold markets: local pawnbrokers and moneylenders who form the unorganised second-hand market for gold jewellery are estimated to still command 75% of the market share in India (Churiwal A, 2012). Interviews conducted around India by Women's World Banking Organisation (2014) revealed that local money lenders are more attractive than organized lending even when they charge rates as high as 30%, because they offer cash on-the-spot against collateral of gold and wedding jewellery. Microfinance institutions offer gold backed short-term loans at rates 6-8% lower than the uncollateralised loans, up to 80% of the gold value. High accumulation of gold jewellery on one hand and lack of conventional banking coupled with accessibility to second-hand gold trading markets on the other, strongly suggests that gold could be widely used as an alternative savings mechanism.

The PIH hypothesis allows for future uncertainty, which is consistent with Indian households that historically have had to rely on agriculture or casual labour income that is highly unpredictable.[6] Irregular income makes financial planning

[5] Source for Gold Price: World Gold Council;
Source for Inflation (expressed in consumer prices annual % change) and Real Interest Rates (inflation adjusted): Indexes;

[6] For the purpose of this paper 'casual labour' is differentiated to 'regular labour' and is defined as: *A person casually engaged in other's farm or non-farm enterprises (both household and non-household) and getting in return wage according to the terms of the daily or periodic work contract. Usually, in rural areas, casual labourers can be seen to normally engage themselves in 'public works' activities.* Source: National Sample Survey of India, Household Consumer Expenditure, Round 66, Supporting Documents, Chapter 1 – Introduction.

difficult and also makes it harder to insure against exogenous shocks. Households with an irregular income stream looking to smooth their consumption over time are likely to heavily discount future streams of income. Uni and Rani, (2003) find that in India, individual income security affects the whole household. Insecurity comes from random shocks such as illness or death as well as industry-specific shocks e.g. weather disasters in agriculture, seasonal demand for agricultural labour, varied working hours and therefore income, etc. As a coping mechanism, households rely on social networks and micro-finance. That implies that non-regularity of income would be expected to have a positive effect on gold expenditure, as irregular income earners would have to find alternative ways to protect their living against unexpected events. I use gold jewellery purchased by Indian households to test the main hypothesis that vulnerable households use gold to mitigate against future uncertainty. Within the PIH framework even poorer households can accumulate asset stock over time, in this case gold jewellery, to respond to economic shocks such as extended unemployment spells, illness or death. Vulnerable households are not exclusively poor households however; I use regularity of income, illiteracy, home ownership, household location and household consumption, inter alia, to test whether this hypothesis stands when Indian households are concerned. To support this hypothesis, it is also important to demonstrate gold is treated as something other than a luxury good. I estimate Engel curves of food expenditure to establish a baseline for Indian household behaviour towards a normal good.

Culturally influenced preferences provide an alternative hypothesis for this consumer behaviour towards gold. Jewellery has denoted status throughout Indian history and households have accumulated gold and jewellery since before Moghul times. Rao's (2001) gold purchase research focusing on the ritual and economics of marriage in India, has shown that even poorer households often spend as much as seven times their annual income on wedding expenses, much of which includes gold jewellery. Half of the gold jewellery bought in India is for weddings (World Gold Trends Report, 2010). Moreover, religious festivals such as Dhanteras and Diwali, traditionally prompt a strong seasonal surge in demand for gold, as it is considered an auspicious purchase. Debraj (1998) states "social

norms weigh heavily on people's choices." This cultural motivation yields two testable hypotheses: firstly, do households spend money on gold for dowries, to signal social status within the community? Secondly, is there an intra-household mechanism motivated by the wife's higher education level, whereby households in which wives have relatively greater bargaining power spend more on gold?

Despite the high demand for gold, a shortage of suitable data has meant that there has been relatively little analysis of what determines this household preference. For example, the Indian Census is particularly designed to highlight gaps and shortages of quality of life in rural and poorer areas but does not count jewellery and precious metal deposits, such as gold and silver. Overall, although studies agree that demand for gold stems primarily from strong demand for gold jewellery, there seems to be a gap of systematic analysis of the factors that drive Indian household decision-making towards purchasing gold. The contribution of this paper is to address these factors using large-scale, all-India data. The paper makes three contributions; firstly, it examines whether the PIH can explain observed patterns of demand for gold jewellery in India. Specifically, it tests the effects of regularity of income, land and home ownership, rural vs. urban location of household, household type and sex and literacy of head of household on gold jewellery expenditure. Secondly, it tests the alternative hypothesis of Culturally Influenced Preferences (CIP), in the form of dowries that drive demand for gold jewellery. Lastly, it tests whether Intra-household Bargaining Power (IHBP) explains the demand for gold jewellery: specifically, whether gold purchases are larger in households where wives have more education than their husbands.

The outline for the remainder of this paper is as follows. The next section provides an overview of the main hypothesis used to explain demand for gold in India. It discusses how the implications of the assumptions of the PIH fit in with Indian household behaviour. Gold might be an important savings mechanism because free borrowing and lending, the standard PIH assumption, is likely to be incorrect in an Indian context. Indian households do not have access to traditional saving accounts, due to geographic poverty traps, lack of education and lack of access

to traditional banking facilities. The theoretical importance of dowries and wives' bargaining power in India give context to intra-household decision-making. The third part of this paper includes a description of the data, along with summary statistics that will help interpret the regression results. The fourth part estimates Engel curves for food and gold, to establish food as a normal good and determine whether gold is treated as a luxury good or otherwise. Household features such as main source of income, household location, sex of the head of household and literacy levels are considered. The econometric model based on PIH follows, and discusses coefficients for vectors relating to permanent income, household utility, household permanent wealth and fixed effects, determined by culture. The empirical part of the paper presents results of regression analysis based on the econometric model. Robustness tests use food, a normal good, to test the model's validity. The final section concludes.

2. Theoretical Framework

a. The permanent income hypothesis

The permanent income hypothesis (PIH) provides the theoretical background for this study and is used to explain why Indian households with low average income and little income security have such high gold consumption. A simple version of the PIH assumes that households take decisions with an infinite horizon, where consumption decisions are based on lifetime income and overall wealth, rather than current income. It is assumed that there are no costs associated with saving or with borrowing against future income. PIH divides income and consumption into permanent and transitory components. Permanent consumption is proportional to permanent income. Friedman (1957) and Meghir (2004) argue that the transitory and permanent components of income and consumption are uncorrelated. This provides a rational explanation as for why Indian households would spend money on gold. Rather than being a luxury, gold may be the only means of storing wealth available to poor households. This is a plausible explanation for why households with low and irregular current income might have higher expenditure on gold jewellery.

The model can be expressed more formally as follows. The consumption equation (1) defines a relation between permanent income Yp and permanent consumption Cp. It specifies that the ratio between them is independent of the size of permanent income but does depend on other variables.

$$Cp = k(i,u,w)Yp \qquad (1)$$

Firstly, k(i,u,w), the propensity to consume out of permanent income, depends on interest rates (i), utility preferences (u) and (w) the ratio of wealth to income. In this context, (u) is determined by the number of members of the consumer unit, their characteristics, i.e.: their ages, and any utility factor that affects anticipation, i.e.: inequality of wealth in society.

The two separate components Consumption and Income follow:

Consumption: $C=C_p+C_t$ (2)

where Cp is permanent consumption and Ct is transitory consumption.

The factors determining transitory components of consumption are exogenous to the individual and often individual-specific, such as unusual sickness, a favourable opportunity to purchase, etc.

Income: $Y= Y_p+Y_t$ (3)

Y_p is the permanent component of income that is equivalent to household's wealth. The permanent component is influenced by factors such as: head of household education, household type that reflect the main source of income, urban or rural location, sex, land ownership and home ownership.

Y_t is the transitory component of income that is affected by unexpected incidents, such as cyclical fluctuations in the economy that affect most households, illness, but also error of measurement.

b. Implications of PIH within the Indian context

A main assumption of the basic version of PIH is that households can borrow and lend freely. In terms of borrowing, there are three reasons why this assumption is inaccurate in the case of Indian households. Firstly, rural locations in developing countries typically lack the banking infrastructure for savings and borrowing. Jallan & Ravallion (2002) show that in rural China many households are capital constrained due to geographic factors. They also show that agricultural output in particular depends on labour and own capital because of limited access to credit markets. Geographic supply-side impediments to banks are found even in developed countries. A US study (Washington, 2006) for example, has shown that banks are less likely to operate branches in lower income areas. Secondly, access to credit is limited due to immobility of capital. A lot of rural areas in India are geographically inaccessible, such as tribal villages in the Rajasthani desert or remote villages in the Himalayas. Although microfinance has been introduced slowly as a means of pooling minimal funds

across households into funding small enterprises locally, a very small percentage of households utilises microfinance. The majority prefer to borrow at a higher rate from local informal lenders. The third reason is that people with low levels of education are typically less willing to deal with financial institutions and feel more comfortable borrowing from informal sources close to their village, even when they charge much higher rates than the formal sector. For example, in Bangladesh (Shitagnsu, 2011) 95.2% of the borrowing to rebuild houses following cyclones was from non-governmental sources, such as non-governmental organisations, private moneylenders and friends or family, while only 4.8% used government banks.

PIH takes into consideration household assets in the measure of long-term wealth and also assumes that children and their parents constitute one household unit. This assumption holds in the traditional Indian family unit, as extended families live together, and children stay with their parents even after marriage. An implication is that consumption is determined by long-term considerations, where any transitory changes in income provide additions to assets or use of accumulated assets, but not changes in consumption. In this context, purchases of gold by Indian households may be seen as savings means rather than a consumption good.

For the sake of completeness, it is appropriate to discuss why households would not save cash. It is argued (Banerjee, Duflo, 2007) that people living on less than $1 per day do not save cash because of fears of theft and impulse spending. The transaction costs of selling gold may be sufficient to prevent people from cashing in gold for secondary needs such as drinking, smoking or gambling, the main vices of people living on less than $1 per day (Banerjee, Duflo, 2007). As such gold and jewellery provide an alternative to mitigate against the risk of impulse spending. Another reason for holding gold as savings is its easy storage and transportability. Research in coastal Bangladesh (Shitangsu, Routray 2010), has shown that low income households invest in jewellery because the area floods

frequently and jewellery is easy to store and transport when relocating at short notice.

c. Cultural implications: the case of dowries

An alternative hypothesis, for high gold expenditure in India, is culturally influenced preferences (CIP). One of the main cultural influences on annual household expenditure is wedding celebrations, including dowries. Weddings are public events that signal status within the local society. Rao (2002) has shown that Indian villagers demonstrate “civic individuality” and condition their social success and position on their interactions with their community. He uses data from south India to show that expenditure is influenced by how individual identity is shaped within the context of social recognition and status maintenance. Households take such decisions under extreme poverty and risk, as a coping mechanism; by maintaining their position in the social networks, they signal their social status and improve the marriage prospects of their daughters, for example. Caldwell & Reddy (1988) found that in the southern state of Karnataka, dowries have been increasing substantially for several decades and by 1988 were on average six times the annual income of a family. Arunachalam (2008) finds that in Tamil Nadu, once agricultural households cover their household needs any extra income goes towards daughters’ dowries. In addition, grooms who cannot offer financial security demand dowries of cash and jewellery. These results highlight the importance of a good dowry and the pressure for parents to spend beyond their means. Duflo & Udry (2004) find that dowries give wives bargaining power in consumption decisions. Hence jewellery, as part of a dowry, is seen as something that can be used at time of emergency, be sold or mortgaged to buy land or fertiliser, or pay for kids’ education, medical bills etc. Religion also drives dowry expenditure. It has been found (Khamis et al, 2012) that Hindu and Muslim households traditionally spend more on dowries than other religious groups in India.

d. Intra-household Bargaining Power

The third hypothesis examined in this paper is that demand for gold is largely determined by intra-household bargaining power (IHBP). Broadly speaking, the hypothesis states that men and women prefer different types of assets and the actual portfolio of assets owned will be determined by the relative bargaining power of husbands and wives. The importance of intra-household bargaining power has been shown by Klawitter (2010), who found that the wife's bargaining power over finances in lower income households directly affects whether a family has a bank account. She also argues that households should not be considered as one unit for finance and savings purposes, but rather each member's access to finance must be treated separately. A study (Ashraf, 2009) conducted with data from Philippines shows that when the wife makes household decisions, matters such as children's education, debt repayment or savings are prioritised. In contrast, husbands seem to hide their income or use it for personal spending on gambling, alcohol or cigarettes, if their decision making is private. If decision making is done jointly between husband and wife, women tend to take over the whole income and it is found that women as decision makers tend to save and invest more and household debt is more likely to be repaid. By determining the wife's bargaining power within the household, one can assess the family's resource allocation and vulnerability in times of death, health impediment or separation from the main income earner.

There are various instruments to measure wife's intra-household decision power. Applied work (Sinha 2012, Antman 2014, Lenjiso et al 2016) suggests that there is correlation between the wife being employed and having increased decision-making power alongside her husband. Individual financial power contributes to greater bargaining power over the choice of how to allocate funds. Instruments often used in applied work to measure the wife's bargaining power are the difference in wages compared to her husband, or a binary variable showing whether the wife works, or the wife's education level compared to that of her husband's. Alternative empirical findings explaining the wife's intra-household power, not related to employment, are found to stem from cultural aspects, such

as recognising women's work within the household that leads to some transfer of funds from husband to wife (Sinha 2012), or the wife's access to a larger inheritance that seems to improve her marriage market negotiations (Amaral, 2014). The HCE data used for this paper, allows to test the wife's intra-household bargaining power hypothesis, using the difference in education between spouses. The data does not include information on whether the spouse works and what her earnings are, not information on access to inheritance.

3. Data

Data for this study comes from the National Sample Survey of India, “Household Consumer Expenditure”, Round 66, henceforth HCE. The Survey was conducted between 01 July 2009 and 30 June 2010. The survey covers all States and Union Territories of India and was conducted in four separate sub-rounds. The dataset is cross sectional and contains observations from 100,854 households and 468,551 individuals. HCE is generally regarded as providing accurate and reliable information about a range of household characteristics. It is used for official welfare calculations such as poverty lines. Round 66 in particular, offers consumption figures for both 30 days and 365 days and is generally believed to be more accurate compared to earlier rounds (Deaton & Kozel, 2005).

In each of the four sub-rounds an equal number of sample villages and town blocks have been sampled to ensure a uniform spread of sample units over the entire survey period. The First Stage Units (FSUs) are the 2001 Census villages for the rural sector and Urban Frame Survey (UFS) blocks for the urban sector. The allocation between rural/urban also follows the 2001 Census with double weight assigned to the urban sector, subject to the restriction that the urban sample size in bigger states (i.e.: Maharashtra, Tamil Nadu) should not exceed the rural sample size. The minimum number of FSUs/UFSs is 16 per state for both rural and urban. The ultimate stage units (USU) are households in both the sectors. In case of large FSUs/UFSs (i.e. larger than 1200 people) one intermediate stage of sampling is the selection of two hamlet-groups (hgs)/ sub-blocks (sbs) from each rural/ urban sector (Household Consumer Expenditure Survey, 2010).

The sample survey includes all members of households within the selected hamlet/sub-block. A household is defined as ‘a group of persons usually living together and taking food from a common kitchen, including members that stay away from home for less than six months.’ Households residing in open spaces, roadside shelters and regularly in the same place are also included, under the

term ‘no dwelling’. Older people in care homes and students in ashrams are included as single-person households. Finally, if people living in a hostel/hotel regularly pool income to spend on food and other consumer goods, they are treated as one household and are included in the survey. The following are excluded: prisoners, indoor patients in hospitals and nursing homes, floating population with no normal residence, foreign nationals, residents of military barracks and orphanages. Visitors and guests in households are also excluded.[7]

This dataset has several advantages for this paper, compared to other Indian datasets. It is comprehensive in terms of household consumption and includes expenditure on gold jewellery. These consumer goods do not otherwise appear in the Indian Census questionnaire. It also provides all-India expenditure on gold jewellery, while other individual surveys (Rao 2002, Desai & Andrist 2010) either look at wedding-related consumption on a village level or ignore it completely. Secondly, it measures all goods and services consumed within the household, even where the goods have not passed through official markets. This is important because in developing countries a high proportion of economic activity is not normally measured, because it occurs within the household or on black or grey markets. Household consumption is likely to provide a better indicator of total income than traditional income measures such as GDP per capita. Alternative data sources, such as the Census, ask about formal income but not actual consumption. In addition, the HCE data also contain a number of useful control variables for this study, such as Household Consumer Expenditure on goods and services during the reference period[8], value of goods and services produced and consumed within households during the reference period, value of goods and services received by households as remuneration in kind, value of goods and services received as social transfers in kind, from government and from non-profit institutions and background information on the composition of the households, such as age, gender, education, caste and religion.

[7] See Appendix A.1 to Chapter II for “size of a household” and “type of a household” definitions.
[8] For second hand items the value of consumption is deemed as the purchase value. Similarly, for home produced/exchanged goods the value of consumption is the local retail price during reference period. Consumption of durables is deemed as the time of purchase.

Gold expenditure might be under-reported in the HCE for several possible reasons: firstly, this survey only accounts for cash or credit card purchases and not for exchange in gold. Secondly, there is a high incidence of tax avoidance, corruption, a parallel non-transparent economy and risk of theft, which all lead households to underreport the value of their jewellery and gold. Finally, an issue with using cross-section data instead of panel data is that data and effects are observed ex-ante in regard to future income and consumption and treated as if they were ex-post. Highly fluctuating income is not a good indication of permanent income, but the data includes the direct question: “are you a regular income earner?” that is used as a more accurate income indicator. These factors make under-reporting of gold expenditures more likely, although it is unclear ex ante whether the degree of under-reporting is likely to be higher for some types of households than others. This is expected to have a downwards bias on the coefficients on gold expenditure, so the effects that are estimated in the analysis are lower bounds of the true values.

Data of interest

Table 2.1 presents a list of the variables included in this study, along with mean, standard deviation and definitions. The importance of these variables with respect to the main hypothesis of this paper (PIH) is explained in the theoretic framework. Each household has been questioned about purchase and ownership of gold ornaments, silver ornaments, jewels & pearls and other ornaments.[9] Among all households questioned, 87,682 households answered the questions in relation to jewellery expenditure, purchased in the 365 days prior to the survey. These households are the group of interest.

[9] “Other ornaments” consists of costume jewellery and non-precious metals reported in the HCE. There are not included in my analysis.

Dependant Variable	Mean	SD	Description
Gold Expenditure (in rupees)	704.26	10,117.32	Household gold jewellery purchases for the last 365 days preceding the survey
K vector: Propensity to consume	**No of Hhs**	**% of total Hhs**	**Description**
Regular Salary: Yes	24,503	27.88%	*Is any member of the household a*
Regular Salary: No	63,379	72.12%	*Regular salary earner?*
Total Hh Consumption Excl. jewellery (in rupees)	77,455.21	65,381.4SD	*Household food & non-food, durables & non-durables*
U vector: Utility Vector	**mean**	**SD**	**Description**
HoH Age	46.38	13.17	*head of household age*
HoH Sex: Male	78,944	89.82%	*head of household sex*
	No. of Hhs	**% of total Hhs**	
HoH Religion			*Head of household religion*
Hinduism	67,290	76.56%	
Islam	10,872	12.37%	
Christianity	5,647	6.43%	
Sikhism	2,113	2.40%	
Jainism	277	0.32%	
Buddhism	899	1.02%	
Zoroastrianism	17	0.02%	
Others	775	0.88%	
Yp Vector: Permanent Income	**No of Hhs**	**% of total Hhs**	**Description**
Education			*general education level of HoH*
Illiterate	22,334	25.41%	
Primary	19,590	22.29%	
Middle & Secondary	26,403	30.04%	
Higher secondary	7,510	8.54%	
Diploma/certificate course	1,272	1.45%	
Graduate	8,023	9.13%	
Postgraduate and above	2,760	3.14%	
Education Difference between spouses			Husband's Education (years) - Wife's Education (years)
Wife more educated	7.985	9.80%	
Equal level of Education	31,701	38.94%	
Husband more educated	41,730	51.26%	
Household Source of Income			
Self Employed	27,041	30.77%	*Single source of income contributing*
Agricultural/Regular Labour	19,206	21.85%	*50% or more to household's income*
Casual Labour	13,203	15.03%	*during the 365 days preceding*
Self-employed in Agriculture	15,172	17.27%	the date of survey
Others	13,248	15.08%	
Dwelling Ownership			*Type of home ownership (if any)*
Owned	83,665	83.12%	
Hired	13,506	13.42%	
No Dwelling Unit	187	0.19%	
Others	3,293	3.27%	
Sector			*Household location*
Rural	52,410	59.63%	
Urban	35,483	40.37%	
Landownership			*Household owns any land?*
Landowner: Yes	77,712	88.42%	
Landowner: No	10,173	11.58%	

Table 2.1: Summary Statistics of variables used in the econometric model

Table 2.1 shows that only a third of the households have regular income and a quarter have an illiterate head of household, while the majority own their home and some land. Figure 2.3 shows significant dispersion in expenditure across different geographic zones. Somewhat surprisingly, neighbouring states often have quite different levels of expenditure. Maharashtra on the west coast of India is at the lowest band, with expenditure of less than 1,000 rupees; directly south, Karnataka is two bands higher with ten to twenty times as much expenditure. The highest expenditure (dark purple) is observed in Lakshadweep, a group of islands off the west coast, and in Pondicherry, a city-state on the east coast.

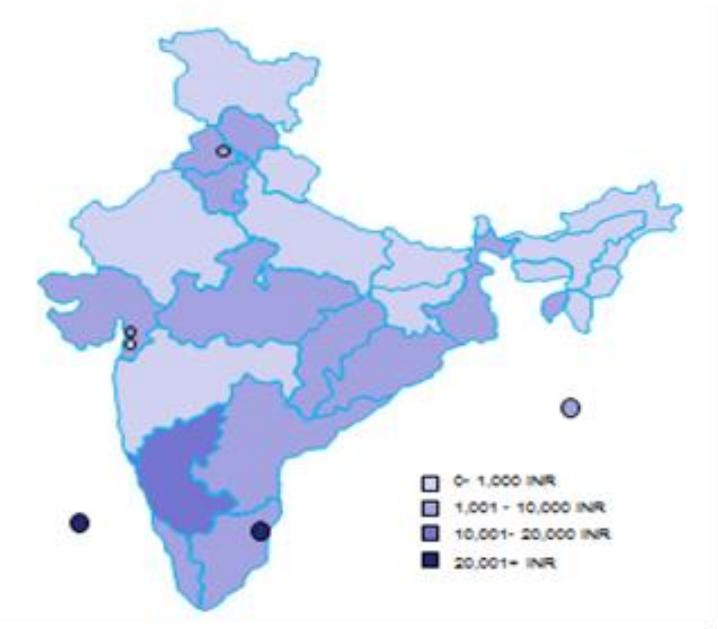


Figure 2.3: Mean gold expenditure by State– NSS Data Round 66

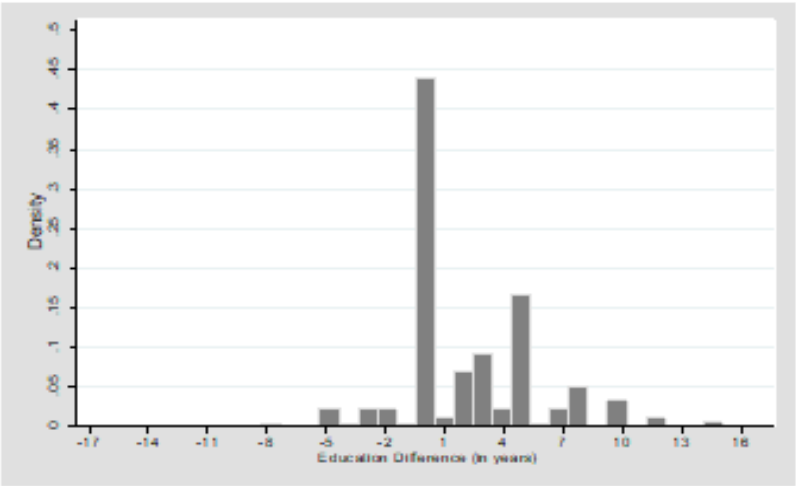


Figure 2.4: Histogram of education difference amongst Indian married couples (husband's education – wife's education) Source: NSS Data R66 analysis

To address the Intra-household Bargaining Power hypothesis, I have created the variable “Education Difference “, which is the husband’s years of education minus the wife’s years of education. The distribution of this variable is shown below in Figure 2.4. The frequency is highest around zero, which indicates that most couples have the same level of education, otherwise, the head of household tends to be more educated than the spouse. Only households with one wife are used in this case because in households with more than one wife, it is difficult to assess which wife has the most bargaining power. The data contains 729 households with multiple wives, which were dropped for the analysis.

4. Engel Curves

I examine Indian households' expenditure behaviour towards normal goods as a benchmark to compare against their behaviour with regard to gold jewellery expenditure, which is typically perceived as a luxury good. I use Engel curves to give an insight into Indian household spending on particular goods, depending on household income. This nonparametric technique enables a first estimation of the dependence of one variable on another variable, without imposing a functional form a priori. To test the Permanent Income Hypothesis, it is important to determine whether poorer households treat expenditure on gold jewellery as a luxury. Equation 4 describes a simple generic form of how expenditure q on any given good i depends on household wealth y and household-specific characteristics z. Household wealth z is usually measured as log annual household income or log annual household expenditure (Jacoby G., 2000). In this case I use the latter.[10]

$$q_i = g_i (y, z) \qquad (4)$$

Engel's Law states that the poorer the family, the larger the share of the budget spent on food (Engel 1857, Chai & Monetta 2010). For this reason, food is a normal good but also a necessity for poorer households; it therefore provides a good robustness check with which to assess spending on gold. Plotting food expenditure over total household expenditure would result to a concave line, because as an essential good, food expenditure does not tend to increase proportionately with income. On the contrary, plotting expenditure on a luxury good against total household expenditure would result to a convex curve, because expenditure on a luxury good would increase as overall income increased. Although one of Engel's initial assumptions was that all humans have the same basic needs, this assumption has been broadly challenged (Chai & Monetta, 2010), because the composition of expenditure on goods and services with the exception of very few goods such as food, depends on demand patterns of the population. Household specific characteristics vary considerably across

[10] Total annual household expenditure excluding rent and taxes paid.

individuals and the income effect for individuals at different points in the wealth distribution must be fully captured. An issue that arises however, when classifying households on the wealth or total consumption scale, is trying to decide the bin width of expenditure. To avoid this issue, households' main source of income rather than levels of expenditure is used, to distinguish between various household expenditure patterns.[11] Figure 2.5 shows the relationship between food expenditure over log total household expenditure for each household group, according to their primary source of income. Results are consistent with Engel's Law, whereby food expenditure is capped no matter how wealthy the household (Zimmerman 1932). Labour households, both "agricultural" and "casual" seem to have lower food expenditure altogether, whereas self-employed in agriculture and regular salary earning households exhibit the highest food expenditure, compared to other types of households. These expenditure patterns are consistent with Engel's Law, as labour households have a lower total expenditure in relation to the self-employed in agriculture and regular wage households. Figure 2.6 demonstrates household expenditure on gold jewellery in relation to household log total expenditure. It is clear that gold is not treated as a luxury good, as consumption does not seem to rise steeply with overall expenditure, particularly for lower and mid wealth households. Self-employed and regular salary households seem to drive higher demand for gold, as in the case of food expenditure. This reinforces the initial hypothesis that gold is treated as something other than a luxury amongst Indian households, particularly the less wealthy ones. As Engel (1836) suggested "it is difficult to say where useful consumption ends and luxury begins, since luxury is a relative, and not an absolute, concept. It would be a grave mistake to define luxury as the unproductive use of material goods. Luxury is possible in all spheres of consumption." To overcome this issue, parametric analysis using OLS regressions follows, where expenditure on food is similarly treated as a benchmark for expenditure on gold as a robustness check.

[11] Source of income classification, as per the Indian Household Consumer Survey questionnaire 2009-2010

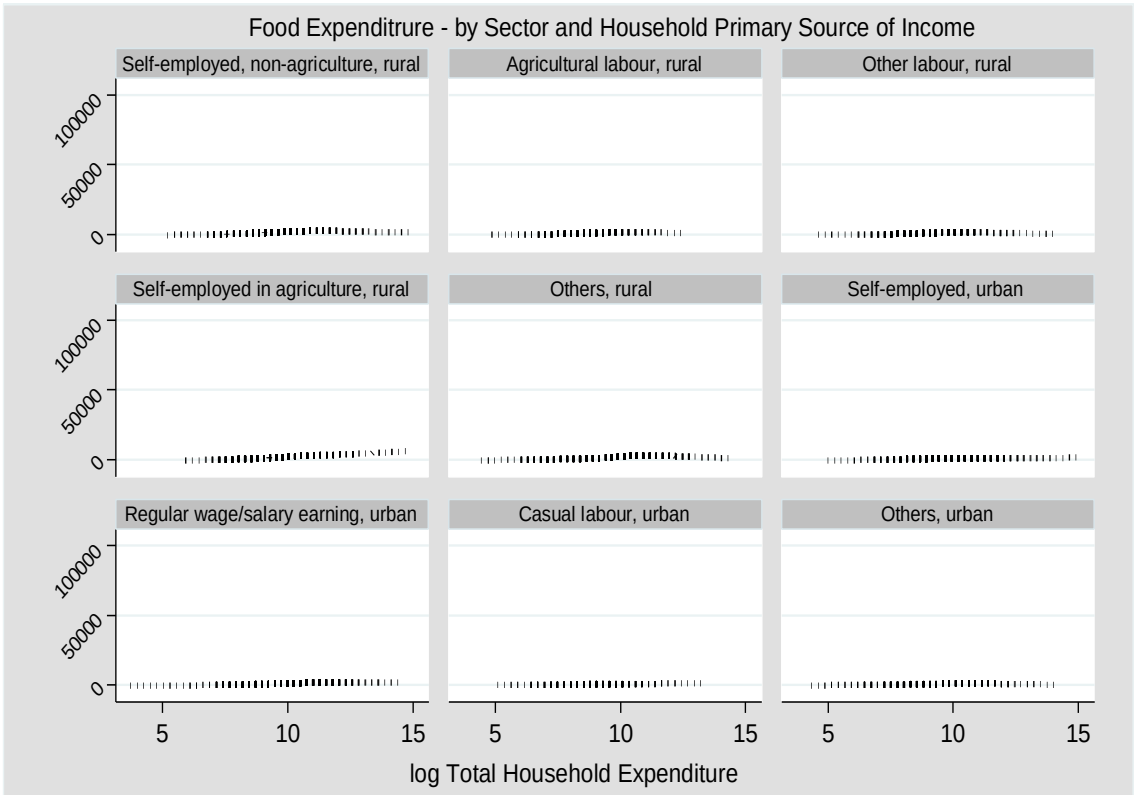


Figure 2.5: Non-parametric representation of total food expenditure (in rupees) and log total household expenditure (in rupees), by household income source and sector

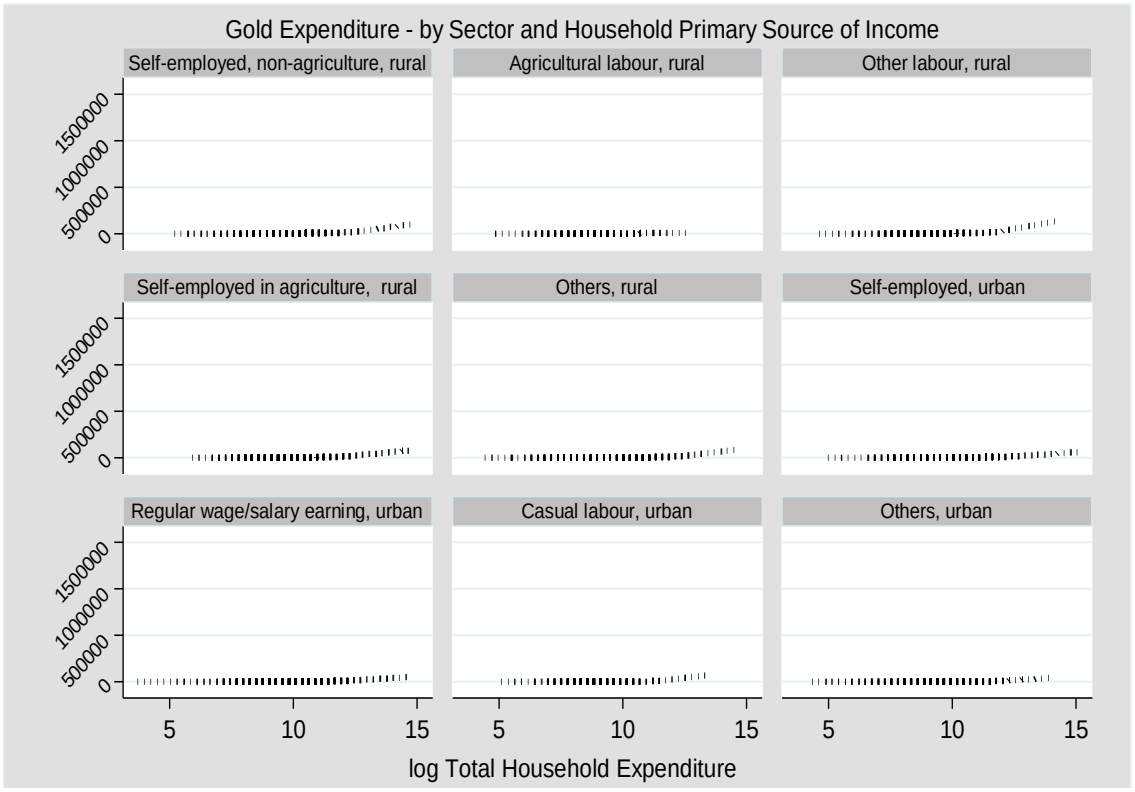


Figure 2.6: Non-parametric representation of total gold expenditure (in rupees) and total household expenditure (in rupees), by household income source and sector

Food is confirmed as a normal good under other aspects of household composition, such as male and female head of household. Figure 2.7 shows that for same levels of overall expenditure, male-headed households spend slightly more on food than female-headed ones. Gold expenditure in figure 2.8 is also treated as a normal good for the lower and mid consumption households, however, expenditure on gold for male-headed higher-wealth households is higher.

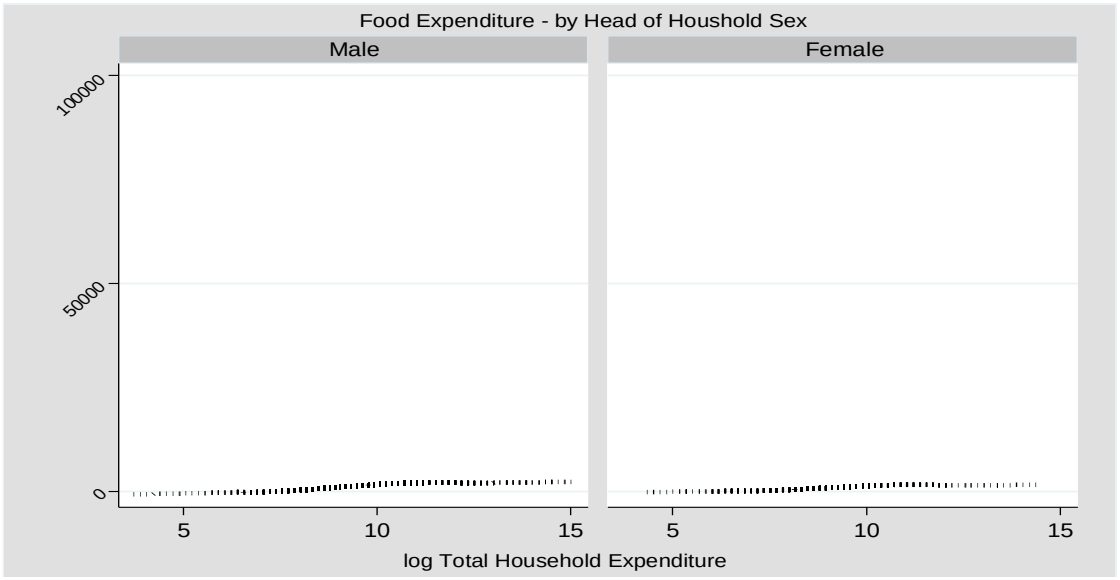


Figure 2.7: Non-parametric representation of total food expenditure (in rupees) and log total household expenditure (in rupees), by head of household sex

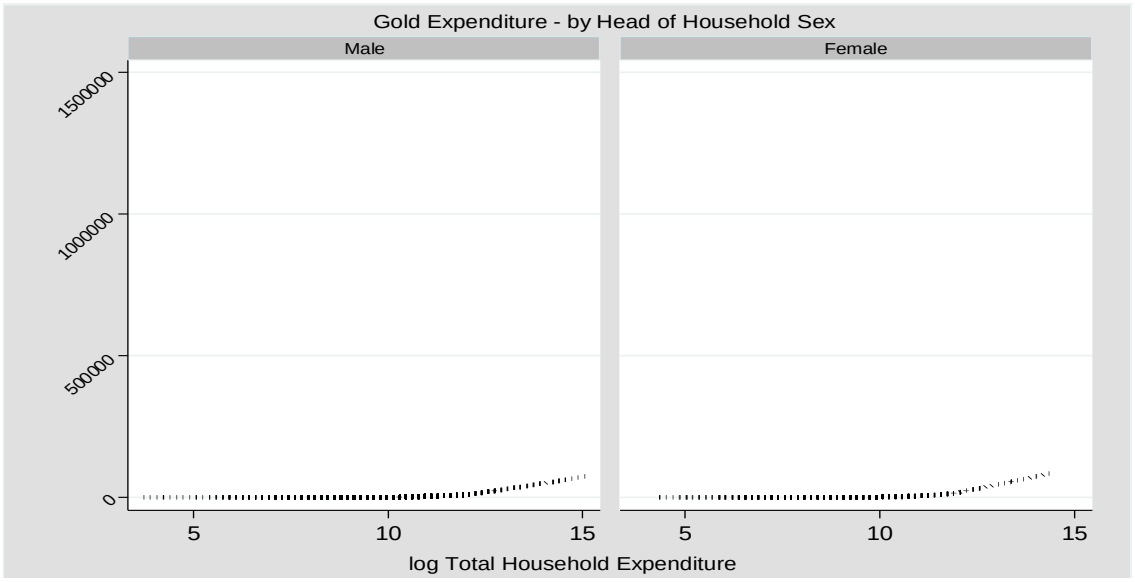
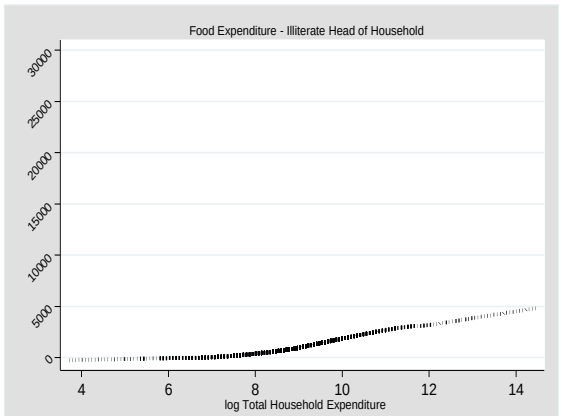
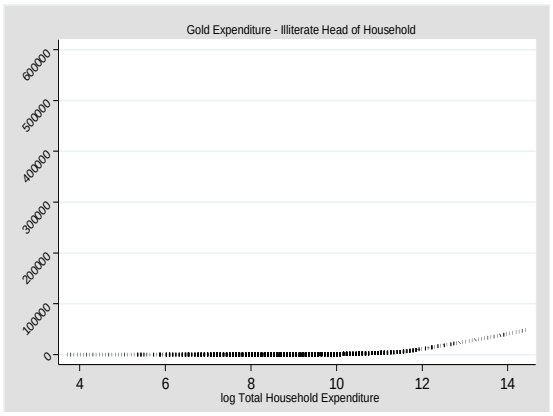


Figure 2.8: Non-parametric representation of total gold expenditure (in rupees) and log total household expenditure (in rupees), by head of household sex

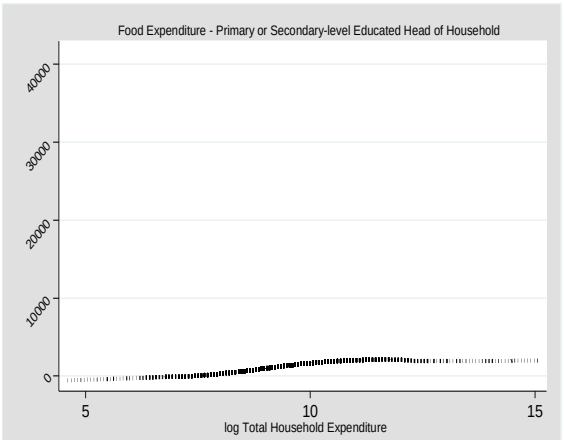
Figure 2.9 summarizes food and gold jewellery expenditure across different types of households, dependent on the head of household's education level. Food appears to be a normal good, as the slightly concave lines demonstrate for households with primary, secondary and graduate educated head. Households with an illiterate head tend to spend more on food as overall expenditure increases, this is explained by the fact that these also tend to be the poorest households and food forms part of the majority of their expenditure, as a necessity. Expenditure on gold does not appear to be convex, hence does not immediately appear to behave as a luxury good. Expenditure on gold jewellery remains consistent, as overall expenditure increases, while it only increases alongside overall expenditure at the higher end of total expenditure distribution. The explanation for why illiterate and graduate households treat gold as a normal good is not necessarily the same for both levels of education. As the literature suggests, illiterate households might prefer gold as an alternative to dealing with banks, which involves signing contracts and interacting with bank staff. The highly educated households might recognise the value of gold as an alternative investment, as it has held its' value against inflation as discussed in figure 2.2.

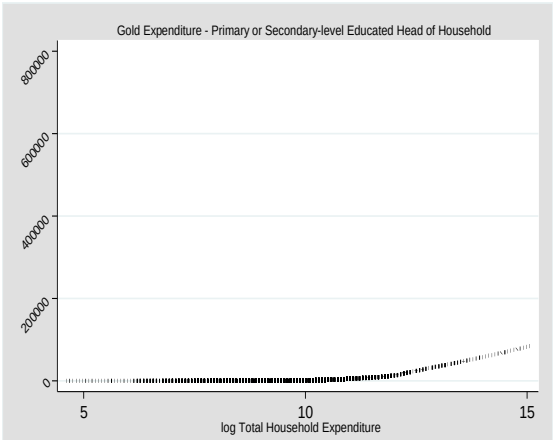
Overall, the Engel curves included in this chapter, demonstrate that for the majority of households with expenditure on gold in the year of the Indian HCE, gold is treated as a normal good not a luxury good. This seems to be particularly true of households in the lower and middle of the total household expenditure distribution, as well as for those with agricultural or casual labour as their main source of income. All households exhibit similar behaviour towards gold expenditure, regardless of the head of household's education level.



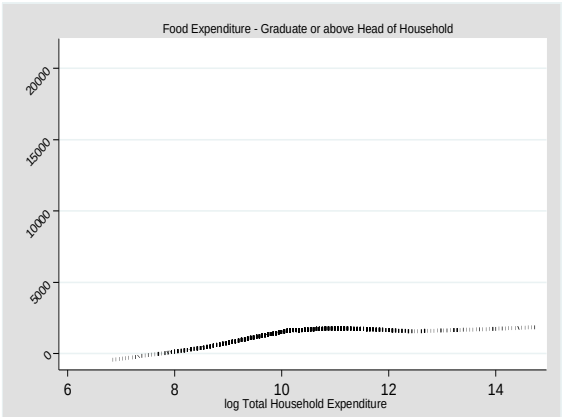


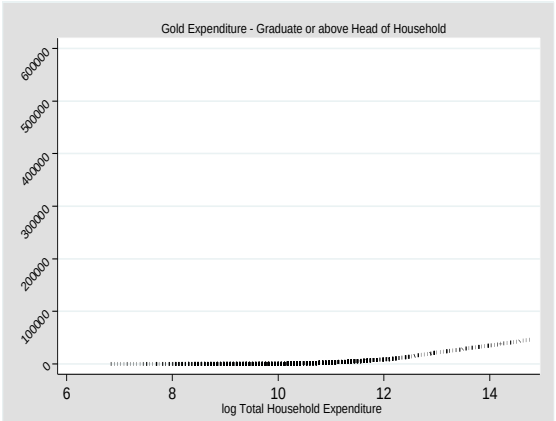
Food- Illiterate HoH *Gold – Illiterate HoH*





Food – Primary & Secondary literate HoH *Gold – Primary & Secondary literate HoH*





Food – Graduate HoH *Gold – Graduate HoH*

Figure 2.9: Non-parametric representation of log total household expenditure (in rupees) and food expenditure (left) and gold (right), in rupees, for various education levels of the head of household

5. Econometric Model

Why do Indian households hold wealth in the form of gold? I examine the determinants of the value of household gold purchases. The independent variables capture the three main hypotheses discussed in Section II.

a. Permanent Income Hypothesis

The econometric specification used to analyse gold demand per household is:

$$G_h = aK_h + \beta U_h + \gamma YP_h + \delta + eh \qquad (5)$$

Where G_h is household gold purchases expressed in rupees. Consumption per household is observed for the previous 365 days. K_h is regular income or alternatively an income proxy, such as consumption. The data does not contain an income variable, so I employ the consumption-based approach used by Filmer and Pritchett (2001) and McKenzie (2005). The Total Consumption variable is made up of expenditure on household food and non-food, tobacco, intoxicants, fuel and light, medical, entertainment, rent, education, durables and non-durables. The PIH states that it is the individual's forecast of permanent income that matters for consumption, not the level of current income. To capture this, the regression includes YP_h , a vector of permanent income variables that expresses the household specific characteristics that determine long term income inflows. These include: head of household education level, household type (determined by primary income source), a location dummy for urban/rural, and state and dummy variables for land and home ownership. In addition, the HCE includes a question on whether the head of household has regular employment and I include this to capture the possible extent of forecasting error concerning future income. U_h is a vector of variables capturing household specific characteristics that affect consumption including age and sex of head of household and number of members per household. δ is a constant.

b. Cultural Influence Hypothesis: the case of dowries

The regression model is modified to add religion in the utility vector, as a household-specific characteristic. The religion dummies capture different dowry traditions across different religious groups. Hindus tend to provide dowry in the form of jewellery, clothes and household furnishing for their daughters while Muslim grooms tend to provide their future brides with cash dowries (Rao 2001, Caldwell & Reddy 1988). It has been found that Islamic traditions have been affected by Hindu traditions in India, hence Muslim fathers are now providing jewellery dowries for their daughters too.[12] The regression uses a set of religious dummy variables (Hindu and Muslim) as control variables, to check for specific effects of dowries. Desai and Andrist (2010) find that average marriageable ages for girls across India are between 14- 25 with the mean age just below 20. To capture the potential effect of dowries on gold purchases, I have created a variable for the number of unmarried boys and girls within the household aged 14 to 25. Hence, equation (5) is amended to include a cultural variable C_h reflecting religion and unmarried children per household and becomes:

$$G_h = aK_h + \beta U_h + \gamma YP_h + zC_h + \delta + eh \qquad (6)$$

c. Intra-household Bargaining Power

To test the bargaining power hypothesis, I have created "Education Difference" that measures the difference between the husband's and the wife's education levels in years.[13] I have included only married couples with one wife, because in households with multiple wives it would be difficult to determine bargaining power amongst the wives. Thus equation (5) is amended to include a bargaining power variable $\mathbf{B_h}$:

$$G_h = aK_h + \beta U_h + \gamma YP_h + xB_h + \delta + eh \qquad (7)$$

[12] Islamic dowries practise of "Mahr" defined by Oxford Islamic Studies. Available at: http://www.oxfordislamicstudies.com/article/opr/t125/e1390 [February 2014]

[13] In the HCE education is reported as the highest level attained. Education levels for the purpose of this study are assigned the following numerical values: Not literate 0, Primary: 5, Middle: 8, Secondary: 10, Higher Secondary: 12, Diploma: 13, Graduate: 15, Post-Graduate: 16

d. Coefficients discussion

Given the three hypotheses tested in this paper, it is helpful to sum up the expected effect of each variable, in particular as described in Table 2.2. Consumer theory holds that the propensity to consume out of transitory income is positive, therefore the expected effect of having regular income is positive. On the other hand, Permanent Income Hypothesis suggests that irregularity of income leads to higher purchases of gold to compensate for future uncertainty, hence the expected effect would be negative. Finally, the Cultural Hypothesis suggests that regardless of household current income or regularity, members spend on gold to signal social status.

	Traditional Consumer Theory	Permanent Income Hypothesis	Cultural Hypothesis	Intra-Household Bargaining Hypothesis
K vector: Propensity to consume				
Regular Salary: Yes	+	-	?	n/a
Total Hh Consumption excl. jewellery (in rupees)	+	n/a	n/a	n/a
U vector: Utility Vector				
HoH Age	+	n/a	+	n/a
HoH Sex: Male	-	n/a	-	?
HoH Religion				
Hinduism	n/a	n/a	+	n/a
Islam	n/a	n/a	+	n/a
Yp Vector: Permanent Income				
Education				
Iliterate	-	+	n/a	+
Education Difference				
Husband more educated	n/a	n/a	n/a	-
Household Source of Income				
Casual Labour	-	+	n/a	n/a
Dwelling Ownership				
Owned	+	-	+	?
Sector				
Rural Households	-	+	+	+
Landownership				
Landowner: Yes	+	-	+	?
Key: + positive effect, - negative effect, ? Unclear effect/no literature to support either case				

Table 2.2: Summary of expected coefficient effects for all hypotheses

Age of head of household is expected to have a positive effect in the case of traditional Consumer Theory as well as in the Cultural Hypothesis, as increased wealth usually comes with age, hence increased expenditure on gold. Moreover, in the case of the Cultural Hypothesis spending on gold probably peaks as the head of household reaches middle-age, when spending on children's weddings and jewellery takes place. Assuming the head of household is male, this is also when he has the resources to buy his wife expensive jewellery for festivals like Diwali, Eid, Karwachauth and so on. The literature suggests that women prioritise savings, so under the Permanent Income hypothesis a female head of household would spend a larger proportion of total household expenditure on gold, compared to a male headed household (Klawitter 2010, Ashraf 2009).

Religion, as discussed above plays a role to gold holdings as it has been found that Hindu households mainly favour gold jewellery and lately so do Muslim ones, especially at times of weddings. Therefore, the Cultural Hypothesis predicts that Hinduism and Islam will have a positive effect on gold expenditures.

Illiterate and low-educated households typically have lower incomes and wealth, so their expected expenditure on gold would be low under traditional consumer theory. The PIH suggests the opposite: that illiterate households have less access to the banking system and consequently they will save using gold. Thus, the coefficient on illiterate head will be positive. This off course does not imply that under the PHI higher educated households do not treat gold as a luxury. According to the intra-household bargaining power literature, the more educated a woman the more empowered she is within the household. In households where the wife is more educated than her husband, she will also have more bargaining power over expenditure and therefore, the co-efficient on gold expenditure will be positive.

The Permanent Income hypothesis assumes that gold is used to hedge against future uncertainty; hence it is the vulnerable households such as those headed

by informal works or illiterates, that spend more on gold. Consumer Theory suggests the opposite: that households with regular earnings such as self-employed and salaried workers spend more on gold jewellery. The cultural hypothesis does not depend on income source, as it looks at household behaviour in the context of community and how gold signals status regardless of the household's primary income source. Rao (2002) found that rural families spend money on festivals, where women wear gold and silver jewellery simply for entertainment, because in rural areas there is limited access to movie theatres and television sets. Therefore, the coefficient for rural households would be expected to be positive under all three hypotheses tested.

Dwelling and land ownership are treated similarly under consumer theory, the wealthier the household the more it will spend on luxuries such as gold. The same applies for the cultural hypothesis. The PIH on the other hand suggests that land and home owners can use their property or land as collateral for a bank loan in times of need, hence the effect on gold expenditure is expected to be negative.

6. Results

Dependant Variable *Gold Expenditure*	**1. Permanent Income Hypothesis**	**2. Cultural Hypothesis**	**3.Intra-household Bargaining**	**(1)+(2)+(3)**
Rural Sector	288.486	320.793	293.944	328.984
	*(4.83)***	*(5.36)***	*(4.91)***	*(5.48)***
State: Orissa	330.856	274.836	331.009	273.671
	*(2.44)**	*(2.02)**	*(2.44)**	*(2.01)**
Landowner	-174.292	-143.08	-175.928	-145.231
	(-1.35)	*(-1.11)*	*(-1.36)*	*(-1.12)*
Dwelling Owned	-79.837	-62.824	-84.059	-68.863
	(-0.67)	*(-0.53)*	*(-0.70)*	*(-0.58)*
Regular Income (Yes)	-391.196	-346.523	-387.967	-341.446
	*(-6.12)***	*(-5.41)***	*(-6.06)***	*(-5.33)***
Total Household Expend.	0.073	0.074	0.073	0.074
	*(87.47)***	*(88.06)***	*(87.32)***	*(87.90)***
Total Household Expend^2	6.49	6.16	6.52	6.19
	*(12.13)***	*(11.48)***	*(12.17)***	*(11.54)***
HoH Illiterate	176.546	141.053	133.801	78.973
	*(2.67)***	*(2.12)**	*(1.84)*	*(1.08)*
Income Source - Labour	490.176	471.829	486.003	465.401
	*(7.21)***	*(6.94)***	*(7.15)***	*(6.84)***
Male HoH	-490.263	-481.647	-540.056	-553.826
	*(-5.68)***	*(5.57)***	*(5.78)***	*(5.92)***
HoH Age	-5.687	-4.081	-5.429	-3.709
	*(-2.70)***	*(-1.93)*	*(-2.57)**	*(-1.75)*
Religion: Hinduism		700.373		920.06
		*(8.23)***		*(8.34)***
Religion: Islam		908.73		920.05
		*(8.25)***		*(8.34)***
Hh with Unmarried Boys		-178.267		-177.733
		*(4.77)***		*(4.75)***
Hh with Unmarried Girls		-130.985		-131.045
		*(2.91)***		*(2.91)**
Education Difference			-87.982	-126.883
(Husband's Educ.> Wife's Educ.)			*(1.40)*	*(2.01)**
Constant	-317.884	-1001.415	-220.478	-872.436
	*(-2.25)**	*(-6.23)***	*(-1.40)*	*(-5.04)***
Observations	100,521	100,518	100,521	100,518
R-squared	*0.21*	*0.21*	*0.21*	*0.21*
Absolute value of t-statistics in parentheses				
* significant at 5% level; ** significant at 1% level				

Table 2.3: OLS results for Gold Expenditure (dependant var.)

Ordinary least squares (OLS) regression results, based on equation (5) of the econometric model, are presented in Table 2.3. The overall regressions are strongly significant and there is robust evidence that the PIH explains high levels of gold expenditure. Despite the potential problem of under-reporting of gold jewellery purchases, which would bias the coefficients towards zero, most of the

coefficients in all specifications have the expected signs and are statistically significant. Column (1) includes results testing the main hypothesis, based on estimating the determinants of demand for gold jewellery on household level. There is support within the results for the income uncertainty explanation for gold purchases, raised within the PIH. There are positive and significant coefficients on the variable for vulnerable households, i.e. those with Illiterate head, casual or agricultural labour as the main source of income and irregular salary earners.[14] Gold purchases by casual labour and irregular earning households, two groups usually vulnerable to economic shocks, are used to deal with inconsistent income flows that lead to future uncertainty. These particular types of households have limited access to formal financial institutions and thus require alternative means to mitigate against income and survival risk. This is consistent with the econometric analysis section of this paper, showing that transitory income is expected to have little effect on consumption expenditure, but does influence asset stocks such as savings in the form of gold.

Education also seems to play an important role, as it is households with an illiterate head of household that favour gold purchases, suggesting a reluctance to deal with formal institutions such as banks. The results also reinforce the initial findings, provided by the Engel curves, showing that casual labour and illiterate households appeared to be treating gold as a normal good rather than a luxury. Rural households and households situated in the state of Orissa, a state with low total household consumption otherwise, also have higher gold consumption. Rural households might lack conventional banking facilities due to geographic poverty traps and thus may use gold as an alternative financial product. On the other hand, households that own land and their dwelling spend less on gold. Households who own land may be able to use it as collateral and therefore require fewer alternative savings options.

[14] See Appendix A.2 to Chapter II for a summary “Total Consumption” Table, according to main Income Source

OLS results based on the modified regression model, equation (6), including religion as a determinant of dowry-related, culturally influenced household behaviour is presented in column (2). The results show that religion plays a role in the overall demand for gold with Muslim and Hindu households spending more on gold than Christian or Buddhist ones. This is consistent with the literature, which shows the effect of religion on social behaviour and consumption patterns. The coefficient having either unmarried boys or girls in the household is negative, indicating limited support for the alternative theory based on dowry expenditure. Regression results adding the “education difference” variable, as per equation (7), are presented in Column (3). Expenditure on gold jewellery seems to drop as the husband’s education level overtakes his wife’s education level. These results are not significant, so there is no support for the IHBP hypothesis.

7. Food Consumption as a Robustness Check

Dependant Variable *Gold Expenditure*	**1. Permanent Income Hypothesis**	**2. (1)+(2)+(3)**
Rural Sector	497.421	479.08
	*(41.33)***	*(40.73)***
State: Orissa	922.89	1080.39
	*(33.71)***	*(40.42)***
Landowner	109.929	77.036
	*(4.22)***	*(3.04)***
Dwelling Owned	192.879	159.417
	*(8.00)***	*(6.80)***
Regular Income (Yes)	336.957	294.346
	*(26.17)***	*(23.44)***
Total Household Expend.	0.0053	0.0046
(excluding Food)	*(31.56)***	*(28.18)***
Total Household Expenditure^2	-2.33	-2.02
(excluding Food)	*(21.49)***	*(19.13)***
HoH Illiterate	-149.774	-97.468
	*(11.24)***	*(6.79)***
Income Source: Labour	-484.502	-433.178
	*(35.41)***	*(32.49)***
Male HoH	371.397	412.921
	*(21.35)***	*(22.51)***
HoH Age	8.728	7.609
	*(20.57)***	*(18.28)***
Education Difference		76.188
(Husband's Educ.> Wife's Educ.)		*(6.17)***
Religion: Hinduism		-1133.669
		*(67.82)***
Religion: Muslim		-749.777
		*(34.68)***
Household with Unmarried Boys		121.517
		*(16.58)***
Household with Unmarried Girls		156.215
		*(17.70)***
Constant	-155.797	733.651
	*(5.48)***	*(21.64)***
Observations	100,521	100,518
R-squared	*0.08*	*0.13*
Absolute value of t-statistics in parentheses		
* significant at 5% level; ** significant at 1% level		

Table 2.4: OLS results for Food Expenditure (dependant var.)

Table 2.4 shows the results of a series of OLS regressions, using food expenditure as the dependent variable. The main results are consistent with food being a standard normal good, as the Engel Curve analysis suggested in part IV. Unlike in the gold regressions, the coefficients on regular income earners, landowners and dwelling owners are positive and significant. This is consistent with food being a normal and basic good, whose consumption increases with income. Unlike the gold regression, the coefficient on primary source of income: Casual labour is negative. These coefficients are as one would expect with a normal consumer good and suggest that the behaviour of Indian households is in line with standard models of consumption for most goods. This suggests that the coefficients in the gold regressions are not driven by anomalies in the Indian data or generally unusual patterns of consumption. This reinforces that high levels of gold purchases in vulnerable households are driven by factors outside the standard consumption models and thus provides further support for the hypothesis that gold purchases are driven by the lack of alternative savings mechanisms.

8. Conclusion

An important issue facing developing economies such as India is that informal workers and other non-regular earners, lack basic protection against income uncertainty. Sources of income uncertainty include random shocks to employment, health or domestic production i.e. weather disasters in agriculture, seasonal demand etc. The PIH implies that households facing high levels of income insecurity should have high savings to smooth consumption over time. However, poor households often do not have access to traditional financial services. This paper explores an alternative savings mechanism that is commonly used in rural India. Within the context of income uncertainty, as described in the PIH, I find that rural, non-regular income earning labour households have higher spending on gold jewellery.

There are two alternative hypotheses for high levels of gold expenditure in India. The first is cultural. Gold has an important role in Hindu and Muslim cultures and thus religion might be an important determinant for dowries. The second alternative hypothesis is that gold expenditure reflects intra-household bargaining power. Women are more likely than men to save (Duflo & Udry 2004, Ashraf, 2009) and women are likely to have stronger preferences for gold as a luxury consumption good than men. This implies that households in which women have relatively strong bargaining positions (i.e. those where wives have more education than their husbands) are likely to spend more on gold. This paper finds relatively little support for either hypothesis. Households containing unmarried boys and girls do not have higher gold expenditure, although religion seems to be a determinant of consumer behaviour. Hindu and Muslim households spend more on gold jewellery. I do not find support for the importance of dowries to gold expenditure, apart from the religious aspect.

Finally, education is a determinant of preferences. Households with an illiterate head of household have higher expenditures on gold jewellery. This supports the

theory that uneducated individuals in India see gold jewellery not only as an ornament but also as a store of wealth and collateral for informal loans. Finally, households in which the wives have more education than the husband do not have higher gold expenditure, all else equal, suggesting that intra-household bargaining power is not an important determinant of gold expenditures.

Chapter III

1. Introduction

India, the world's second largest country in terms of population, also contains many of the world's poorest people (World Bank 2017, Oxford Poverty & Human Development Initiative 2012). Using the World Bank's poverty line definition of $1.90 per person per day, India has the largest number of poor people in the world ahead of China, Nigeria, Bangladesh, and Democratic Republic of Congo.[15] It also has one of the highest concentrations of poverty along with Chad, Burkina Faso, and several other sub-Saharan Africa countries, Tajikistan; Iraq; Haiti; Cambodia; Afghanistan; and Pakistan.[16] Although poverty levels remain high, some recent evidence suggests that they may be in decline. Using the World Bank's poverty lines, Indian poverty has dropped from 46.1% of the population in 1993 to 31.4% in 2009 (World Bank, 2015). Other agencies find different levels of poverty. According to the Indian Planning Commission (2012), using poverty headcount ratio at national Indian poverty lines, poverty has fallen from 45.3% in 1993 to 29.8% in 2009. According to the Oxford Poverty and Human Development Initiative, poverty rates persisted at 41.3% in 2011/2012.[17]

Conventional economic theory suggests that they key to poverty reduction is economic growth (Ravallion 2001, Squire 1993). In recent years, Indian growth has been exceptionally high. In 2009, a year in which developed countries experienced a slow-down in growth rates, India experienced a GDP growth rate of 8.5%. This increased to 10.26% in 2010. An important question that arises is whether GDP growth led to significant decreases in Indian poverty. Amartya Sen (1988) states that "it's not the time-dimensional focus on growth, but the salience

[15] Top 5 countries with the world's largest numbers of population in extreme poverty, ranked by population size: India, China, Nigeria, Bangladesh, Democratic republic of Congo. World Bank Population Rankings, 2016.
Source: http://data.worldbank.org/data-catalog/Population-ranking-table, accessed 23 July 2017
[16] Global Multidimensional Poverty Index, Oxford Poverty & Human Development Initiative.
Source: http://www.ophi.org.uk/multidimensional-poverty-index/, accessed 23 July 2017
[17] OPHI Country Briefing 2017: India, Global Multidimensional Poverty Index, Oxford Poverty and Human Development initiative, University of Oxford, 2017

and reach of GDP and living conditions". In other words, he suggests that there might be a time-lag for GDP growth to have an impact on poverty and living conditions, if any at all. Kuznets (1955) also suggests that as a country is undergoing economic growth, primarily through industrialisation and moving away from agriculture, there is a lagged effect on reducing inequality, with a worsening in inequality observed at first. Kuznets' conclusions refer to inequality, while the analysis in this paper concentrates on poverty, however as a relative measure of poverty is used, some of Kuznets' conclusions are discussed later in the paper. There is a long-standing debate in the literature about the effects of economic growth on living standards and poverty. Deininger & Squire (1996) conclude that a 10% increase in GDP would lead to a 21.2% drop in poverty, in a study across 108 countries, including India. However, there is also substantial literature to show that GDP growth does not necessarily and immediately lead to poverty reduction. Adelman & Morris (1973) conclude that poor people "are hurt by growth". Datt & Ravallion (2011) suggest that the poor of India in particular, "have not benefited from the transformation", referring to the effects of high GDP growth rates observed in India from mid-1990s to 2010. A related issue is that the nature of economic growth may have an effect on the extent to which poverty is reduced. There is evidence supporting labour-intensive growth as a mechanism towards poverty alleviation (Ravallion 1995, Shultz 1998). This suggests that Indian states with industry-led growth would have experienced some of the greatest levels of poverty reduction. Another related issue is the role of government and whether it uses the additional income from growth to benefit the poor (Ravallion 2010, Ahluwalia, Carter & Chennery 1979). For example, poor people may particularly benefit from improvements in the general level of education and public health (Dreze & Sen, 2013). Despite the robust Indian GDP growth rates ranging between 4% and 10% for the period of 1995 to 2010, the share of government's final consumption expenditure has remained stable between 10% and 11% of GDP for the same period, the effects of which are discussed in extent in the next section.[18]

[18] See Appendix B.1 to Chapter III for full definitions of GDP expenditure components. Source: OECD (2009), National Accounts of OECD Countries 2009, Volume I, Main Aggregates, OECD Publishing, http://dx.doi.org/10.1787/na_vol_1-2009-en-fr

The differences in estimated poverty rates outlined above suggest that the methodology of measuring poverty is important to the observed outcomes. How poverty is defined, and the data and techniques used to set poverty lines, directly affect the estimated poverty rate. The methodology used to identify poverty also has important policy implications, for example where poverty lines are drawn will affect which households will receive subsidies or aid. Poverty can either be measured in absolute or relative terms. The most widely used absolute poverty threshold is the World Bank's $1.90 per person per day (henceforth pppd), using Purchase Power Parity (henceforth PPP) rates. The World Bank adopted the $1.90pppd threshold in 2011 in response to changes in global levels of inflation, food prices etc., having previously used $1.25pppd as the relevant threshold. The World Bank's methodology using Purchasing Power Parity rates is used widely as a measure of poverty for the purpose of international comparison (Ceh & Ravallion, 2010).

An alternative to the absolute poverty approach is to measure poverty relative to overall income levels. In the UK, European Union and much of the OECD the poverty line is set at 60% of median household income. Using 60% of the median household income addresses poverty issues mostly associated to the geographical, social and cultural contexts of daily life (Savadogo et all 2015). By construction, this methodology takes into consideration the relative median level of expenditure in the local area examined; as such, it indirectly reflects how local taxation impacts on expenditure for example, which is particularly relevant to Indian states, where taxation, schooling and health are tackled at a state rather than national level.

This paper addresses the following two issues. Firstly, poverty rates in India in 2009-10 are estimated using the two alternative methods for setting poverty lines. I estimate absolute poverty lines using an approach similar to that used by the World Bank. I convert Indian household consumption into US Dollars, using the World Bank's basket of goods for selection purposes and PPP exchange rates. I

then use the $1.90 pppd and $1.00 pppd benchmarks to measure the percentage of population below these two poverty lines. Secondly, I use 60% of the median household consumption in Indian rupees to set a relative poverty line. I compute median per capita consumption at both the state-level and national-level to create alternative sets of relative poverty lines. The consumption data comes from the 2009-2010 Household Consumer Expenditure survey from Round (Round 66) of the National Sample Survey of India. I find that using absolute poverty lines produces higher poverty rates, namely I find that in 2009 57% of the sample lived below the $1.90 pppd line, while 30% lived in extreme poverty, below the $1 pppd line. By contrast, 17% of the sample lived below 60% of the national median consumption level in 2009, and this increases to 20% after adjusting for the non-random sampling methods used to construct the HCE data set.

Secondly, the impact of state-level GDP growth on poverty is estimated using a maximum likelihood model. I estimate the likelihood that an individual falls below the poverty lines as a function of individual characteristics such as literacy, age and source of income and state-level GDP growth, constructed using data from the Indian Ministry of Statistics and Program Implementation and measured at constant 2004-2005 prices. I then regress GDP growth rates for various periods to identify if a household's position above or below the poverty line is affected. I also test for the percentage of services as part of GDP growth and its effect on poverty.

The outline for the remainder of the paper is as follows. The second section discusses the extent and causes of India's high GDP growth rates in the late 2000s. The third section provides the framework for this paper, discussing the definitions of poverty and methodologies for setting poverty lines in developing countries. The fourth section describes the data from the Indian Household Survey used for this paper and provides an overview of its advantages and limitations. The fifth section describes the construction of absolute poverty lines, using the 2011 International Comparison Program basket of goods and also the construction of relative poverty lines using 60% of the median annual per capita

consumption, as a benchmark. It further describes the logit regression model used to examine whether poverty reduction is linked to GDP growth. The sixth section presents estimated poverty lines using the methodologies described in previous sections and estimates of the determinants of poverty using regression analysis. The seventh section summarizes and concludes.

2. The Indian Growth Story

As can be seen in Figure 3.1, India's Gross Domestic Product has grown over the past two decades at rates ranging between 5.53% (in 1990) and 10.25% (in 2010). The annual average growth over this period has been 6.6% and the trend growth rate has been increasing over time. Over the same time, per capita income has grown tenfold in current terms from 9,545 rupees in 1993 to 89,660 in 2013, while in constant terms it has grown by 175% from 17,784 rupees to 48,910, shown in Figure 3.2. Despite the considerable variation in income stemming from currency fluctuations, Indian real per capita income has been consistently rising since the mid-1990's. This points to the fact that headline income in India has grown over the last 20 years alongside economic growth. However, it is not entirely clear whether growth has caused an increase in the disposable income of less-wealthy members of society, and thus a decline in poverty.

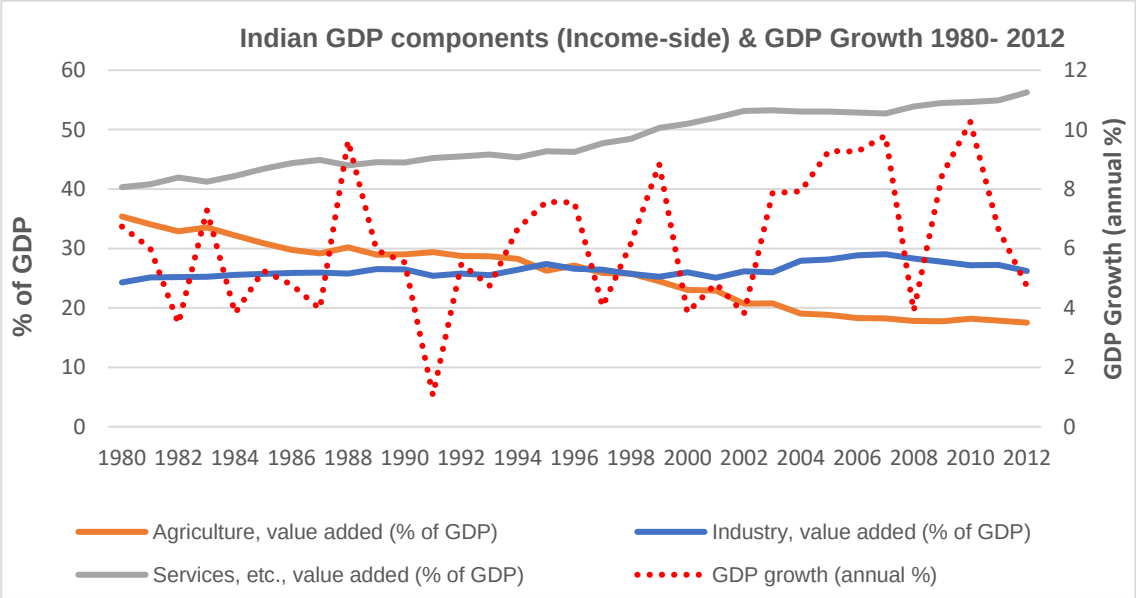


Figure 3.1: Indian GDP Growth (%) and GDP Components (% of GDP) Income-side. Source: World Bank Indicators

Figure 3.1 shows a breakdown of GDP shares by sector. It is evident that Indian GDP growth has been driven by growth in the services sector, which has

increased from about 40% to over 55% of GDP over the period.[19] On the other hand, the share of industry, which includes components such as mining, manufacturing and electricity and gas supply, remained roughly constant throughout the period and the share of agriculture has consistently declined. This could provide a possible explanation as to why growth might not have an immediate effect on poverty alleviation. For example, an increase in GDP does not necessarily lead to an automatic change in the country's legal framework for improved access to schooling. The development of the service sector has been a result of increased Foreign Direct Investments (henceforth FDI) and foreign companies benefiting from government initiatives and partnerships with local companies in the 2000s.[20] FDI is usually associated with lower labour costs in the hosting country, therefore, despite the overall increase in employment, this has not necessarily resulted in a well-remunerated labour force. Banerjee and Duflo (2007), suggest that an expanded middle class has developed through the growth years in India, in particular around big cities, however, this also does not necessarily point to the poor also being better off. As such, the shift in sector shares shown in figure 3.1 provides little support for the labour-intensive growth theory.

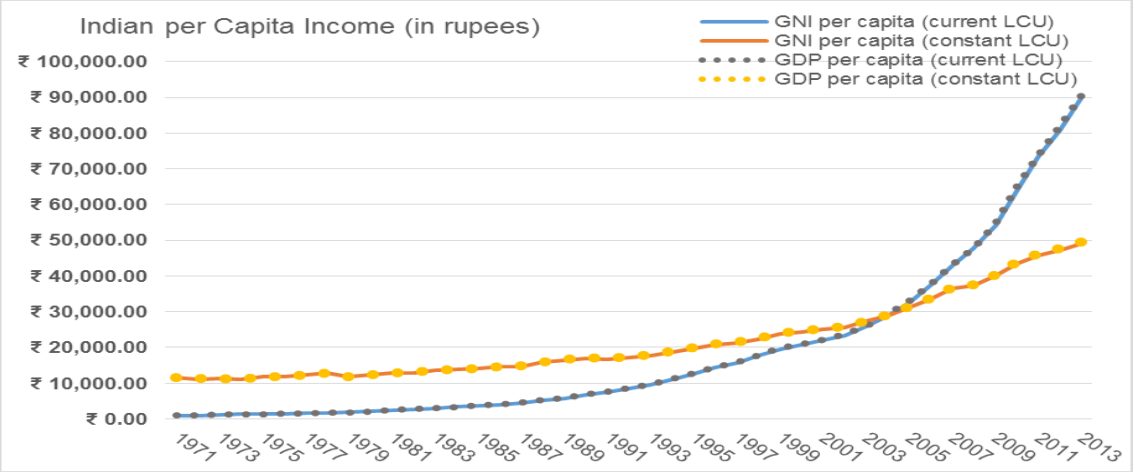


Figure 3.2: Indian GDP per capita Income and GNI per capita Income in Local Currency Unit (LCU) Rupees. Source: World Bank Indicators

[19] Services Sector includes: Transport, Storage & communications, Railways, Transport by other means, Hotels and restaurants, Banking & Insurance, Real estate, Ownership of dwellings and business services, Public administration. Source: GDP at Factor Costs, World bank Indicators

[20] India Brand Equity Foundation, Foreign Direct Investments https://www.ibef.org/economy/foreign-direct-investment.aspx, accessed 31 July 2017
OECD Indicators: FDI Inflows https://data.oecd.org/fdi/fdi-flows.htm, accessed 31 July 2017

Figure 3.3 shows the expenditure components of Indian GDP. These include capital formation, final consumption by households and the government, and trade.[21] Firstly, "Final Consumption" by households has been declining as a share of GDP, particularly in the mid-2000s. This implies that total household expenditure on goods and services, has not kept pace with the overall increase in income. One possible explanation for this is that inflation has reduced purchasing power, leaving households worse off. Secondly, "Government Final Consumption", has remained consistently at just above 10% of annual GDP expenditure throughout the period, implying that the growth in expenditure on collective goods and services such as education, housing and healthcare has roughly matched the growth in GDP. Within "Government Final consumption", for example, total public expenditure on health has remained around 1.02% of GDP for the entire period 1995 to 2010.[22]

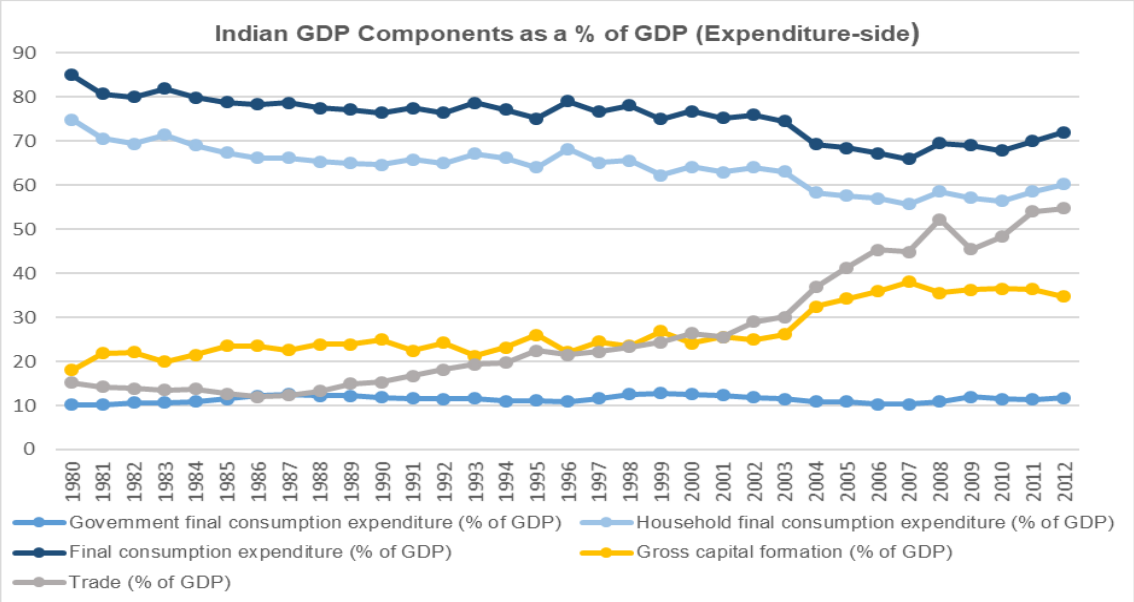


Figure 3.3: Indian GDP Components Expenditure-side. Source: World bank Indicators

[21] See Appendix B.1 to Chapter III for full definitions. Source: OECD (2009), National Accounts of OECD Countries 2009, Volume I, Main Aggregates, OECD Publishing, http://dx.doi.org/10.1787/na_vol_1-2009-en-fr, accessed 20 May 2015

[22] Health expenditure, public (% of GDP) : Public health expenditure consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations), and social (or compulsory) health insurance funds. Source: World Bank Indicators

On the other hand, Gross Capital Formation, e.g. government investment and expenditure on infrastructure such as roads, bridges, airfields and dams, transport equipment such railways and intellectual property and fixed assets such as mineral exploration, has consistently increased as a share of GDP since the mid-90s. It is evident from figure 3.3 that government investment has grown at a faster rate than direct government expenditure on things directly consumed by the poor.

There is some evidence to suggest that the benefits of infrastructure investment have been distributed unequally and many Indian households do not seem to have directly benefited from this expenditure. Dalton et all (2012) suggest that the benefits of GDP growth might not have been passed down to the end consumers immediately, due to various geographic variations. Disparities across different Indian states, different prices of goods between urban and rural markets, state-level legislation and minimum wage implementation or income taxation could have all acted as impediments to uniform access to public goods. Gupta (2012) suggests that there is still a lot of colonialist bureaucracy left over, in the way processes of the Indian state are run. Bureaucracy tends to accommodate corruption and this tends to slow down and complicate official procedures, such as school registration, for example. There is a gap between the policies formed and the way they are implemented; this differentiation between official government programmers and the actual reach they have to the targeted population, points to a deep chasm of inadequacy, despite the countless research papers and economic intermediation (Gupta, 2012). For example, children in schools receive free meals, as a benefit in kind to ensure substantial nutrition. However, bearing in mind that 23% of all Indians in the 2009-10 HCE are illiterate, this part of the population would not have benefited from this policy because they would not have attended school.[23]

[23] Illiteracy rates from analysis of the 2009-2010 Round (Round 66) of the Household Consumer Expenditure Sample Survey of India.

3. Theoretical Framework

a. Defining Poverty

Poverty is generally associated with scarcity of resources that prevent smoothly run everyday life. “How to measure poverty”, is a far more complicated issue. The most widely used measures of poverty evolve around the concepts of absolute and relative poverty. The United Nations defines absolute poverty as the amount of money necessary to meet basic needs such as food, clothing and shelter.[24] Absolute poverty refers to a set standard that does not differ across regions or countries and is usually related to income, such as the measure used by World bank to measure poverty at $1 per day, for example. While absolute measures of poverty are beneficial for comparison purposes, either within a region or internationally, they are also criticised for lacking time-sensitivity, arbitrarily taking a cut-off point on the income scale and not adequately measuring quality of life. Relative poverty, benchmarks against societal standards and thus provides a measure of social exclusion. Townsend (1979) defines relative poverty as “when someone's resources are so seriously below those commanded by the average individual or family that they are, in effect, excluded from ordinary living patterns, customs and activities”. A key part of this definition is that not only the individual, but also the collective level of economic activity should be considered. Measuring poverty at 60% of the median income, using asset indexes or using calorie-intake counting, are all examples of relative measures of poverty (Filmer & Pritchet 2001, McKenzie 2004, Maitra 2016). Relative poverty measures are seen as diachronic taking into consideration culture and habit changes and are also sensitive to social exclusion. The criticism against them is that they do not allow for comparability amongst countries and that they measure inequality rather than poverty.

This distinction between approaches, is particularly relevant when measuring poverty in developing countries such as India. Poverty in developing countries, in

[24] United Nations, Poverty, http://www.unesco.org/new/en/social-and-human-sciences/themes/international-migration/glossary/poverty/ accessed 28/08/2017

particular, describes a state of affairs with more urgency for basic needs, such as sanitation and clean water, access to healthcare and education availability but also on the household's position within the community. Ravallion (1992), in his work for the World Bank says that "poverty is said to exist in a given society, when one or more persons do not attain a level of material well-being deemed to constitute a reasonable minimum by the standards of that society".[25] Effective measurement of poverty is clearly related to the community and localized standards of living. Hobsbawm (1968) also suggests that poverty is "always defined according to the conventions of the society in which it occurs". Savadogo et al (2015) also attempt to define poverty using a community-based definition and find that poverty is not only seen as scarcity of basic needs and indecent living conditions, but also vulnerability, powerlessness and absence of social capital and community networks for support in times of need.

Food and nutrition are also used to construct poverty measures. The UN Food & Agriculture Organisation defines poverty as the amount of chronically undernourished population, without defining it further however. [26] Indian intra-country poverty lines are set using calorie consumption. An issue with calorie consumption however, is quality of calories consumed, not just quantity, which is not taken into account. India's official poverty lines for example, that are set using calories consumed per person per day, have recently been questioned because they have not been revised in 35 years and the altering composition of food consumed makes it harder for existing government programmes to administer the desired amount of carbohydrates, through food subsidies (Kattula et al, 2016). [27]

[25] Ravallion M "Poverty Comparisons, a Guide to Concepts and Methods", Living Standards Measurement Study Working Paper Number 88, World Bank, 1992

[26] Undernourishment: A state, lasting for at least one year, of inability to acquire enough food, defined as a level of food intake insufficient to meet dietary energy requirements. For the purposes of this report, hunger was defined as being synonymous with chronic undernourishment. Source: http://www.fao.org/hunger/glossary/en/ accessed 12 August 2015

[27] Poverty Line set at 2,400 calories per person per day in rural areas and 2,100 per person per day in urban areas.

b. Absolute Poverty Threshold: living on $1.90 per day, the World Bank approach

The World Bank's methodology using Purchasing Power Parity (PPP) rates is used widely as an absolute measure of poverty but it also a great point of debate amongst economists, mainly because the aim is converting local currencies to US Dollars, for the main purpose of international comparison. As such, they are not always considered the most reliable tools for effective poverty measurement (Ceh & Ravallion 2010, Deaton & Heston 2008). Firstly, although international comparison is useful in its' own right, it also creates a drawback that is, it dictates the way that lines are compiled. In particular, a set basket of goods is used across all 199 participating countries, to collect prices in order to estimate the PPP rates. Therefore, PPP's reliability is often criticised because rates depend on how accurately prices have been collected and how well consumption patterns are represented within each country. World Bank's widely used measure of living at less than $1 per day was first created in 1991 in an attempt to provide a poverty comparison benchmark for as many countries around the world. In 1993 this benchmark was revised to $1.08 per day and in 2005 to $1.25 per day. The latest revision in 2011 raised this figure to $1.90 per day. The current World Bank poverty estimate, at the time of writing this paper, is based on 2011 International Comparison Program Round, which produces Purchasing Power Parity (PPP) rates, to enable international comparison in US Dollars.

Using $1.90 per day poverty line, the latest round suggests that in India, poverty India has dropped from 46.1% in 1993 to 31.4% in 2009.[28] However, there are several concerns about these figures. First, these figures have been compiled using PPP rates, instead of market exchange rates. Essentially, the PPP, is the rate at which the Indian per capita Gross Domestic Product in Indian Rupees needs to be converted into US Dollars, in order to represent the same access to goods and services across different countries, as such provides an alternative to exchange rates. According to the World Bank the poverty headcount ratio at Indian national poverty lines using calorie consumption counting, was 45.3% in

[28]Source:http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators accessed 23 November 2015

1993 and 29.8% in 2009. Poverty figures using the World Bank's calculations and India's own poverty lines seem to agree at the $1.90 per day level, but they would grossly differ if any slightly different cut-off point on the income scale were to be considered. Secondly, the International Comparison Programme, compiles price data from 199 countries, in order to calculate PPP rates. India hadn't provided new data since 1985, hence the calculations between 1985 and 2010 are subject to measurement error. Third, the World Bank's PPP calculations use average prices even for larger countries, and do not account for urban and rural price differences. This approach will result in measurement biases unless rural and urban price differences are the same across areas and countries, and thus cancel each other out. Fourth, because a new methodology was introduced in the 2005 and 2011 ICP rounds, results cannot be compared with earlier rounds. Finally, the basket of goods, used for the ICP calculations, although quite wide in range, assumes homogeneous choice of goods and services across a range of countries. Although the basket of goods is the same for every participating country, the ICP assigns country-specific weights are now assigned on different groups of goods and services, to better reflect local consumption and expenditure patterns. The accuracy of the resulting poverty calculations then simply becomes a question of weights. Each country is expected to provide consumption weights, according to their National Accounts however, India, in particular, last participated in the ICP in 1985, hence no new data had been collected until the 2011 round.

Despite these drawbacks this paper uses elements of the World Bank methodology for two reasons: firstly, it provides a benchmark basket of goods against which I assess actual Indian consumption. Secondly, it raises the issue of weights, which will help determine shifts in consumption patterns.

c. Relative Poverty Threshold: living on 60% of median income

Setting a poverty line at 60% of median household income is a relative measure of poverty, widely used in developed countries, as it implicitly incorporates local standards of average community expenditure levels, culture and lifestyle. It also offers certain advantages over using other ways of measuring poverty. Firstly, it is measured in the country's local currency, in this way currency risk and

fluctuations are avoided. Secondly, it allows for an insight into welfare which combines measures of both poverty and inequality. Taking into account social inclusion is important, as Narayan et al (2000) have shown that economically marginalized groups also tend to be socially marginalized. Secondly, by setting separate poverty lines at 60% of the median expenditure per State, it can be used for intra-country comparisons amongst Indian states. Local differences in inflation for example, are tackled and also local differences in other areas such as employment, health and education are also accounted for. Every Indian state has its own government and laws are set at state-wide level, while only matters of security or tackling national epidemics, are decided by the central government. For example, although the Ministry of Health and Family Welfare deals with matters of HIV an endemics control all around India, maters such as hospital maintenance are passed down to the local State governments to be dealt with. The funds from the budget for maintenance of public hospitals are distributing to local governments and they then decide which hospitals and other related infrastructure will be funded and how these funds will be utilised. As a result, the overall level of healthcare is not harmonised around India but instead every local State-government has discretion of how the budget will be spent and what that means for the citizens is that hospital facilities and access vary hugely amongst Sates. Another example is that of minimum wage. Although the notion of "minimum age" is mentioned in legislation since 1948, there is however, no unified minimum wage around India. That might not be necessarily a bad thing, given the local differences of employment opportunities, but what's important is that legislation is not binding, even on a local-State level. Therefore, it is difficult for families to plan as there is no minimum figure to count on and irregular workers end up accepting whatever the employer offers, in order to be able to put food on the table. By using the median expenditure at State-level, State-wide matters that would affect expenditure decisions would be reflected in the spending patterns and local differences would be accounted for.

This theoretic framework also poses considerations. Firstly, the geographic area where the data originates from is of crucial importance for a country as unevenly developed as India. Taking into consideration the whole of India for example, will

result to very different numbers to constructing the median on a State level. Secondly, what constitutes household income is also debatable. For example, in the UK, where this measure of poverty is used for official calculations, thresholds are set after income tax, council tax and housing costs have been deducted, where housing costs include rents, mortgage interest, buildings insurance and water charges. They therefore represent what the household has available to spend on everything else it needs, from food and heating to travel and entertainment. The case of India is different, because housing is not as secure for all, as in a developed country, for example. As there is no hard and fast rule as to whether “disposable income” only or the entire income should be considered is one of the criticisms of this methodology.

4. Data

The primary data for constructing poverty lines and subsequently developing a model to link growth and poverty, are drawn from the 2009-2010 Round (Round 66) of the National Sample Survey of India, labelled “Household Consumer Expenditure”, here forth HCE, which covers all States and Union Territories of India. The HCE is conducted every 5 years by the Indian Ministry of Statistics and the National Sample Surveys Office, in particular. This round of data was taken at the peak of a ten-year growth spur, wherefrom we can go backwards to measure the effect of various period of growth, namely 5 years, 3 years and 1 year leading up to 2009-2010. A stratified multi-stage design has been adopted for the 66th round survey. The first stage units (henceforth FSU) are the 2001 Indian Census villages in the rural sector and Urban Frame Survey (henceforth UFS) blocks in the urban sector. The ultimate stage units (henceforth USU) are households in both sectors, with 100,348 households included in this survey.

Table 3.1 summarizes all the data categories provided in Round 66 of the HCE. It also provides an account of which data is included in forming poverty lines following the two distinct methodologies, that of the World Bank using the PPP rates basket of goods and that of Median Income using all goods and services accounted for in this survey. In terms of choice of goods for PPP calculations, the following observations are not taken into consideration; round 66 does not include observations on “pasta”, “lamb”, “delicatessen & other food preparation” or “cheese”. On the other hand, the PPP basket of goods does not include “pan”, one of the main tobacco by-products used by the poorer population in India and the general category of “narcotics” does not define whether it can be included. Bread has its’ own cluster in the PPP basket, but it does not appear at all in the Indian HCE Surveys. “Fruit” and “other milk products” are also not further defined, leaving ghee (clarified butter) which is used by almost every household in India unaccounted for. Spices and nuts commonly used by all Indian households are not included in the PPP basket of goods either. All of these food-articles that are

not included in the PPP basket of goods, could potentially distort results, especially if they are essentials specifically used by Indian households.

Using HCE data has several advantages for the purpose of this paper. Firstly, HCE is used for official welfare calculations of deciding poverty lines within India, it is therefore a widely accredited dataset. Secondly, this dataset is also comprehensive in terms of household assets, consumption and food expenditure and offers ample details of wealth holdings such as land and dwelling, along with acres owned, whether the land is irrigated, cultivated or leased out etc. Furthermore, it measures all goods and services consumed within the household, even where the goods have not passed through official markets, an advantage of using consumption rather than income data. In addition, the HCE data also contain information about value of goods and services produced as household output and used by its members themselves during reference period, value of goods and services received by households as remuneration in kind, value of goods and services received by households through social transfers in kind, by government and non-profit institutions, as well as background information on the composition of the household and individual member education, caste and religion characteristics.

In terms of challenges, the data has been non-randomly collected. In rural areas every village is divided into two categories: “affluent” households and the rest of households. “Affluent” households form 25% of the rural sample, 50% of the households have “principal earnings from non-agricultural activity” and finally the rest of 25% is formed by every other household. Households in the urban sector are also pre-selected according to income; the top 10% of Monthly Per Capita Expenditure (MPCE) forms 25% of the sample, 50 % of the sample includes households in the 60% of the MPCE distribution and finally the remaining 25% of the sample is made up from households in the bottom 30% of the distribution, in terms of MPCE. Finally, round 66 also includes the creation of three new States: Uttaranchal, Chhattisgarh and Jharkhand, all of which were created in 2000. The

existing three states that they came from are Uttar Pradesh, Madhya Pradesh and Bihar respectively.

The sampling methodology poses some considerations. Firstly, “affluent” households are actively selected to form a quarter of the rural surveyed entities, as a result the total consumption expenditure analysis will be biased upwards. Secondly, households whose primary earning activity is agriculture are actively avoided for 50% of the sample, that would restrict interpreting results, when regressing poverty to agricultural growth. In addition, sampling methodology followed in the urban sector means that the lower 30% of the population’s consumption distribution has been under-weighed in the sample by 5% and similarly, the middle 60% of the population’s consumption distribution has been underweighted in the sample by 10%. Finally, as this survey is used to set official poverty lines in India, by means of calorie counting, their poverty estimates are also going to be downwards biased.

The non-random sampling in the rural sector cannot be corrected, as the categories specified in the survey are not mutually exclusive and are not based on numerical values that can be adjusted. Still, this measure of “affluence” does not necessarily mean western standards of “affluence”, meaning cash-rich households; instead in the rural sector, the person conducting the survey is expected to identify the households living in the village, which may be considered to be relatively more affluent than the rest. This is done by considering the factors generally associated with rich people in the locality such as: living in large pucca house in well-maintained state, ownership of cultivable/irrigated land in excess of certain norms i.e. 20 acres of cultivable land or 10 acres of irrigated land, ownership of motor vehicles and costly consumer durables like T.V., VCR and Refrigerator, ownership of large business establishments, etc. The urban sample can be adjusted however, to identify the actual median of the population, that is not the same as 50th centile of the sample, but the 65th. As explained above the lower 30% and middle 60% of the distribution have both been under-weighed in the sample by a combined 15%. As such, the median of the population

is the 65th centile of the sample and not the 50th. Table 3.2 below summarizes the non-random sampling in methodology.

Round 66 - Schedule of Items from the HCE Survey			
	Item Category	**Used for the "World Bank" basket**	**Used for the "60% of Median Consumption" basket**
1.	cereals	√	√
2.	cereal substitute	√	√
3.	pulses & products	√	√
4.	milk & milk products	√ excludes ghee	√
5.	sugar	√	√
6.	salt	√	√
7.	edible oil	√	√
8.	egg, fish & meat	√	√
9.	vegetables	√	√
10.	fruits (fresh)	√	√
11.	fruits (dry)	x	√
12.	spices	x	√
13.	beverages etc.	√	√
14.	pan	x	√
15.	tobacco	√	√
16.	intoxicants	√	√
17.	fuel and light	x	x
18.	medical (non-institutional)	√	√
19.	entertainment	√	√
20.	minor durable-type goods	√	√
21.	toilet articles	√	√
22.	other household consumables	√	√
23.	consumer services excl. conveyance	√	√
24.	conveyance	√	√
25.	clothing	√	√
26.	bedding etc.	√	√
27.	footwear	√	√
28.	education	√	√
29.	medical (institutional)	√	√
30.	durable goods	√	√
31.	rent	x	x
32.	consumer taxes & cesses	x	x

Table 3.1: Consumption categories as they appear in the HCE questionnaire, compared to ICP 2011 Basket of Goods. Source: HCE Survey Round 66 and ICP 2011 Methodology

Round 66 HCE Sampling Methodology		
Sector	Household characteristics	Number of households to be surveyed per FSU/UFS
Rural	relatively affluent households	25%
	of the remaining, households having principal earning from non-agricultural activity	50%
	other households	25%
Urban	households having MPCE of top 10% of urban population	25%
	households having MPCE of middle 60% of urban population	50%
	households having MPCE of bottom 30% of urban population	25%

Table 3.2: Sampling methodology for Round 66 of the HCE. Source: Chapter I – Introduction, HCE Survey Round66

A note on using consumption data rather than income. It is widely accepted that in developing countries the use of household consumption instead of income is preferred, when assessing living standards, because consumption better reflects both legal and undeclared income, as well as in-house produced foodstuff and other materials that are used for survival purposes. As such total household expenditure will be used to create poverty lines, instead of household income. Additionally, as a lot of people do not have bank accounts and often put their savings in alterative durables such as gold, consumption, which is registered very accurately in this Household Survey is not going to produce much different results to income.

GDP growth data is sourced from the Indian Ministry of Statistics and Program Implementation GDP at Factor Cost per State. Using GDP growth will allow for regressions that combine the use of cross-section data for poverty with growth data for various time periods. Figure 3.4 shows the various growth rates, per state, for three different periods, preceding the peak of GDP Growth in 2009-2010. GDP growth is estimated using National Accounts data, which is the most encompassing and readily available data set for this purpose. It has been challenged in literature due to the lack of uniformity in timeframe of data collection

and its' regularity (Bosworth et al, 2007). Although the National Accounts recognise and account for un-registered sectors such as unregistered manufacturing, the data is not collected annually but is a result of quinquennial follow up surveys on the Economic Census.[29] For registered sectors, such as 'trade, hotels and restaurants', gross output of private companies is estimated using Reserve Bank of India studies. Therefore, some annual estimates of output and employment are largely based on either simple interpolations or on extrapolations of underlying source data.

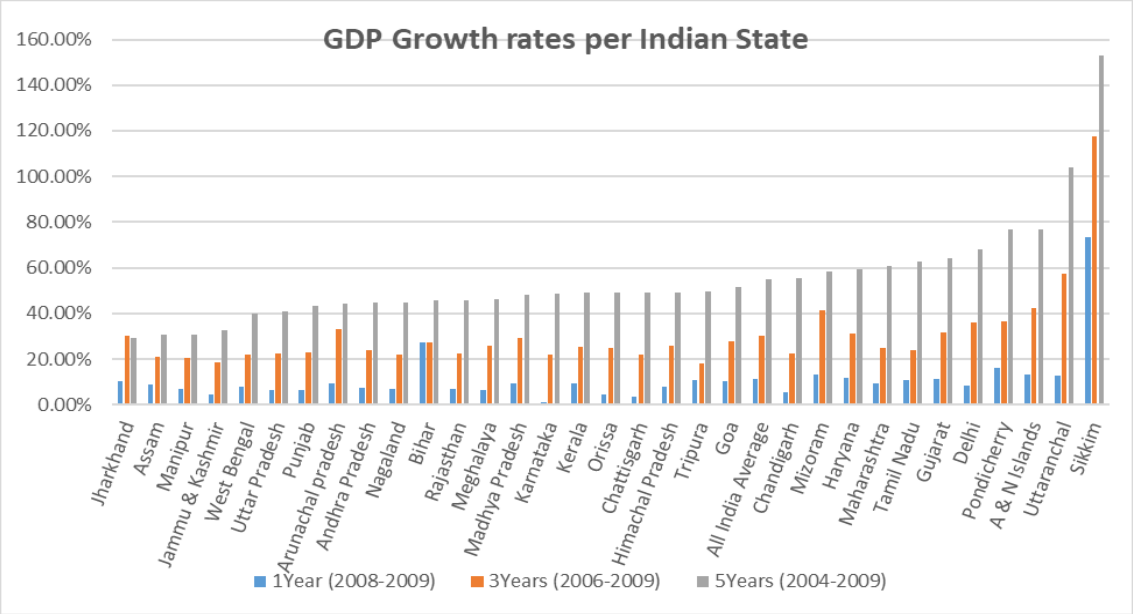


Figure 3.4: GDP Growth per Indian State for different time periods. Source: Indian Ministry of Statistics and Program Implementation. See Appendix B.2 to Chapter III for table with GDP Growth Rates, per State.

[29] Ministry of Statistics and Programme Implementation, Brief method of compiling Gross Product estimates by Industry, http://www.mospi.gov.in/133-gross-domestic-product, accessed 30 June 2019

5. Estimating Poverty in India and Econometric Model to assess the impact of GDP growth

a. Using the World Bank methodology to estimate poverty

A very widely used tool, when constructing poverty lines, is the basket of goods used by the World Bank for calculating PPP rates. I have used the same "Basic Heading" categories under the aggregated level of "Final Consumption Expenditure by Households", specified in the methodology for constructing the PPP basket of goods, as a guide to selecting the items from the HCE survey to be used in the construction of the World Bank poverty lines.[30]

Appendix B.3 to Chapter III, enlists all the "Basic Headings" categories that appear in the PPP calculations.[31] These have been matched using expenditure on the same items from Round 66 of the HCE, in order to create a basket of goods that imitates that used by the World Bank. The annual household expenditure using this basket of goods is then divided by the number of family members to generate the per capita annual expenditure (henceforth APCE) in Indian rupees. PPP rates from the 2011 ICP round are then used to convert APCE into US Dollars. The head of household's APCE in US Dollars, is then used to assess whether the person is poor on two separate occasions, firstly in the case of extreme poverty, set at living on $1 per person per day and the latest World Bank's revision set at living at $1.90 per person per day.

b. Using 60% median consumption to estimate poverty

As discussed in chapter III, literature suggests that effective measures of poverty in developing countries, like India should look beyond income measures, therefore this paper draws alternative poverty lines to the World bank ones, at 60% of median APCE for the purpose of comparison between the two. Using 60%

[30] For a list of the "Basic Headings" see http://siteresources.worldbank.org/ICPEXT/Resources/ICP-2011-report.pdf

[31] See Appendix B.3 to Chapter III for a discussion of how expenditure patterns have changed for Indian households, between 1995 (Round 50) and 2009 (Round 66).

of the median annual per capital consumption to define the poverty line, is therefore considered to take into account the household's locality and overall community living standards. In order to estimate annual household expenditure, I use annual expenditure on all items surveyed in Round 66, as per table 3.1, that excludes expenditure on rent and utilities. The annual household consumption expenditure is then divided by the number of household members in order to obtain the APCE. I then estimate the 60% of the median APCE per State, that allows for the household to be assessed in comparison to the other households in the same State. This approach allows for local characteristics to be taken into consideration, such as the effect of state-wide laws, local unemployment, inflation and education opportunities. By calculating the median annual consumption per state and then setting the poverty line at 60% of the median, I allow for a regional measure of poverty, which works well for India, because of the regional differences in language, economy, laws and governance.

As described in Data section, adjustments have been made in the urban sample, in order to compensate for actively over-selecting households within the top 10% of the urban consumption distribution. As such the sample for urban households has been adjusted so that the 65^{th} percentile of annual per capita consumption is calculated per state, acting as the "adjusted median" and the poverty line is then set at 60% of the "adjusted median".

c. Econometric Model

Most models that link growth to poverty suffer from using the same data on both sides of the equation, because usually poverty is measured as income or expenditure and so is growth; the same applies to one of the most prominent models that is widely used to study the relationship between poverty and growth, that of Datt & Ravallion (1992). Most models linking poverty to growth, the Datt & Ravallion model included, use panel data for the period in question and are also built with the purpose of international comparison, in mind. This paper is therefore providing an alternative method, which differs in two main points. Firstly, it uses cross-section data and focus on India only. Its' most important contribution

however, is that it does not use the same set of data to identify GDP growth data per state and expenditure data to measure poverty. The econometric model is constructed to identify localised elements in both the dependant variable, which is poverty, as well as in the independent variables, growth and household location expressed as rural/urban. The rest of the independent variables are household and person specific.

The binary nature of the dependant variable (Poor=1, Not Poor=0) requires the use of a logit maximum likelihood estimation model. Model (1) is using GDP growth per state at factor cost, to firstly, determine the effect of growth on poverty and secondly, to also measure the lagged effect that growth might have on poverty. As such the model will use three alternative rates of GDP growth to explore the effects of 5-years GDP Growth, 3-years GDP Growth and 1-year GDP Growth, at a state-level.

$$P_{HH} = aG_S + bS_S + c\,X_{HH} + d + e \qquad (1)$$

P_{HH} expresses poverty, which is a binary variable 1- Poor, 0 – Not Poor;

Various definitions of “Poor” will be tested, according to the two methodologies followed to set poverty lines as described earlier in the paper, in order to determine their effectiveness.

G_S expresses % GDP growth per state, in Indian rupees.

5 Year GDP %change = (2009-10GDP – 2004-05GDP) / 20042005GDP

3 Year GDP %change = (2009-10GDP – 2006-07GDP) / 20062007GDP

1 Year GDP %change = (2009-10GDP – 2008-09GDP) / 20082009GDP

Alongside GDP growth rates **G**, the model includes a variable to identify how much of the % GDP Growth resulted from expansion in the Services sector, in particular. Variable S_S shows how much of the total GDP growth per state, was attributed to growth in the services sector, within the same state, for the same period.

X_{HH} expresses individual head of household’s characteristics;

i.e.: main source of income (agriculture, self-employed, casual labour, regular labour, other), urban/rural household location, years of education for the head of household and age of the head of household.

c is a constant and **e** is the error term.

6. Results

a. Comparing absolute and relative poverty rates

Table 3.3 summarizes poverty rates per Indian state as well as for the whole of India, as a result of using the two methodologies described in Sections IV and V. The first comparison to address is that of using nominal exchange rates and PPP exchange rates, within the World Bank methodology. Using 2009 nominal exchange rates puts almost all of the Indian population below the poverty line, whether this is drawn at $1pppd or at $1.90 pppd, as it converts expenditure in Indian rupees to US Dollars, using market exchange rates. Using PPP rates produces different results, with the “All India” poverty rate at 31% for $1pppd and at 57% for $1.90pppd. This is a result of using the PPP basket of goods to produce exchange rates that take into account the level of economic activity in each country.

Secondly, comparing poverty rates between the two methodologies also produces different results. Results using the World Bank methodology, put more than 50% of the households in Uttaranchal, Rajasthan, Uttar Pradesh, Jharkhand and Karnataka in extreme poverty, as defined by the $1pppd poverty line. When the poverty line is raised to $1.90pppd, the percentage of households in poverty raises to around 80% for the same States and additional States like Bihar, Orissa, Chhattisgarh, Kerala and Gujrat also appear to have more than 50% of households in poverty. If the alternative methodology is used to highlight States where households are below the 60% of the median (using the adjusted-Urban sample) and therefore considered poor, Chandigarh, Delhi and Daman & Diu are the States with highest poverty rates just above 30%, that is substantially lower than the World Bank methodology results.

State	Absolute Poverty Threshold - World Bank Basket Methodology				Relative Poverty Threshold - 60% of the Median Methodology				
	APCE converted in USD using 2009 Nominal Exch. Rates USD/INR 48.08		APCE converted in USD using 2011 ICP PPP rates USD/INR 13.46		% Poverty rate (allowing for unadjusted Urban Sample)	% Poverty rates (allowing for adjusted Urban Sample)	% Poverty rates of Rural Households[32]	% Poverty rates of Urban Households	
	Poverty at $1pppd 2009	Poverty at $1.90pppd 2009	Poverty at $1pppd 2009	Poverty at $1.90pppd 2009				60% median calculated for the entire State sample	60% of the median calculated for the Urban State sample
Jammu & Kashmir	71.21%	96.39%	0.41%	15.22%	8.92%	14.34%	8.92%	11.13%	23.82%
Himachal Pradesh	58.55%	96.39%	0.83%	12.90%	15.73%	17.98%	15.73%	6.96%	37.27%
Punjab	68.71%	96.39%	13.68%	36.75%	16.73%	24.08%	16.73%	17.66%	35.37%
Chandigarh	50.49%	75.41%	18.69%	33.44%	24.26%	39.67%	24.26%	37.38%	41.76%
Uttaranchal	92.02%	97.64%	55.09%	76.11%	10.91%	17.14%	10.91%	13.77%	33.52%
Haryana	69.16%	93.70%	13.40%	35.23%	19.73%	25.57%	19.73%	16.30%	36.19%
Delhi	63.37%	87.24%	15.09%	37.74%	22.09%	33.07%	22.09%	31.74%	33.97%
Rajasthan	93.30%	97.78%	59.28%	81.31%	11.41%	18.62%	11.41%	13.42%	35.74%
Uttar Pradesh	95.87%	98.88%	69.87%	88.02%	12.22%	18.28%	12.22%	12.41%	36.15%
Bihar	89.43%	98.07%	10.39%	60.73%	11.66%	16.43%	11.66%	10.06%	36.16%
Sikkim	61.98%	89.06%	0.65%	17.58%	12.76%	13.15%	12.76%	5.47%	26.25%
Arunachal Pradesh	63.50%	91.41%	1.71%	21.45%	17.12%	21.39%	17.12%	12.25%	33.50%
Nagaland	54.59%	92.87%	0.00%	2.34%	5.76%	10.74%	5.76%	7.52%	24.06%
Manipur	91.48%	99.34%	0.04%	28.66%	5.71%	7.74%	5.71%	7.00%	15.14%
Mizoram	55.43%	92.93%	0.13%	13.09%	16.69%	20.75%	16.69%	16.82%	28.68%
Tripura	75.81%	95.10%	0.75%	28.23%	11.31%	5.60%	11.31%	11.80%	35.29%
Meghalaya	77.99%	96.46%	0.24%	28.30%	4.48%	11.40%	4.48%	10.06%	31.37%
Assam	85.30%	97.59%	3.34%	47.10%	10.47%	13.92%	10.47%	8.64%	35.82%
West Bengal	75.06%	92.82%	3.62%	37.32%	13.67%	22.00%	13.67%	16.50%	37.96%
Jharkhand	96.29%	99.45%	72.92%	86.68%	9.68%	20.57%	9.68%	13.61%	37.82%
Orissa	87.30%	97.05%	16.43%	60.37%	15.16%	19.78%	15.16%	10.47%	40.00%
Chhattisgarh	91.57%	98.34%	25.24%	65.62%	17.03%	22.00%	17.03%	13.22%	40.08%

[32] 60% median calculated for the entire State sample (rural and urban).

Madhya Pradesh	81.56%	95.66%	10.22%	48.39%	17.40%	22.27%	17.40%	14.92%	35.50%
Gujarat	91.06%	97.22%	51.33%	74.73%	17.09%	22.69%	17.09%	17.44%	35.01%
Daman & Diu	82.81%	98.44%	28.13%	56.25%	23.44%	32.81%	23.44%	21.88%	43.75%
D & N Haveli	88.54%	98.96%	50.00%	75.52%	15.63%	22.92%	15.63%	18.23%	36.46%
Maharashtra	86.97%	95.82%	44.76%	70.11%	16.50%	23.45%	16.50%	17.80%	35.75%
Andhra Pradesh	87.04%	96.32%	47.75%	71.73%	16.98%	23.17%	16.98%	16.11%	37.45%
Karnataka	88.72%	97.04%	52.19%	74.58%	15.38%	22.80%	15.38%	17.69%	35.40%
Goa	75.23%	94.82%	11.94%	37.16%	17.79%	19.59%	17.79%	16.67%	25.96%
Lakshadweep	78.69%	90.71%	33.88%	59.56%	12.02%	24.04%	12.02%	20.22%	28.91%
Kerala	78.30%	91.95%	29.46%	56.46%	21.63%	27.09%	21.63%	16.44%	39.65%
Tamil Nadu	88.93%	97.17%	46.88%	72.33%	16.22%	24.22%	16.22%	18.11%	36.23%
Pondicherry	73.61%	93.06%	19.27%	46.88%	15.97%	29.86%	15.97%	27.60%	35.49%
A & N Islands	34.82%	69.64%	0.89%	4.82%	14.11%	17.14%	14.11%	14.46%	28.13%
All India	83.13%	95.73%	30.56%	57.15%	17.18%	20.48%	17.18%	14.48%	34.99%

Table 3.3: Summary comparison of poverty rates, using two methodologies

Overall, using the 60% of median methodology to set poverty lines, produces lower poverty rates than those produced by the World bank methodology; namely, All India poverty is at 17% if the sample is un-adjusted for the urban non-random sampling and 20% if the urban sample median is adjusted to correct for non-random sampling. In the latter case, individual State poverty rates also vary significantly while some States such as Nagaland, Manipur and Tripura seem to experience lower poverty rates around 10%, some others such as Chandigarh, Delhi and Daman & Diu experience poverty rates higher than 30%. What emerges from this comparison is that trying to develop a unified poverty alleviation strategy for the whole of India would be challenging and might even produce negative effects for some of the States. Urban poverty is on average at 14% for the whole of India and rural poverty at 17% for the whole of India.

b. Spatial Analysis

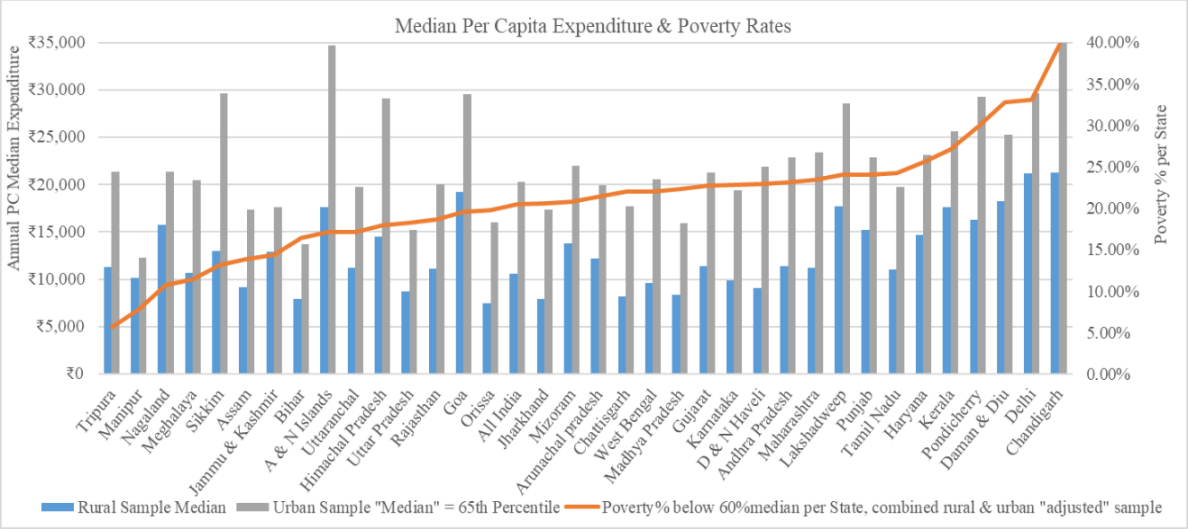
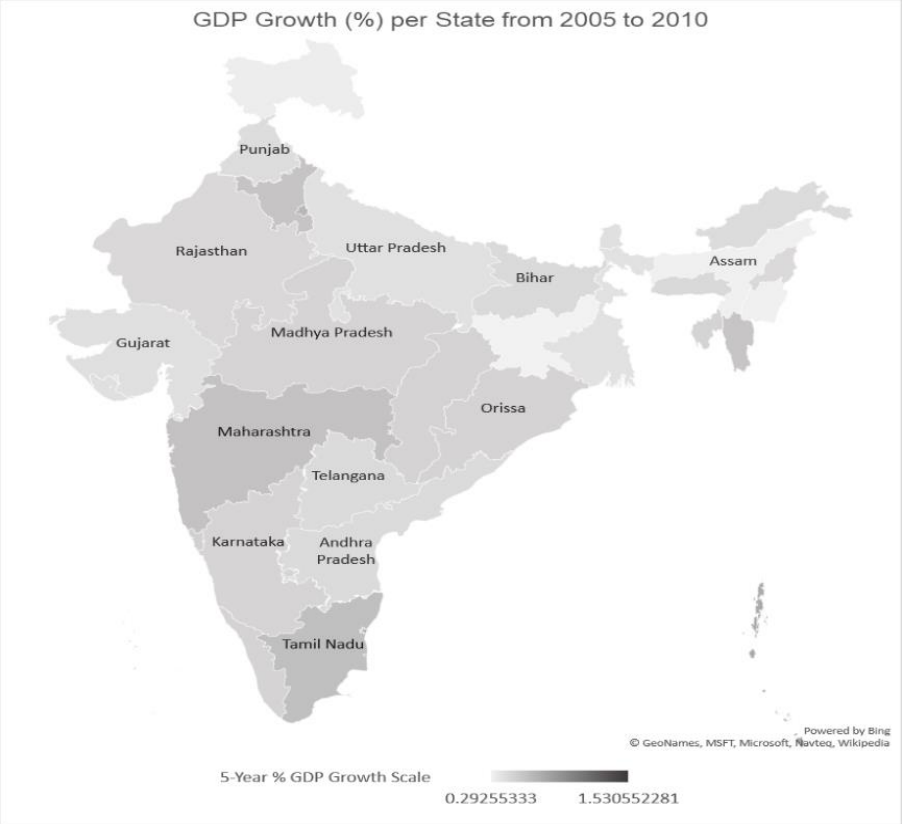


Figure 3.5: Median annual per capita expenditure per State and % of Poor per State (Poverty Line set at 60% of median consumption), for combined rural and "adjusted" urban samples.

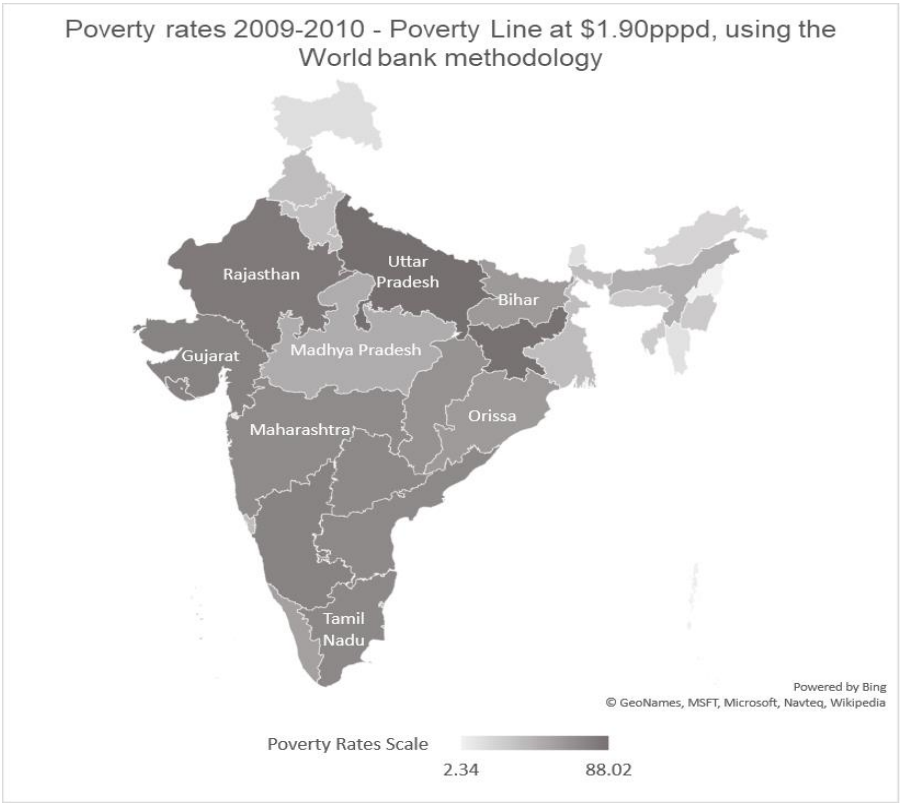
Figure 3.5 demonstrates no immediate link between the sample State APCE medians and poverty rates, when using the 60% of the median consumption to set poverty lines. For example, states with similar rural median APCE, such as Goa and Pondicherry present very different poverty rates of 19% and 29% respectively. At the same time, states with lower median APCE, such as Manipur, Assam and Bihar do not necessarily

present high poverty rates. For example, Bihar and Uttar Pradesh, two states traditionally portrayed in literature as low-income, here replaced by median APCE, present poverty rates of 16% and 18%, respectively, that is slightly lower than the All India average poverty rate of 20%. In contrast, urban states with highly business-oriented and industrial economies such Delhi and Chandigarh, with median urban APCE at or above 30,000 rupees, have the highest poverty rates in this analysis, at 33% and 39%, respectively. The argument for using this methodology to set regional poverty lines is strengthened by the fact that it allows for all of the differences that Indian States experience, to come into focus and be used to individually assess each state according to its' own level of economy, welfare and legal systems that impact the level of living.

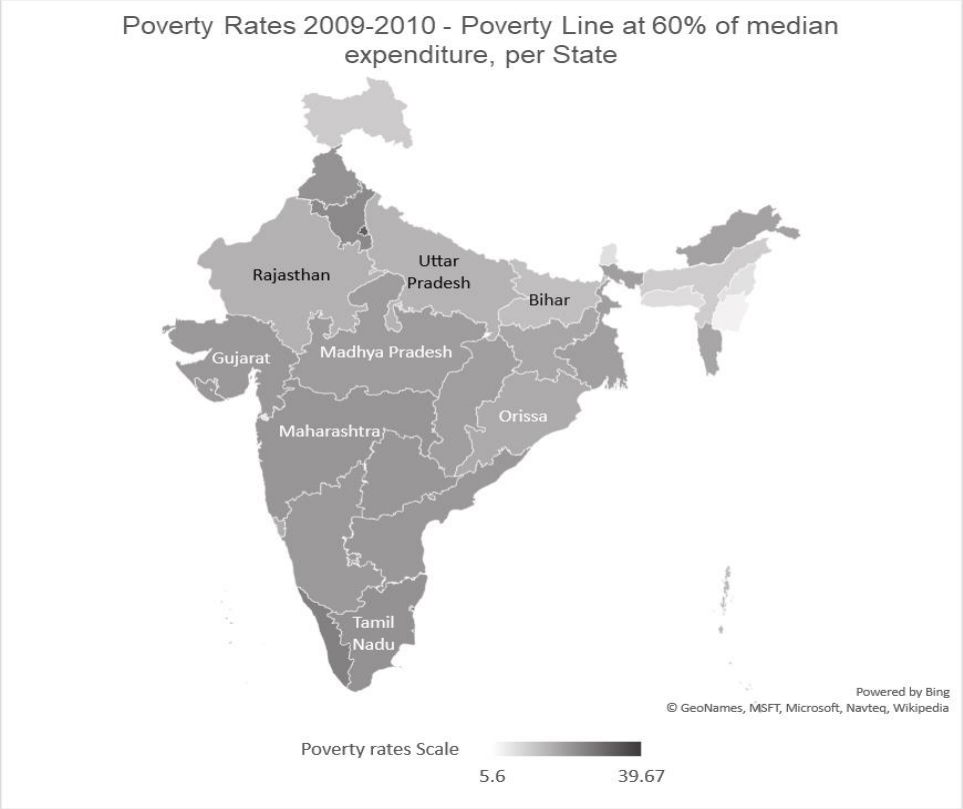
The regional element is becoming clear in Maps 2 and 3, which plan out poverty rates in neighbouring states, using absolute and relative poverty rates respectively. Following on from the debate in section II about how local legal framework and welfare rules allow for the benefits of growth to be passed down to households, it is evident that neighbouring states such Arunachal Pradesh and Nagaland for example, have different poverty rates of 21% and 10%. When poverty rates are combined with 5-year GDP growth rates in Map 1, then it is also evident that some states with low 5-year GDP growth, such as Jammu and Kashmir, Assam and Manipur also present low poverty rates in the 2099-2010 HCE Round, with relative poverty rates at 14%, 14% and 7%, respectively. As such, it is already starting to become apparent that growth does not automatically and clearly lead to poverty reduction. Analysis later in this section looks into this aspect in detail. Jammu and Kashmir, Sikkim and Nagaland are the only three States with low poverty rates, whether relative or absolute. 5-year GDP growth rates are different in all three states; hence no immediate correlation between growth and poverty can be drawn in this case either.



Map 1: 5-year % GDP Growth per State



Map 2: Poverty rates, using the World bank methodology



Map 3: Poverty rates at 60% below the median consumption – using entire sample, with urban sample adjusted for non-random sampling

c. Impact of State GDP growth on poverty

The results for logit regressions based on model (1) follow below. Growth is a continuous variable, expressing GDP Growth per State as the percentage change of GDP in Indian rupees between 2004 - 2009 (5 year % GDP growth), between 2006 – 2009 (3 year % GDP growth) and finally between 2008 – 2009 (1 year % GDP growth). Regression results also show how poverty has been affected, in relation to the services sector growth, as a percentage of the overall state GDP growth.

Using World Bank methodology to set poverty lines

Tables 3.4 and 3.5, present logit regression results where the dependant variable is absolute poverty rates, set at $1pppd and at $1.90pppd, as per the World Bank methodology; per capita expenditure has been converted from Indian rupees to US dollars using two types of exchange rates: nominal and PPP, as described in section V. I observe consistent results, regardless of the type of exchange rates used to convert expenditure from Indian rupees to US dollars and across all growth time-periods, for the following: there is less log likelihood for urban households and households where the head of household earns regular income to be poor; additionally, the log likelihood of being poor reduces as the head of household's education and age levels increase. The fact that results are consistent regardless of where we draw the poverty line, going from $1pppd to almost double $1.90ppppd indicate that where the World Bank methodology is used to draw poverty lines, urban households and households with regular income are less likely to be poor. The constant is positive and significant in all cases, showing that if growth, household sector, source of income, head of household's education and age were held constant, households would be prone to be poor.

Poor (Yes-1, No-0) using World Bank Method	Poor @ $1 using Nominal Exchange rates			Poor @ $1 using PPP Exchange rates		
	5 Year %GDP Growth per State	3 Year %GDP Growth per State	1 Year %GDP Growth per State	5 Year %GDP Growth per State	3 Year %GDP Growth per State	1 Year %GDP Growth per State
%GDP Growth (1)	-0.006	-0.017	-0.018	0.014	-0.011	-0.063
	*(11.61)***	*(-23.15)***	*(-16.73)***	*(29.47)***	*(-13.19)***	*(-37.25)***
%Services	-0.5328	-0.702	-0.477	1.885	-1.64	-0.384
(as a % of total GDP Growth)	*(-6.67)***	*(-12.02)***	*(-11.78)***	*(27.74)***	*(-34.29)***	*(-18.69)***
Sector	-0.509	-0.549	-0.545	-0.117	-0.126	-0.116
(Rural - 0, Urban-1)	*(-23.25)***	*(-24.94)***	*(-24.78)***	*(-6.84)***	*(-7.32)***	*(-6.72)***
Regular Salary	-0.412	-0.399	-0.429	-0.667	-0.594	-0.632
	*(-16.60)***	*(-16.06)***	*(-17.28)***	*(-23.53)***	*(-21.03)***	*(-22.35)***
HoH Education	-0.279	-0.278	-0.278	-0.208	-0.207	-0.206
	*(-89.18)***	*(-89.17)***	*(-89.25)***	*(-91.70)***	*(-91.40)***	*(-90.92)***
HoH Age	-0.015	-0.016	-0.015	-0.014	-0.016	-0.015
	*(-21.75)***	*(-23.43)***	*(-22.54)***	*(-25.94)***	*(-28.77)***	*(-27.83)***
Constant	5.383	5.699	5.276	-0.741	2.515	2.087
	*(68.48)***	*(84.34)***	*(101.46)***	*(-12.11)***	*(46.67)***	*(49.49)***
No of Obs	100,348	100,348	100,348	100,348	100,348	100,348
LR Chi2	*15,465.72*	*15,875.48*	*15,708.80*	*13,323.41*	*13,337.27*	*14,246.60*
Absolute value of z-statistic in parentheses						
*** significant at 1% level;*						
Note (1): GDP Growth Per State measured for different periods of length preceedng the 2009-2010 HCE Survey, see column headings for each period						

Table 3.4: Aggregated Logit Regression outputs at various time-lagged GDP growth rates, using the World Bank-methodology poverty lines at $1pppd, using Nominal Exchange rates and Purchase Power Parity Exchange rates.

Poor (Yes-1, No-0) using World Bank Method	Poor @ $1.90 using Nominal Exchange rates			Poor @ $1.90 using PPP Exchange rates		
	5 Year %GDP Growth per State	3 Year %GDP Growth per State	1 Year %GDP Growth per State	5 Year %GDP Growth per State	3 Year %GDP Growth per State	1 Year %GDP Growth per State
%GDP Growth (1)	-0.014	-0.016	-0.018	0.007	-0.014	-0.021
	*(14.99)***	*(-13.50)***	*(-9.61)***	*(16.12)***	*(-20.87)***	*(-22.39)***
%Services	-1.59	0.1945	-0.476	1.228	-1.223	-0.027
(as a % of total GDP	*(-11.57)***	*(1.86)*	*(-6.83)***	*(19.63)***	*(-27.54)***	*(-0.88)*
Sector	-0.772	-0.82	-0.826	-0.223	-0.238	-0.221
(Rural - 0, Urban-1)	*(-18.63)***	*(-19.79)***	*(-19.95)***	*(-13.67)***	*(-14.51)***	*(-13.53)***
Regular Salary	-0.165	-0.165	-0.186	-0.544	-0.5	-0.53
	*(-4.21)***	*(-4.20)***	*(-4.75)***	*(-23.91)***	*(-21.95)***	*(-23.39)***
HoH Education	-0.337	-0.335	-0.333	-0.229	-0.229	-0.227
	*(-55.04)***	*(-54.85)***	*(-54.75)***	*(-103.56)***	*(-103.48)***	*(-102.87)***
HoH Age	-0.012	-0.012	-0.012	-0.016	-0.018	-0.017
	*(-9.77)***	*(-10.05)***	*(-10.06)***	*(-31.80)***	*(-34.31)***	*(-32.10)***
Constant	8.645	7.262	7.45	1.572	3.94	2.94
	*(60.56)***	*(60.38)***	*(71.20)***	*(27.11)***	*(76.77)***	*(71.14)***
No of Obs	100,348	100,348	100,348	100,348	100,348	100,348
LR Chi2	*6,417.48*	*6,301.55*	*6,265.53*	*17,865.51*	*18,402.11*	*17,885.78*
Absolute value of z-statistic in parentheses						
*** significant at 1% level;*						
Note (1): GDP Growth Per State measured for different periods of length preceedng the 2009-2010 HCE Survey, see column headings for each period						

Table 3.5: Aggregated Logit Regression outputs at various time-lagged GDP growth rates, using the World Bank-methodology poverty lines at $1pppd, at Nominal Exchange rates and Purchase Power Parity Exchange rates.

Where consumption has been converted from Indian rupees to US dollars by using nominal 2009 exchange rates and poverty is measured at $1pppd, results in tables 3.4 and 3.5 are consistent and significant. Households are less likely to be poor as

GDP growth rates rise, regardless of the time growth is measured in. Additionally, where GDP growth has been a result of increasing outputs from the Services sector, households are also less likely to be poor. Raising the poverty line to $1.90 produces similar results, with the only exception being the case of 3-year Services-led growth, which is positive and not significant. Where consumption has been converted from Indian rupees to US dollars by using 2011 PPP exchange rates, as 5-year GDP growth increases, it also increases the likelihood of households being poor. As the Services component increases as part of the overall 5-year GDP growth per state, it also increases the likelihood for households in the state to be poor. This is not the case with 3-year and 1-year growth.

While results remain widely the same, regardless of the exchange rates used to convert consumption to US dollars, they vary at the main variable of interest, GDP growth. One plausible explanation is that although the PPP exchange rates are more accurate for the sake of currency conversion, they are calculated using a basket of goods based on Western average consumption, that wouldn't necessarily reflect what an Indian household would deem as necessities. In this case poverty lines might be overestimating the amount of "poor", including people who would have otherwise been classified as middle-income earners, branded as "poor". Overall, there is evidence that GDP growth has contributed to lesser the likelihood of households being poor, where short-term growth is concerned, measured either 3 years and 1 year before the 2009 HCE survey. The only exception is 5-year GDP growth, that has a worsening effect on poverty, where PPP exchange rates are used.

Using 60% median Expenditure methodology to set Poverty Lines

Logit results from model version (1) are shown in tables 3.6 and 3.7, where the poverty line is calculated at State-level; the head of household is deemed "Poor", if his or her annual per capita expenditure is below 60% of the State median APCE. To compensate for non-random sampling for the urban sample, its' median has been adjusted so that the sample's 65th percentile is considered the population median. Table 3.6 presents regression results, using the Urban Sample only, with adjusted

median. Table 3.7 presents regression results using the entire sample, where the urban median has been adjusted.

Poor (Yes-1, No-0) *using 60% of the median for the Urban median-adjusted sample*	**5 Year %GDP Growth per State**	**3 Year %GDP Growth per State**	**1 Year %GDP Growth per State**
% GDP Growth (1)	0.005	0.001	-0.001
	*(6.32)***	*(1.04)*	*(-0.88)*
% Services	*0.782*	*-0.004*	*0.372*
(as a % of total GDP Growth)	*(7.83)***	*(0.06)*	*(6.69)***
Regular Salary	-0.528	-0.516	-0.515
	*(-20.70)***	*(-20.27)***	*(-20.26)***
HoH Education	-0.285	-0.284	-0.285
	*(-77.62)***	*(-77.51)***	*(-77.50)***
HoH Age	-0.014	-0.014	-0.013
	*(-16.72)***	*(-16.55)***	*(-16.32)***
Constant	1.413	2.11	1.89
	*(15.15)***	*(25.57)***	*(28.36)***
No of Obs	41,448	41,448	41,448
LR Chi2	*9,292.19*	*9,204.88*	*9,249.10*

Absolute value of z-statistic in parentheses
*** significant at 1% level;*
Note (1): GDP Growth Per State measured for different periods of length preceding the 2009-2010 HCE Survey, see column headings for each period

Table 3.6: Logit Regression outputs at various time-lagged GDP growth rates, using 60% of the median APCE to draw the poverty lines; median-adjusted Urban sample only.

Poor (Yes=1, N0=0) *using 60% of the median the entire Sample with median-adjusted Urban Sample*	**5 Year %GDP Growth per State**	**3 Year %GDP Growth per State**	**1 Year %GDP Growth per State**
GDP Growth (1)	0.007	0.002	-0.002
	*(12.24)***	*(2.77)**	*(-1.73)*
% Services	*1.048*	*-0.546*	*0.229*
(as a % of total GDP Growth)	*(13.13)***	*(-9.38)***	*(7.24)***
Sector	2.289	2.291	2.308
(Rural - 0, Urban-1)	*(108.98)***	*(109.02)***	*(109.57)***
Regular Salary	-0.653	-0.539	-0.545
	*(-22.47)***	*(-21.57)***	*(-21.86)***
HoH Education	-0.253	-0.252	-0.250
	*(-89.51)***	*(-89.34)***	*(-88.93)***
HoH Age	-0.015	-0.015	*-0.014*
	*(-23.56)***	*(-23.97)***	*(-22.84)***
Constant	-1.319	-0.024	-0.541
	*(-18.25)***	*(-0.39)*	*(-10.92)***
No of Obs	100,348	100,348	100,348
LR Chi2	*19,941.57*	*19,794.74*	*19,740.78*

Absolute value of z-statistic in parentheses
*** significant at 1% level; * significant at 5% level*
Note (1): GDP Growth Per State measured for different periods of length preceding the 2009-2010 HCE Survey, see column headings for each period

Table 3.7: Logit Regression outputs at various time-lagged GDP growth rates, using 60% of the median APCE to draw poverty lines; entire sample, including median-adjusted Urban sample.

The urban sample regression results show that as 5-year GDP growth rates increase, so does the likelihood of being poor for an urban household. 3-year and 1-year GDP growth are not significant. Growth rates, as a result of growth in the services sector are also significant in the cases of 5-year and 1-year growth; as the percentage of services increase part of the overall state GDP growth, so does the likelihood of being poor, for the urban households in that state. The rest of the variables follow the pattern identified already in the regression results where the World Bank methodology was used to draw poverty lines. As such, regular salary households have less likelihood of being poor and so have households with an educated head and an older head. This is consistent with literature, suggesting that regular salary households have better forecasting financial ability and can therefore, budget and save, as a way to mitigate against poverty. The constant signifies that if all else was held fixed, households would be prone to being poor.

Table 3.7, demonstrates the effects of GDP growth on poverty, using 60% of the median to draw poverty lines, where the entire sample is used, including the median-adjusted, urban sample. 5-year and 3-year GDP growth increase also increase a households' chances of being poor. One-year GDP growth is not significant. In all time periods, households are more likely to be poor, as the percentage of services increases within the overall state GDP growth. Urban households are more likely to be poor, all else kept constant. This is one of the main differences to the results using the World bank to draw poverty lines, here urban households are less likely to be poor.

In both cases, households with regular salary are less likely to be poor. Additional years of age and education of the head of household do act as a deterrent to poverty, in this case too. This is consistent with the World Bank poverty lines logit results earlier in the section.

7. Conclusion

Using absolute and relative methodologies for calculating poverty rates in India has produced diverse results. Firstly, the World Bank methodology, using PPP rates has produced higher absolute poverty rates than the relative 60% of the median methodology; namely the “All India” poverty rate is 31% for the $1pppd poverty line and 57% for the $1.90pppd poverty line. The “All India” poverty rate is 20% when the 60% of the median poverty line is used, for the entire sample, having adjusted the median of the urban part of the sample. Poverty is 35% for the Urban sample, when adjusted for non-random sampling. Large dispersion in poverty rates between States persists, regardless of the methodology used. Spatial analysis confirms that neighbouring states present very different growth and poverty rates, emphasising the effects of local legal and welfare systems in every Indian state.

Secondly, while GDP growth seems to broadly have a positive impact on absolute poverty rates, the opposite appears to be true for relative poverty rates. Absolute poverty rates have been constructed using the same benchmark across the whole of India and accounts for absolute expenditure in monetary terms. In this sense, it follows from literature that growth would have had a positive impact on poverty measured in this particular way. Relative poverty lines, on the other hand, have been constructed at State-level, thus even if the heads of two households, in separate states, spend the same amount per year, they might be on different levels across the poverty scale, depending on where the poverty line has been set, for each state. This offers the benefit of accounting for localised wage and employment levels and also expenditure patterns and local prices. Conversely, the absolute poverty line has been arbitrarily set by The World bank at $1.90 and does not allow for any localised variation. Regression results show that households in Indian states that experienced higher GDP growth five years prior to the HCE survey, are more likely to be poor. This is consistent for both absolute and relative poverty, apart from the case of measuring poverty using the World Bank methodology, where expenditure has been converted, using nominal exchange rates. Medium and short-term GDP growth, when significant, has had a reducing effect on poverty. In concurrence with the results of the effects of longer-term GDP growth, I draw the following two conclusions: there is an immediate

positive effect on poverty as a result of high GDP growth rates, while this is reversed in the longer-term of a 5-year period. One plausible explanation consistent with literature discussed earlier is that while households benefit from GDP growth in terms of immediate boost in income, and therefore expenditure, employment in India is not necessarily secured in the long-term. This also explains why absolute poverty rates seem to benefit from growth, but relative poverty rates do not. An alternative explanation could stem from Kuznets hypothesis, indicating that what I observe in the relative poverty rates, is in fact the first part of the inverted U-shape Kuznets curve, demonstrating the worsening in inequality before an improvement is observed. Kuznets suggests government fiscal policy can redistribute income from those owing production factors to skilled labour, thus affecting poverty and inequality rates. There are a few points to consider however, regarding the Kuznets hypothesis. Although the hypothesis is concerned with inequality and not poverty, I discussed in the theoretical section of this paper that the relative poverty measure I have used, incorporates local standards of average community expenditure levels, culture and lifestyle thus taking into consideration inequality to some degree. However, Kuznets assumes growth due to industrialisation, while the growth observed in India in 2010 is either through Services or Industry and has been the result of foreign direct investment and exports, as discussed in earlier sections. Foreign direct investment is often attracted to the hosted country due to low labour costs, therefore although there would have been an initial boost in local employment to meet foreign demand for goods and services, this does not necessarily mean that employment would be secured long-term or that household purchasing power would increase in line with inflation. Additionally, as the world economy slowed down in 2010, so did demand for exported goods and services, that would have reduced the workforce needs associated with foreign direct investment ventures. This point is further supported in the regression results where regular salary households are less prone to be poor. Urban households are more likely to be poor as a result of GDP growth and they are also more likely to be poor if the services sector contributed more in the state GDP growth.

Finally, higher rates of services as a component of GDP growth per state, produce contrasting results, depending on the methodology used for setting poverty lines. When I use the World Bank methodology to set poverty lines, households are less

likely to be poor, because of the expansion in the services sector. That is not to say that the head of household is employed in the services sector or that the household income comes from the services sector. It means that where GDP growth has been enhanced as a result an expanding services sector within the state, households in this state are less likely to be poor. The opposite is shown where the 60% of the median methodology is used to set poverty lines. In this case households are more likely to be poor as a result of services expansion, contributing to the state GDP growth. The latter can be explained through existing literature and the discussion in section 2; the services sector is very diverse and includes the transport sector, alongside banking and insurance, communications, hotels and restaurants. Overall, some level of pre-existing education or technical skill is required in order to be employed in most of these sub-sectors. It then follows that an expansion in services sector would have only advantaged the already educated and skilled labour force, while disadvantaging further the uneducated or unskilled, both often associated with the extremely poor. This holds in the case where the relative poverty rates are concerned but not in the case of the absolute poverty rates.

Chapter IV

1. Introduction

Gross Domestic Product growth is often described in literature as an enhancer to income (Ravallion 2001, Squire 1993, Deiniger & Squire 1996). Studies suggest that not all income level groups within society benefit the same amount, however. Time lags, negative trickle-down through government spending and uneven welfare and labour frameworks are reasons attributed to uneven income growth (Stiglitz 2015, Greenwood 2010). Uneven income growth leads to financial inequality amongst the population. Marginal Productivity theory (henceforth MPT), in neoclassic economics, suggests that the gains from GDP growth trickle down in the wider population of a country through government spending and private investment. Additionally, each member of society gets back what they input. In other words, renumeration should equal marginal productivity. Members of society closer to the top income levels benefit more or faster from growth, while those at the bottom of the income distribution scale are worse off (Friedman 2005). This has implications for pre-existing inequality, because only members of the labour force with pre-existing education and labour skills would be able to benefit from the economic expansion.

In India, internal migration from rural to urban areas, has been linked to Gross Domestic Product (henceforth GDP) growth in the late 2000s, as workers migrated in search of employment (Maheshwari, 2006). Urban population accounted for 31.8% of the total Indian population in 2011, up from 27.8% in 2001. Annual average urban growth was 3.18% between 2001 and 2011 and annual average rural growth was 1.22% for the same period.[33] Changes in labour force are also consistent with internal migration figures, as employment in industrial and services sectors have replaced agricultural employment increasing by 6% and 4% respectively from 1995 to 2010.[34]

[33] Selected Socio-Economic Statistics India-2011, Government of India, Ministry of Statistics and Programme Implementation, Central Statistics Office, Social Statistics Division, New Delhi, October 2011, p.20.

[34] Selected Socio-Economic Statistics India-2011, Government of India, Ministry of Statistics and Programme Implementation, Central Statistics Office, Social Statistics Division, New Delhi, October 2011, p.20.

It is, therefore, unclear if within the GDP growth context of the late 2000s, inequality amongst different income levels of the population would have decreased. There are some additional considerations within the MPT framework that add uncertainty over the effect of economic growth on inequality. Firstly, government spending is left to be determined at a State level, therefore the underlying legal framework around the labour market, schooling and welfare for social support is already posing differences at a State level. Regional differences occur within this setting, where neighbouring States might experience largely varying levels of inequality. This has implications in policy-making as a one-fits-all approach to tackle inequality might benefit some States but harm others. Secondly, increased urbanisation has also resulted in increase in slum dwellers within large cities, whose outputs are not quantified unless they are employed in formalised businesses and organisations, which is often not the case. Services and industrial workers' outputs in contrast worth more and are relatively easier to measure. Within this context, the urban population type of dwellers and type of labour mix will determine how inequality has been affected within each State. Within mega-cities like Mumbai or Delhi, for example, where the biggest slums in India are located, much of the population is employed as casual labour, therefore, the balance between casual and regular workers determines how income is earned amongst the different groups of urban population.

Recent search on the topic of inequality in India mainly evolves around identifying the effects of India's economic liberalisation from 1993 to 2004 and the difference in inequality between rural and urban populations. Chamarbagwala (2010) finds that economic liberalisation from mid-90s to mid-00s in India, has led to decreased welfare gap between rural and urban population, at the lower and top end of the population distribution, while the welfare gap has increased for the middle quintiles. Caste division, which is prominent in India, has also been linked to increased wealth inequality as a result of economic liberalisation in the early 2000s (Zacharias & Vakulabharanam, 2011). Spatial inequality for urban areas is attributed to the within-state income differences, using consumption expenditure (Azam & Bhatt, 2018). Chauhan & Mohanty (2016) use the National Sample Survey (henceforth NSS)

datasets, which is also used in this paper, to show that inequality has increased between 2% and 9% for 64 regions from 1993 to 2012, in the overall sample. Although they deal with the regional comparability issue between NSS rounds, it is not clear if they deal with the non-random sampling methodology in the 1993-94 (Round 50) and the 2009-2010 (Round 66) NSS. There is a gap in literature around how urban inequality in particular, has fared as a result of the GDP growth that followed economic liberalisation. Additionally, although the NSS is widely used for poverty and inequality research, the non-sampling issues of the NSS rounds are not accounted for.

This paper explores the change in inequality between 1994 and 2010 amongst the urban population, within the economic shift created in the Indian economy at the peak of GDP growth in 2010. In doing so, I use Round 50 and Round 66 of the National Sample Surveys. I deal with the non-random sampling methodology of the urban sub-sample. The second section includes the literature review, the third provides information around the data used and explains how I have mitigated non-random sampling for the primary dataset used. The fourth section discusses the methodology used to construct Gini coefficients per State for two Rounds of the dataset used. It also discusses the model that links inequality to GDP growth and government spending. The fifth section presents results of the geographic analysis between inequality in 1994-95 and 2009-2010, across different Indian States. It also presents regression results of the model developed in section four. The sixth section includes robustness tests, replacing growth in the main model, with two separate components one for services and one for industrial growth. The seventh part concludes.

2. Literature Review

a. Inequality and Growth in India within the Marginal Productivity Theory Hypothesis

India's GDP growth in the late 2000s has been driven by an increase primarily in services sector outputs and less in Industrial sector outputs. Growth rates have ranged between 5.53% (in 1990) and 10.25% (in 2010). The annual average over this period has been 6.6% and the trend growth rate has been increasing over time. Over the same time, per capita income has grown tenfold in current terms from 9,545 rupees in 1993 to 89,660 in 2013, while in constant terms it has grown by 175% from 17,784 rupees to 48,910.[35] Indian real per capita income has been consistently rising since the mid-1990's. This points to the fact that headline income in India has grown over the last 20 years alongside economic growth.

Figure 4.1 shows a breakdown of GDP shares by sector. GDP growth has been driven by growth in the services sector, which has increased from about 40% to over 55% of GDP over the period observed in this paper, while industrial outputs have largely remained the same and agricultural output has declined. Literature is not as clear on the driving force of GDP growth; Dehejia and Panagariya (2010) suggest that growth in larger, urban industrial facilities has accelerated growth in services, because of spill-overs between outputs and labour laws. Under the MPT those employed in the higher end of the Services and Industrial sectors would have benefited the most from the GDP growth, leading to unequal distribution of income for those employed in lower paid jobs, or those employed informally. It is plausible to consider that growth in the industrial sector would impact on the outputs in the "services" sector and vice versa, because the "Industry" component of Indian Accounts includes sectors such as Mining & Quarrying, Manufacturing, Construction and supply of Gas, Water and Electricity, with the latter being directly linked to providing the right infrastructure for urban population's wellbeing. Additionally, the "Services" component in the Indian Accounts includes sectors such as Transport, Communications, Railways, Storage, Hotels &

[35] Indian Gros National Income per Capita – World Bank Indicators. Source: https://data.worldbank.org/indicator/NY.GNP.PCAP.KN?locations=IN accessed 10 November 2017

Restaurants, Banking & Insurance, Real estate, Public Administration and other services. At first sight, by “Services” one would think of the popular Indian call centres of the 2000s. However, this GDP component includes all of the sub-sectors mentioned above, that vary in skill and education level necessary and also vary largely on remuneration and they include both public and private workers, just to name one of the different aspects. For example, a bank middle management employee is in the same category as a train driver, or a waiter. These professions vary largely on income and education needed. The development of the service sector in particular, has been a result of increased Foreign Direct Investments (henceforth FDI) and foreign companies benefiting from government initiatives and partnerships with local companies in the 2000s. FDI is usually associated with lower labour costs in the hosting country, therefore, despite the overall increase in employment, this has not necessarily resulted in a well-remunerated labour force. Banerjee and Duflo (2007), suggest that an expanded middle class has developed through the growth years in India, in particular around big cities. Therefore, it is acceptable to think that within the MPT framework, GDP growth would have enhanced inequality amongst different population groups in the urban sector.

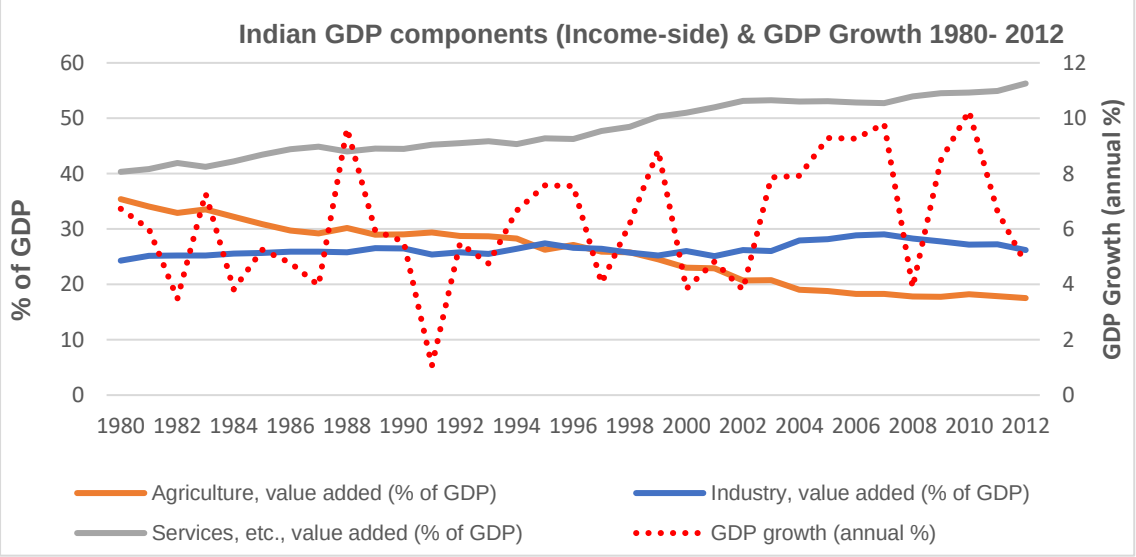


Figure 4.1: Indian GDP Growth (%) and GDP Components (% of GDP) Income-side. Source: World Bank Indicators

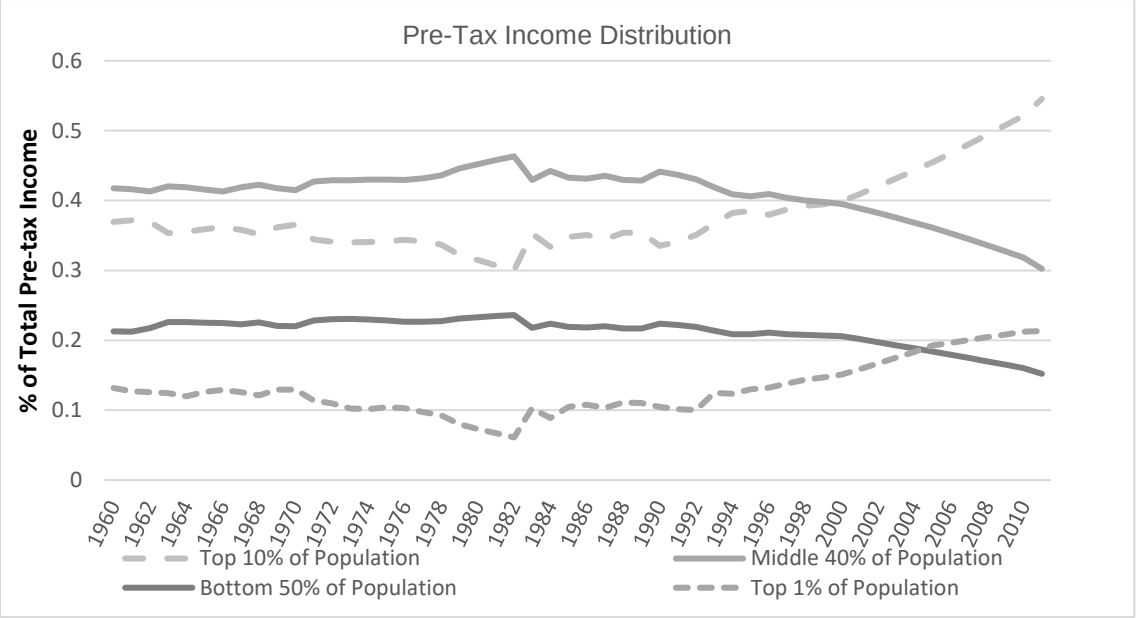


Figure 4.2: Pre-tax Indian income data split in percentiles. Source: "Wealth & Income Database" of the World Inequality Lab and GDP Growth, World Bank

Figure 4.2 demonstrates how the distribution of pre-tax income has changed over the decades for Indian population percentiles. Although inequality has always been evident in India, after the mid-1990's there was a downwards shift in the percentage of total income held by the middle 40% and bottom 50% of the population. Until the mid-1990's the bottom 50% of the population held on average 22% of total income and the middle 40% of the population held on average 42% of the total income. These shares of total income were relatively constant over the longer term, from the 1960's until the mid-90's. After the beginning of the economic liberalisation era for India in the 1990's, the top 10% of the population seems to have rapidly accumulated more and more of the total income share, from an average of 34% in 1990 to 52% of total income in 2010.It follows that with the top 10% of the population holding more than half of total income, inequality would be present. Empirical work has shown that indeed inequality in India has increased after the de-regulation from 1980's onwards, where pre-existing disparities amongst existing caste, education and socioeconomic differences were amplified (Assouad et al 2018); research also shows that a trend stared in the early 90's for the top 1% of the Indian population, that held a quarter of the total income by 2010 (Banerjee & Piketty, 2005). Additionally, the middle class has lost almost 10% of its' share of total income on the lead up to the peak of GDP growth in 2010. The relationship between inequality and GDP growth is not straightforward, because GDP

Growth has also fluctuated over the decades. An issue with using national accounts data to measure GDP is that in India the taxed records only cover around 7% of the adult population in 2010 and therefore do not necessarily represent the entire picture (Assouad et al 2018).

b. Urbanisation

Urbanisation picked up pace during the late 2000s, due the accelerated economic growth. The share of urban population has increased from 25.7% in 1991, to 27.8% in 2001 and to 31.16% in 2011.[36] Additionally, 2011 Census revealed that towns with population of more than 100,000 grew from 68% to 70% and the amount of cities with more than 1 million residents has almost doubled from 28 in 2001 to 53 cities in 2011 (Sadasivam & Tabassu, 2016).[37] Urbanisation raises issues such as lack of basic facilities, swage, clean water, housing and transportation that need to be addressed through increased investment, both public and private.[38] It has also been shown that Industrial growth encourages town growth, because as industry requires more labour to achieve increased outputs, internal migration has filled that gap in the case of India (Meheswari 2006). Rising inequality in India has been found to be an urban phenomenon (Cain et al, 2014). The urban poor are considered as some of the poorest amongst the Indian society because they form part of the slums. Urban slums are also growing as more rural unskilled labour also moves to cities in search of higher paid jobs. Therefore, issues such as housing arise, coupled with the informal nature of employment, lack of access to medical care and welfare facilities, that increase inequality. Official numbers are also under-reported because a lot of the slum-like developments that are un-authorised by the government, are not included in statistical surveys or the Census. For example, more than 100,000 people live under bridges in Delhi, who are rickshaw-drivers or casual workers, their income and living conditions

[36] 2011 Census

[37] Indian Census 2011 definition of urban area: (a) All statutory places with a municipality, corporation, cantonment board or notified town area committee, etc. (b) A place satisfying the following three criteria simultaneously: i) a minimum population of 5,000; ii) at least 75 per cent of male working population engaged in non-agricultural pursuits; and iii) a density of population of at least 400 per sq. km. (1,000 per sq. mile). Source: Census of India 2011 Meta Data http://www.censusindia.gov.in/2011census/HLO/Metadata_Census_2011.pdf accessed 11 July 2018

[38] High Powered Expert Committee, “Report on Indian Urban Infrastructure and Services”, Ministry of Urban Development, Government of India, 2011

are not included in neither the official surveys nor in the Census, as only people in permanent settlements are interviewed (Agarwall, 2011).

c. Government Investment in the Economy

Government spending is expected to make up for the inequalities created by growth and urbanisation, through improving the infrastructure necessary for people to have a decent standard of living. Figure 4.3 shows that while gross capital formation accelerated in the mid-2000s, government final consumption expenditure remained stable, as a percentage of GDP.[39] This creates a positive impression, considering that as GDP grew, so did government expenditure on building or improving public infrastructure and generation of public goods. The gross capital formation component includes expenditure on improving fixed assets like drains, construction of roads, railways, schools, offices and hospitals. Between 2007-2012 Indian states were going through the Eleventh Five Year Plan, with the main objective of expediting annual average growth. In reality, the global financial crisis, the severe fluctuations in international oil prices and strong inflationary pressures in domestic economy[40] have resulted in the deceleration of growth rate to 6.7% (at 1999-2000 prices) during 2008-09 with 1.6% growth in agriculture, 4.2% in industry and 10 % in services sector. At the same time, household total expenditure seems to have slowed down, especially towards the end of 2000s, indicating that households have not maintained their spending power, through the period of GDP growth acceleration.

[39] See Appendix C.1 to Chapter IV, for Indian National Accounts Components definitions, - Expenditure side
[40] inflation peaked at 12.8 % in August 2008

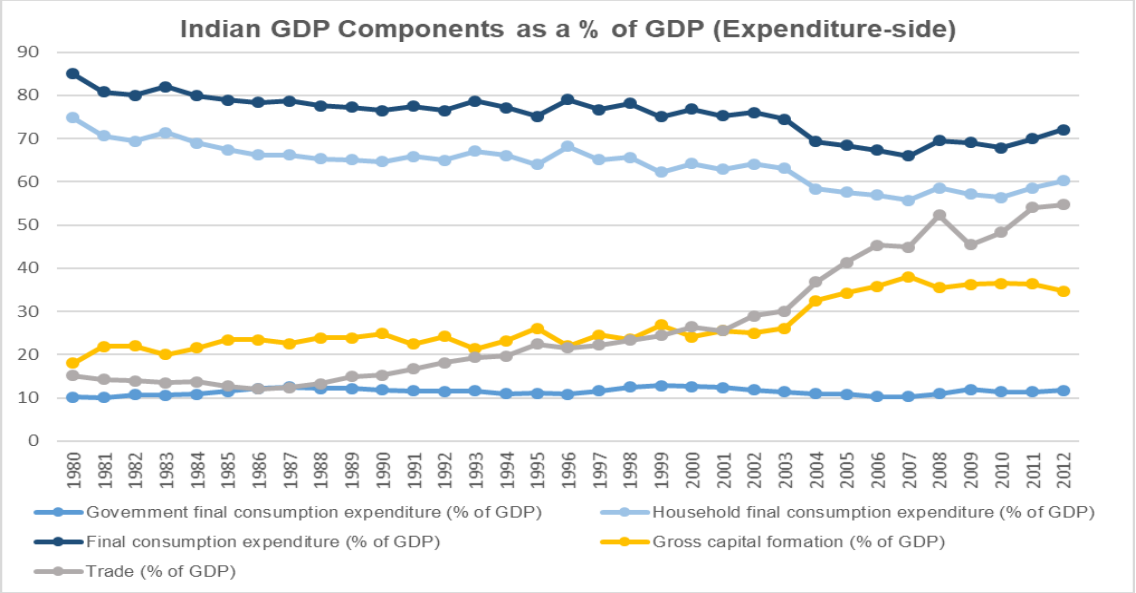


Figure 4.3: Expenditure-side components of Indian National Accounts, expressed as a percentage of GDP. Source: Indian Ministry of Statistics and Programme Implementation

According to the 11th Five Year Plan, investment in Social Services was 30.69% and made up the largest share of total government expenditure. This includes expenditure on education, medical and public health, housing, urban development and slum area development, labour and employment and social security and welfare. These are all area associated with inequality reduction as they are closely related with skills and training development, employment and improved living conditions, such as health, water and sanitation and slum regeneration. Therefore, there is some support around the idea that government expenditure continued to expand with growth to mitigate against inequality. Whether that was enough to counterbalance the forces of urbanisation and pay gap, will be discussed in later sections of his paper.

3. Data

The data is made up of 41,736 urban households, located across the 35 Indian States. The urban expenditure data used for constructing inequality indicators are drawn from the 2009-2010 Round (Round 66) of the National Sample Survey of India, labelled "Household Consumer Expenditure", here forth HCE, which covers all States and Union Territories of India. The HCE is conducted every 5 years by the Indian Ministry of Statistics and the National Sample Surveys Office, in particular. This round of data was taken at the peak of a ten-year growth spur, wherefrom we can go backwards to measure the effect of various periods of growth, leading up to 2009-2010. A stratified multi-stage design has been adopted for the 66th round survey. The first stage units (henceforth FSU) are the 2001 Indian Census Urban Frame Survey (henceforth UFS) blocks, in the urban sector. The ultimate stage units (henceforth USU) are households.

The HCE dataset provides information at household level for annual expenditure on foodstuff, alcohol, tobacco, fuel and light, durables, transportation, education, medical costs, entertainment, rent and utility costs. I add up all these costs to obtain the annual household expenditure. The dataset provides information at individual level on age, sex, education, marital status, source of income, religion and caste. I use the household primary source of income information to obtain the percentage of casual labour households per State.

Using HCE data has several advantages for the purpose of this paper. Firstly, HCE is used for official welfare calculations of deciding poverty lines within India, it is therefore a widely accredited dataset. Secondly, this dataset is also comprehensive in terms of household assets, consumption and food expenditure and offers ample details of wealth holdings such as land and dwelling, along with acres owned, whether the land is irrigated, cultivated or leased out etc. Furthermore, it measures all goods and services consumed within the household, even where the goods have not passed through official markets, an advantage of using consumption rather than income data. In addition, the HCE data also contain information about value of goods and services produced as household output and used by its members themselves during reference

period, value of goods and services received by households as remuneration in kind, value of goods and services received by households through social transfers in kind, by government and non-profit institutions, as well as background information on the composition of the household and individual member education, caste and religion characteristics. Finally, round 66 also includes the creation of three new States: Uttaranchal, Chhattisgarh and Jharkhand, all of which were created in 2000. The existing three states that they came from are Uttar Pradesh, Madhya Pradesh and Bihar respectively.

This paper uses consumption, rather than income data to calculate state-level Gini coefficients. This was necessitated by the nature of the data in the HCE, which reports consumption of various commodities, but does not contain a measure of income. However, household consumption may be a superior indicator of living standards in developing countries, because consumption better reflects undeclared income, such as foodstuffs produced in-house. An additional conceptual issue is that savings rates of poor households are likely to be very low, and thus the difference between a Gini coefficient calculated using consumption and one calculated using income (perfectly measured) is likely to be small for households at the lower end of income distribution.

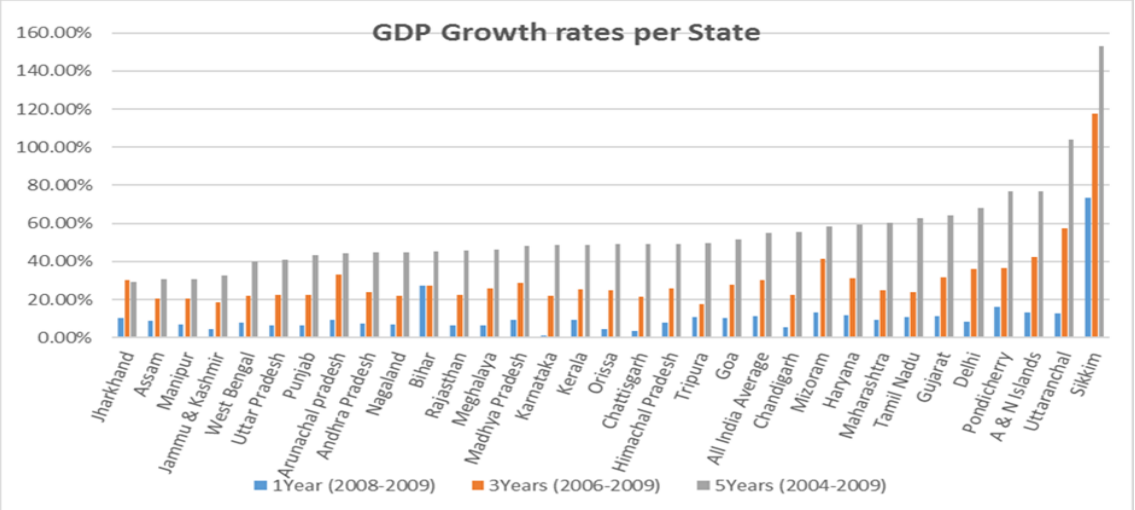


Figure 4.4: GDP Growth per Indian State for different time periods. Source: Indian Ministry of Statistics and Programme Implementation

GDP growth data is sourced from the Indian Ministry of Statistics and Programme Implementation GDP at Factor Cost per State. Using GDP growth will allow for regressions that combine the use of cross-section data for poverty with growth data

that represents a period of time. Figure 4.4 shows the various growth rates, per state for three different periods, preceding the peak of GDP Growth in 2009-2010. The data confirms the literature around growth in the late 2000s, being driven by an expansion in the services sector (Figure 4.1). Finally, Government Expenditure data on Social Security and Welfare have been sourced from the Indian Planning Commission, State-wise Plan Outlays and Expenditure.[41]

Non-Random Sampling

The sampling methodology of the HCE data poses some considerations, because the data has been non-randomly collected. In Round 66 (2009-2010), households in the urban sector are pre-selected according to expenditure, as follows: the top 10% of Per Capita Expenditure (PCE) forms 25% of the original sample, the middle 50% of the sample includes households in the 60% of the PCE distribution and finally the bottom 25% of the sample is made up from households in the bottom 30% of the distribution, in terms of PCE. As a result, the sampling methodology followed in the urban sector means that the lower 30% of the population's PCE distribution has been under-weighed in the sample by 5% and similarly, the middle 60% of the population's PCE distribution has been underweighted in the sample by 10%. By assigning probability weights to each per capita expenditure group, the inverse of the probability that the household was surveyed is used for estimating the Gini coefficients.[42]

Round 50 (1994-1995) will be used to examine how inequality has changed in the period of 15 years between the time when Indian economy was liberalised to when it experienced high GDP growth rates. This Round also has non-random sampling issues, that affect household distribution along the expenditure scale.[43] At first stratum level, the overall urban sample has been split in 9 blocks, depending on whether the population of the urban area where the household is located is below or above 1 million people. In strata blocks 6 to 9 where the population is above 1 million, households are then split in two sub-strata as follows: households with per capita expenditure of

41 Source: http://planningcommission.gov.in accessed May 2018
42 See Appendix C.3 to Chapter IV for Summary of sampling methodology for Round 66 of the HCE.
43 See Appendix C.4 to Chapter IV for Summary of sampling methodology for Round 50 of the HCE.

more than 1500 rupees are put in sub-strata 1 and all other households in sub-strata 2. In strata blocks 1 to 5 where the population is below 1 million, households are then split in two sub-strata as follows: households with per capita expenditure of more than 12000 rupees are put in sub-strata 1 and all other households in sub-strata 2. For the “affluent” blocks 4, 6 and 8, 4 households have been selected from sub-stratum 1 and 6 households from sub-stratum 2. For all other blocks, 2 households have been selected from sub-stratum 1 and 8 households from sub-stratum 2. This non-random sampling design favours “affluent” households that have a PCE of more than 1500 or 1200 rupees depending on the urban area they live in as it actively directs the percentage that will be sampled. I have no way of knowing how the household normal distribution would look like in case a random sampling approach would be followed hence I cannot correct with the use of weights, as I have done in Round 66. I will therefore, not use Round 50 in the regression analysis, but will use qualitative analysis to provide context for results.

4. Methodology

a. Obtaining the Gini Coefficient with Probability weights

The Gini coefficient measures inequality of distribution. In the context of this paper, it has been constructed to measure expenditure inequality within each of the Indian States, by estimating how far the weighed mean expenditure of urban households lie, from the 45-degree line of perfect equality. A second "all India" inequality measure has been created to estimate intra-decile inequality. Debraj (1998), suggests four principles that help assess how efficiently an inequality measure performs. In this case I am not merely using these to assess Gini's suitability as an inequality measure, but rather to assesses its' adequacy within the Indian data context. Firstly, the anonymity principle states that all members of the population measured should be viewed as identical hence, it doesn't matter who earns what. Traditionally, in India castes have often directed who does what, in terms of employment, and that in extend determines who earns what. Some groups for example, would never be allowed to even obtain a clerical job, because of their birth caste. Therefore, within the traditional structure of the Indian society, the anonymity principle does not entirely hold. However, this aspect of Indian society is becoming less and less prominent, as education is improving people's concepts of class divide by birth right, thus improving the application of the anonymity principle. Secondly, the population principle discounts the size of the population measured and is only interested in the proportions and ranges of income amongst different income groups. This is particularly important in India, where a measure of inequality should transverse the geographic vastness of the land and the large population numbers. Admittedly, there are geographic variations that have economic implications due to extreme climate, accessibility and production restrictions around the Indian landmass. I mitigate this to a certain extent, by calculating the Gini coefficient at State level, where there is relative homogeneity, in terms of culture, legal framework and social welfare rules. Thirdly, the relative income principle, also discounts the absolute values of income and focuses on the differences in income amongst the various income groups, as well as how much of the overall income does each group maintain. This principle is satisfied, as I use expenditure rather than income for calculating the Gini coefficients. Using expenditure reflects the goods and

services that a household both needs and likes, allowing for a reflection of the general level of income within the household. However, I avoid having to deal with extreme income values, as households with high income would also save and invest, aspects that are not reflected in my dataset. Finally, the Dalton principle of regressive transfers, suggests that if in the existing distribution of income, a transfer from the richer to the poorer individuals occurs that does not leave the richer individual poorer than the poor, then a series of such transfers will create a state of affairs where the distribution of income will be more equal than the initial one. Analysis would need to be conducted to determine if transfers from India's rich would not result in them being poorer than the poor, for this principle to hold; however, considering the research into the Indian middle class expansion (Banerjee and Piketty, 2005), coupled with India's position as one of the ten countries in the world that host the most billionaires, it is reasonable to assume that such transfers towards equality would be possible, without leaving the wealthier parties worse off than the poorer ones.[44]

The Gini coefficient measures the difference between all possible pairs of expenditure within he population and totals the differences. It is then normalised by the product of total population squared by mean expenditure, as follows:

Inequality per State

$$I_S = \frac{1}{2\sum Hh^2 M_S} \sum \sum Hh_j \; x \; Hh_k \; |y_j - y_k| \qquad (1)$$

Where, inequality per State ($\boldsymbol{Is}$) is the sum of all expenditure differences across every household pair in the State ($|\boldsymbol{y_j - y_k}|$), weighed by the number of household pairs in the State ($\boldsymbol{Hh_j \; x \; Hh_k}$). This sum is then normalised by dividing it by the population of the state sample squared ($\boldsymbol{\sum Hh^2}$) and the mean expenditure across the state ($\boldsymbol{Ms}$).

[44] India's 100 richest people, 2018 Ranking, Forbes Magazine, https://www.forbes.com/india-billionaires/list/3/#tab:overall, accessed October 2019

Using urban data from Round 66 of the HCE surveys of 2009-2010, I construct the annual total expenditure per household. All items included in Annex C.2 to Chapter IV, make up the total household expenditure. I divide the household annual expenditure by the number of household members to produce the per capita annual expenditure. I use one per capita expenditure observation per household to calculate the expenditure differences across every household pair in the State ($|\boldsymbol{yj}-\boldsymbol{yk}|$) and avoid overweighing larger households. The same process has been applied to Round 50 in order to obtain annual, urban, per capita expenditure.

In order to correct for non-random sampling in Round 66, I assign the survey weights to each household, as per Appendix C.3 to Chapter IV. As such, households in the bottom 30% of the annual expenditure distribution have been assigned with probability weight of 0.25, those between the 30% and 90% of the annual expenditure distribution have been assigned with a probability of 0.50 and finally those on the top 10% of the distribution have been assigned with 0.25, as per the survey design. By applying probability weights, I use the inverse probability to the one assigned to each observation, thus correcting for non-random survey sampling.

To obtain the intra-decile Gini coefficient, I first estimate the upper values for the 10 quantiles that make up the entire urban sample, per State. I then repeat equation (1), using all households with each quantile, per State.

b. Model linking Growth to Inequality

In the literature section, I discussed the aspects of GDP growth that are expected to have an effect on inequality within the MPT hypothesis. It follows that beyond GDP growth rates, type of employment is also a contributing factor when inequality is considered, because within the MPT hypothesis, a casual worker would not be contributing and therefore earning as much as a regular salaried bank clerk for example. Therefore, a dummy variable with the percentage of sample employed in Casual labour, per State, has been included in the model. Additionally, growth has

been expressed in two ways; firstly, I am using a variable expressing the absolute percentage change in GDP growth within the 1, 3 and 5 years preceding the 2009-2010 HCE Survey. Secondly, following up for the literature around industry and services leading the GDP growth, I have also included two separate variables that express the % change in Industry and Services respectively, as part of the overall State growth in each of the periods examined, i.e. 1, 3 and 5 years. Finally, Government Spending is also one of the factors that seem to influence inequality within he literature. Government spending allows for the increased GDP income to be passed down to all citizens. In this case the variable represents spending at a State-level on Social Security & Welfare.

$$I_S = aG_S + bL_S + cGS_s + d + e \qquad (2)$$

Where:

I_S expresses inequality, per State, as estimated by the Gini coefficient applying equation (1) on Round 66 expenditure data.

G_s expresses % GDP growth per state: Total % change in GDP per state, in Indian rupees.

5 Year GDP %change = (20092010GDP – 20042005GDP) / 20042005GDP

3 Year GDP %change = (20092010GDP – 20062007GDP) / 20062007GDP

1 Year GDP %change = (20092010GDP – 20082009GDP) / 20082009GDP

L_S expresses the percentage of Casual Labour, per State.

GS_s is the change in Government spending on Social Security and Welfare, per State from 2007 to 2010.

d expresses the constant

e expresses the error term, explained by the analysis residual.

In order to check for robustness, I replace the GDP growth variable in equation (2) with two variables that indicate how much of the GDP growth per State was attributed to growth in Services and Industry sectors.

$$I_S = aI_S + bS_s + cL_S + d + e \qquad (3)$$

I_s shows how much the Industrial sector has contributed to the overall State GDP growth for each of the 1, 3 and 5-year periods.

S_s shows how much the Services sector has contributed to the overall State GDP growth for each of the 1, 3 and 5-year periods.

5. Analysis and Results

a. Inequality measured by Gini

	R66 2009-10	R50 1994-95	Change in Inequality (simple point difference)	% Change in Inequality (Base year= 1994-1995)
	Gini Coefficient (pweights adjusted)	Gini Coefficient (no weights)		
All India	0.3206	0.3672	-0.0466	-12.69%
By State				
A & N Islands	0.3150	0.3350	-0.0200	-5.97%
Andhra Pradesh	0.3114	0.3612	-0.0498	-13.79%
Arunachal Pradesh	0.2831	0.3697	-0.0866	-23.42%
Assam	0.2956	0.3272	-0.0316	-9.66%
Bihar	0.3404	0.3641	-0.0237	-6.51%
Chandigarh	0.3830	0.4224	-0.0394	-9.33%
Chhattisgarh	0.3353	0.3655	-0.0302	-8.26%
D & N Haveli	0.2920	0.3874	-0.0954	-24.63%
Daman & Diu	0.2816	0.2751	0.0065	2.36%
Delhi	0.3190	0.3353	-0.0163	-4.86%
Goa	0.2290	0.3132	-0.0842	-26.88%
Gujarat	0.2816	0.3357	-0.0541	-16.12%
Haryana	0.3055	0.2997	0.0058	1.94%
Himachal Pradesh	0.3392	0.3401	-0.0009	-0.26%
Jammu & Kashmir	0.2591	0.2872	-0.0281	-9.78%
Jharkhand	0.3095	0.3641	-0.0546	-15.00%
Karnataka	0.3180	0.3734	-0.0554	-14.84%
Kerala	0.3621	0.4119	-0.0498	-12.09%
Lakshadweep	0.2937	0.3202	-0.0265	-8.28%
Madhya Pradesh	0.3210	0.3655	-0.0445	-12.18%
Maharashtra	0.3312	0.3817	-0.0505	-13.23%
Manipur	0.1968	0.1827	0.0141	7.72%
Meghalaya	0.2483	0.2923	-0.0440	-15.05%
Mizoram	0.2334	0.2384	-0.0050	-2.10%
Nagaland	0.2129	0.2532	-0.0403	-15.92%
Orissa	0.3386	0.3669	-0.0283	-7.71%
Pondicherry	0.3518	0.3369	0.0149	4.42%
Punjab	0.2933	0.3176	-0.0243	-7.65%
Rajasthan	0.3097	0.3311	-0.0214	-6.46%
Sikkim	0.2168	0.2837	-0.0669	-23.58%
Tamil Nadu	0.3041	0.3866	-0.0825	-21.34%
Tripura	0.2649	0.3224	-0.0575	-17.83%
Uttar Pradesh	0.3288	0.3558	-0.0270	-7.59%

Uttaranchal	0.2784	0.3558	-0.0774	-21.75%
West Bengal	0.3198	0.3461	-0.0263	-7.60%

Table 4.1: Inequality results per Indian State Source: HCE data analysis

Table 4.1 demonstrates the calculated Gini coefficients; both rounds of HCE data suffer from non-random sampling. Round 66 data have been assigned probability weights in order to correct for the sampling design, Round 50 data have not been altered in any way. Overall inequality, measured by the Gini co-efficient, has decreased by 12% from 0.3672 in 1994-95 to 0.3206 in 2009-2010 for 'All India'. To calculate inequality at 'All India' level, I have allowed for all urban households to be considered equally, across 35 States, not accounting for the percentage of total population that each State's population represents. Despite the fact that Round 66 has been altered to correct for non-random sampling, while Round 50 has not been altered, results are broadly consistent with other academic work. Firstly, conditions existed within the Indian post-liberalization time for urban inequality to reduce; commercial banks have been found to distribute 91% of total credit in urban areas (Reserve Bank of India, 2015), additionally, the expansion of banking services, in terms of loans and savings, has also been found to benefit the urban more than the rural population and microfinance programs have been found to have a positive impact on poverty and inequality reduction, within the urban population (Mehta and Battacharya, 2017). Secondly, Maitra (2017) who utilises the HCE datasets for a shorter period, from 1999 to 2004, to examine urban inequality through a durables-based model, has found that although inequality initially increased within the observed period, it decreased in 2004–2005. This is consistent with the findings in this paper, which although it observes a slightly longer period, from 1995 to 2010, it manages to capture the pre- and post-liberalization effects on inequality. On the other hand, results do not agree with Chauhan and Mohanty's (2016) work, who although have utilized the same HCE datasets for a similar period of time to this paper, have found inequality to have increased between 2% and 9% for 64 regions from 1993 to 2012. The difference to this paper is that they examine inequality across the entire sample, not just the urban one and also it is not clear in their paper, whether the non-random sampling in all HCE rounds has been accounted for.

Quantiles	Round 66 (2009-2010) Within-Quantile Gini (weighed)	Round 50 (1994- 1995) Within Quantile Gini (not weighed)	% Change in Inequality (Base Year 1994-95)
1	0.0714	0.1218	-41.38%
10	0.0938	0.1035	-9.37%
20	0.0419	0.0354	18.36%
30	0.0337	0.0270	24.81%
40	0.0306	0.0251	21.91%
50	0.0299	0.0252	18.65%
60	0.0296	0.0268	10.37%
70	0.0311	0.0314	-0.86%
80	0.0366	0.0376	-2.66%
90	0.0486	0.0573	-15.18%
99	0.1233	0.1196	3.09%
100	0.2181	0.1795	21.50%

Table 4.2: Gini Coefficients per Quantile. Data Rounds 50 & 66 HCE Survey

I find that inequality for 'All India' has improved within the bottom 10% of expenditure distribution and an even bigger improvement of 41% within the bottom 1% of expenditure distribution (Table 4.2). There is a smaller decrease in inequality within the 80th and 90th quantiles too. Although the magnitude of results can be partially attributed to correcting for non-random sampling in Round 66 but not in Round 50, the overall direction is supported by other literature. Chamarbagwala (2010) also finds that within the 2004 urban sample, inequality is lower at the 5th and 95th percentiles compared to 1993–1994. Results show that the 30th, 40th and 50th deciles have had the highest increase in intra-decile inequality, which points to increasing inequality within the lower-middle and middle classes. This is consistent with Banerjee and Duflo's (2007) research, who have observed expansion of middle class around Indian cities, in particular. There is an increase of 21% in inequality within the highest 1% of expenditure distribution. Finally, the range of inequality between the bottom and top ends of the distribution has also widened in 2009-2010 where the difference in Gini coefficients between the 10th and 100th centiles was 0.1243 points, up from 0.076points in 1994-95. That shows that although overall inequality has decreased, the difference in inequality between the poor and rich is getting much larger.

b. Geographic decomposition of Gini between States

In order to decompose inequality to regional level, I have also calculated the Gini coefficient within each State. By doing so, I am able to examine inequality between and within States. When examining inequality between States, I observe that the scale

of inequality has narrowed. As shown in the maps in figure 4.5 and figure 4.6, in 1995-96 inequality across Indian states ranged from 0.1827 to 0.4224, while in Round 66 inequality ranged from 0.1968 to 0.3830. The upper end of this range seems to have reduced substantially. However, the States at the two ends of the Gini distribution have remained the same; while inequality in Manipur increased from 0.1827 in Round 50 to 0.1968 in Round 66, Manipur remained the State with the lowest Gini coefficient in both Rounds. Similarly, although I observe a reduction in Chandigarh's Gini from 0.4224 in Round 50 to 0.3830 in Round 66, Chandigarh remained the State with the highest Gini coefficient in both Rounds. Figure 4.7 shows plotted Lorenz Curves for Manipur and Chandigarh. In Chandigarh, 50% of the population has around 20% of the overall expenditure within the State, while in Manipur, 50% of the population has just below 40% of the overall within State expenditure. This shows that the difference in expenditure amongst households in Manipur is not as wide as this in Chandigarh.

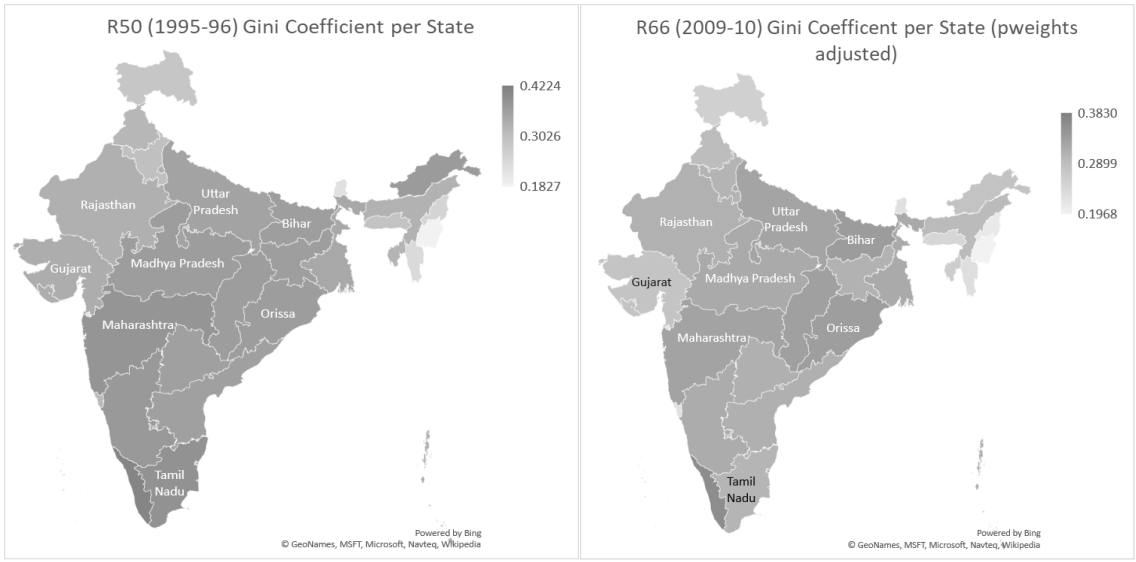


Figure 4.5 (left): Map of India with Gini Coefficients per State. Data Round 50 HCE Survey
Figure 4.6(right): Map of India with Gini Coefficients per State. Data Round 66 HCE Survey

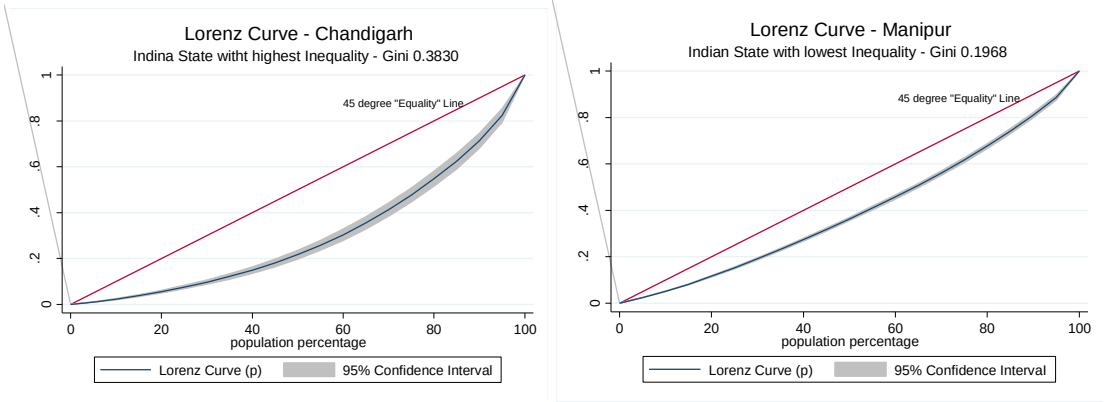


Figure 4.7: Plotted Lorenz Curves for Manipur and Chandigarh. Data: Round 66 HCE Survey

Between States decomposition highlights further regional differences. Goa experienced the biggest decrease in inequality by 27% and Manipur the largest increase in inequality by 8%. Additionally, neighbouring states also present varying levels of inequality, emphasising the regional aspect of government that affects living standards. For example, although two much larger States, Maharashtra and Karnataka with higher inequality of 0.3312 and 0.3180 respectively and surround Goa, Goa has kept its inequality noticeably lower at 0.2290 (Round 66 values). Similarly, although Assam has a higher inequality rate of 0.2956 and borders all four smaller States of Nagaland, Manipur, Mizoram and Tripura, all four have maintained their inequality rates lower than that of Assam, at 0.2129, 0.1968, 0.2334 and 0.2649 respectively.

c. Decomposition of Gini within States

I have calculated the intra-decile range of expenditure per State, for Round 66 (see Appendix C5 to Chapter IV for full table). I have included graphic representations for three of the deciles below, to demonstrate my findings. Figure 4.8 shows the bottom 10^{th} decile range of APCE, per State and reveals that even at the bottom end of the overall expenditure distribution, States differ substantially. While there is overlap between the minimum and maximum 10% of APCE across States, there is a distinct cluster of 7 States at the lower end of the distribution, where the maximum decile APCE is below 8,000 rupees. The APCE range in these 7 countries also appears to be relatively narrow, with an average minimum-maximum expenditure of 1,190 INR. I observe that 22 of the States have a similar range of average 1,300 INR between range minimum and maximum expenditure. This non-parametric decomposition technique shows that for the majority of States, intra-decile inequality within the bottom 10^{th} decile is narrow. It further shows that despite the overlap, there are also 6 States at the higher end of distribution with minimum APCE above 10,000 INR, that is 2,000 INR above the maximum APCE of 20% of all States.

Figure 4.9 shows the 50^{th} decile range of APCE, per State. I find that 19 of the States, that is 54% of total States, have intra-decile range expenditure below 4,000 INR, with

an average within-decile APCE of 2,760 INR. The remaining States have an average range APCE of 9,930 INR ranging from a minimum of 4,200 INR in Uttaranchal to maximum of 21,000 in Chandigarh. This indicates that at 50th decile of overall expenditure, almost half of the Indian States experience relatively similar levels of inequality. Additionally, 18 States, that is 51% of all States, have a maximum APCE below the median maximum APCE of 22,141 INR, that indicates that inequality is not equally spread around the Indian States.

Finally, Figure 4.10 shows the 70th decile range of APCE, per State. I observe that 18 of all States, that is 51%, have an average expenditure minimum-maximum range below the median 4,680 INR, with an average of 3,827 INR. This intra-decile range is similar to the one observed in the 50th decile; additionally, almost half of the States appear to have relatively similar levels of inequality, as they appear to have similar range of minimum and maximum expenditure.

The non-parametric decomposition within States indicates that in the majority of deciles observed, almost half of the States have similar range of minimum and maximum APCE and hence similar and narrow levels of inequality. A group of States appear at the bottom end of distribution in all three deciles observed and also have a narrow intra-decile range, these are Bihar, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Jharkhand and Orissa. It follows that inequality observed across States and deciles is driven by a cluster of States and not by uniformly distributed inequality across all States. The States that seem to have wider range of minimum-maximum APCE across all three deciles observed are Himachal Pradesh, D&N Haveli, Daman & Diu, Lakshadweep, Chandigarh, A & N Islands and Sikkim.

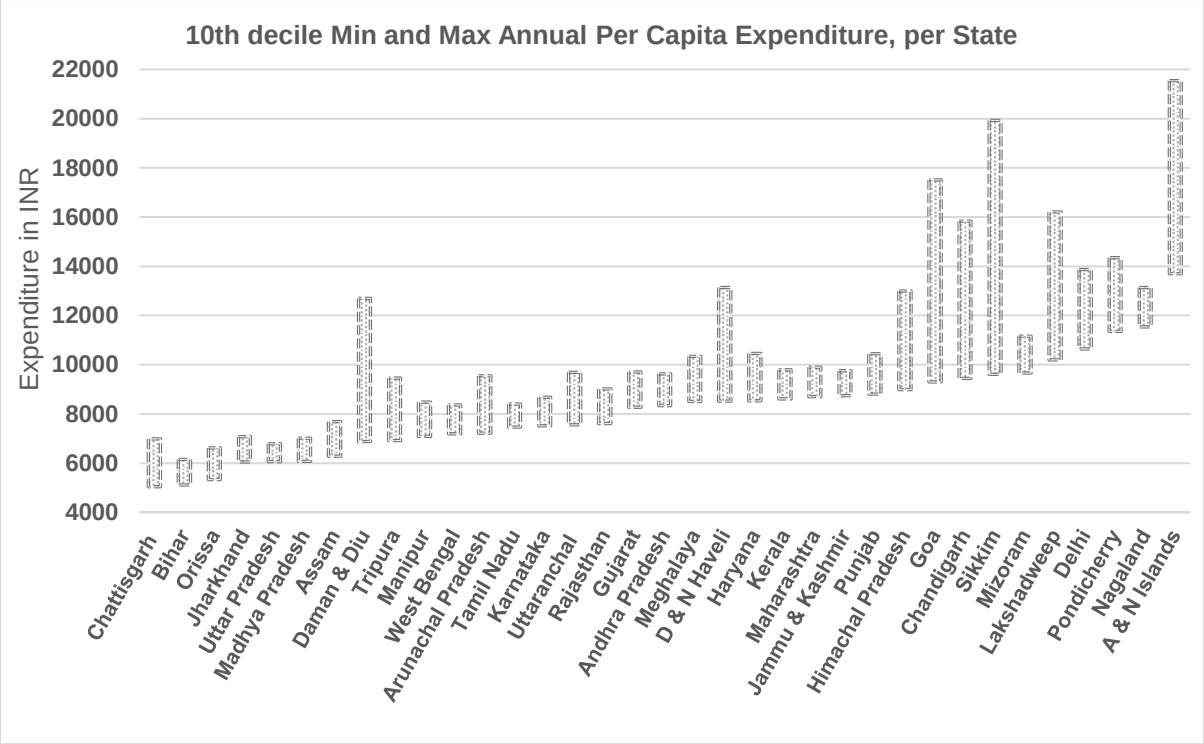


Figure 4.8: 10th decile intra-State APCE range, Round 66

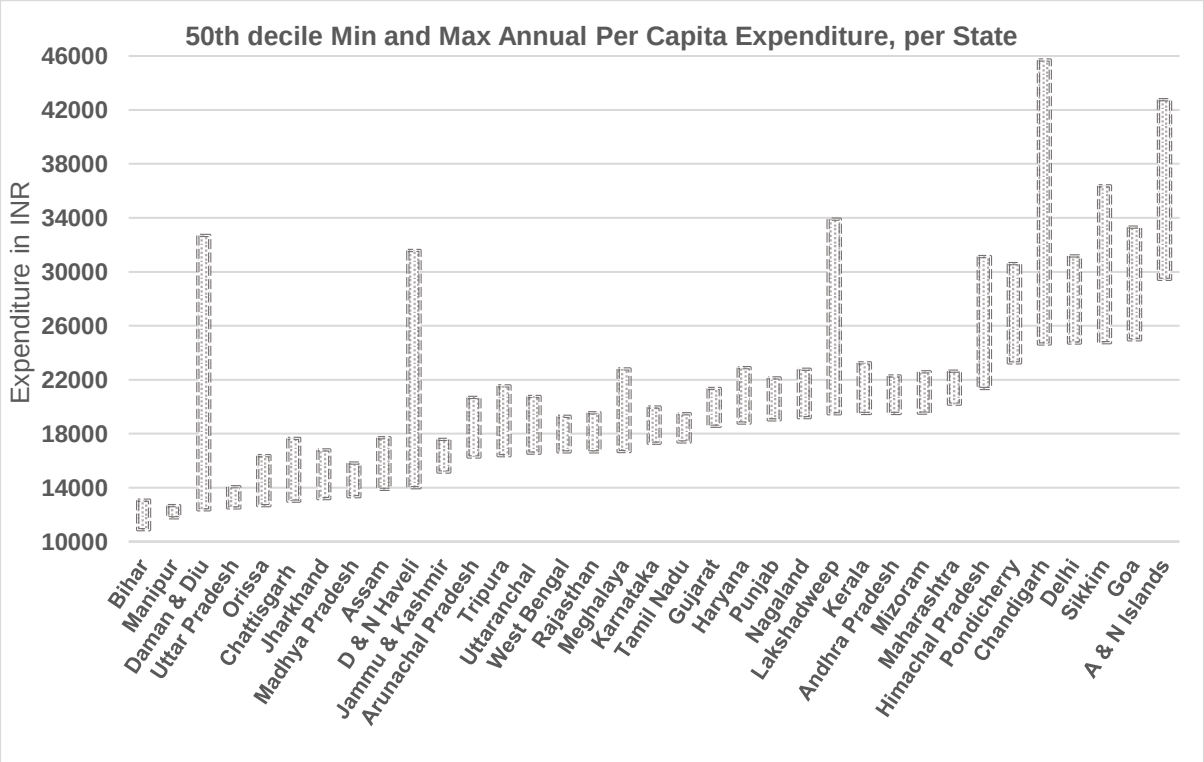


Figure 4.9: 50th decile intra-State APCE range, Round66

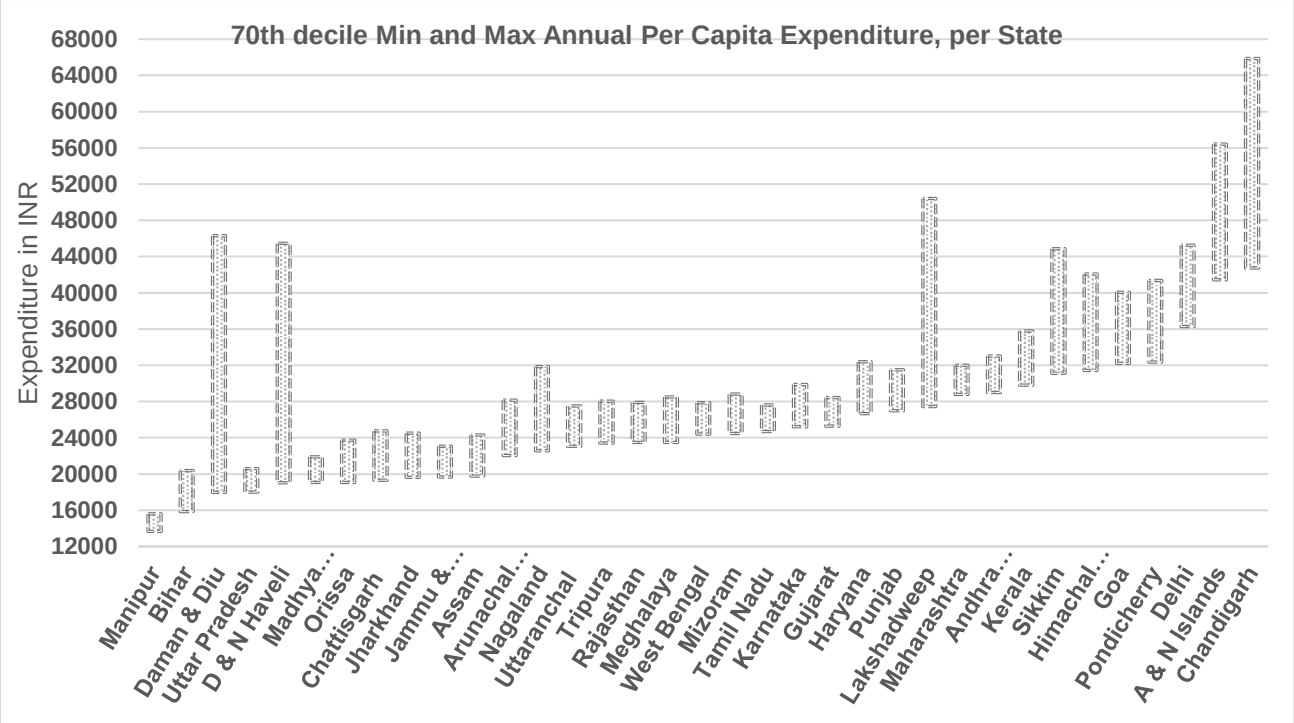


Figure 4.10: 70th decile intra-State APCE range, Round66

I have estimated the correlation between the maximum-minimum within-decile APCE difference and the percentage of GDP growth to check how the two interact. Table 4.3 demonstrates the results; correlation between the two becomes stronger as I move from 1-year GDP growth to 3-year and finally to 5-year GDP growth, this holds for all deciles. This shows that there is positive relationship between positive growth rates and the increasing gap of per capita expenditure within deciles. There is a clear distinction in correlation between the lower three deciles and the remaining ones. Correlation across all periods of GDP growth is stronger than 0.5, while from the fourth decile onwards, correlation becomes weaker. What this indicates is that if annual per capita expenditure falls within the three lower quantiles, this is related stronger to the change in the percentage of GDP growth. The higher the GDP growth, the larger the expenditure disparity within the first three deciles.

	Decile								
	10	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**
1Y Growth	0.5853	0.5743	0.5042	0.2911	0.2664	0.2127	0.2876	0.2022	0.1496
3Y Growth	0.6328	0.6219	0.5682	0.3657	0.3321	0.2788	0.3403	0.2735	0.2447
5Y Growth	0.6347	0.6199	0.5929	0.4475	0.4074	0.3625	0.4034	0.3717	0.3567

Table 4.3: Summary correlation estimation between within-decile APCE minimum-maximum difference and % of GDP growth, per State.

d. Regression Results

Inequality *measured by Gini coefficient (pweight adjusted), per State*	5 Year %GDP Growth per State	3 Year %GDP Growth per State	1 Year %GDP Growth per State
GDP Growth *(%, per State)*	-0.00012	-0.0004	-0.00086
	(-0.43)	*(-1.040)*	*(-1.50)*
Casual Labour	*0.0044*	*0.0040*	*0.0039*
	*(3.58)***	*(3.21)**	*(3.36)**
Government Spending (%change in *Social Security & Welfare)*	-0.0009	*-0.0010*	*-0.0011*
	(-1.00)	*(-1.16)*	*(-1.25)*
Constant	0.2566	0.2667	0.2644
	*(10.26)***	*(11.34)***	*(14.12)***
No of Obs	32	32	32
R-Squared	*0.3645*	*0.4057*	*0.4282*
R-Squared Adjusted	*0.3208*	*0.3420*	*0.3669*
Absolute value of t-statistic in parentheses			
*** significant at 99% level, *significant at 95% level*			

Table 4.4: Regression results using probability weighed observations from Round 66 HCE Survey

Results using regression (2), are not significant in the case of GDP growth, in any of the time periods preceding 2009-2010, at State level. The number of observations is very low, that is because there are only 35 states in India, and moreover, there is no GDP Growth data available for 3 of those, hence the final number of observations is 32. Secondly, although the adjusted R-square values only explain 32% to 36% of the variance, the post-estimation residual plots demonstrate no pattern in the residuals against the fitted values;[45] that is encouraging and as it suggests there is no violation of the least-squares assumption that inequality is linear to the independent variables.

I have constructed the Gini coefficient to measure inequality of urban expenditure distribution, per State. When constructing the Gini coefficient, the anonymity principle suggests that all members of society should be viewed as identical (Debraj, 1998). While I only observe the urban population, in constructing the Gini coefficient, the sample's homogeneity might be distorted due to the fact that the HCE surveys have

[45] see Appendix C.6 to Chapter IV

been designed following the 2001 Indian Census design; the urban sample consists of statutory towns, as well as “census towns”, which include any area with a minimum population of 5,000 inhabitants, with at least 75% of the male main working population engaged in non-agricultural pursuits and population density of at least 400 persons per sq. km.[46] It is plausible that expenditure patterns amongst households living in a megacity like Mumbai would be different to those of a household living in a small town of 5,000 people, even if the two are located in the same State. Differences in expenditure might be influenced by the overall localised level of prices, goods availability, climate and local cultural habits. This is particularly important in this case, because I use expenditure rather than income to construct the inequality Gini coefficient. If household expenditure decisions are influenced by locality and community preferences, then a more localised Gini measure might be more appropriate. Finally, it has been found that Indian national accounts, used to estimate GDP growth, only account for 7% of adult population tax records (Assouad et al, 2018), therefore, they do not include a lot of economic activities that provide income to informal workers, slum dwellers and uninsured labour. This could explain why GDP growth seems to have no effect on inequality in this case.

Casual labour is significant and reveals that as the percentage of casual labour increases in each State, so does inequality. This is consistent with the literature around MPT hypothesis that suggests that casual labour outputs are hard to predict and also are lower than regular salaried outputs, hence incomes and in his case expenditure, tend to be lower.

Finally, changes in Government spending on Social Security and Welfare are not significant. This is not a definitive claim to the fact that government spending has nothing to do with redistribution of government income. There are two possible explanations, firstly, during the 11th Five-year plan, although spending in Social Security made up the largest part of overall government spending, the share of government investment declined slightly, as a percentage of the overall investment in

[46] Census of India – Concepts and Definitions http://censusindia.gov.in/2011-prov-results/paper2/data_files/kerala/13-concept-34.pdf accessed August 2018

the economy, while private sector investment increased.[47] Therefore, although the overall expenditure increased, it might have been private investment that had more of a direct impact on the average Indian urban citizen's income and expenditure. Secondly, the variable used to measure government spending, takes into consideration expenditure at a State Level, there might be a case for spending at town or city-level that might have been more directly correlated with inequality.

47 Source: Planning Commission of India report 2009-2019
http://planningcommission.gov.in/reports/genrep/ar_eng0910.pdf

6. Robustness

Inequality *measured by Gini coefficient (pweight adjusted), per State*	5 Year %GDP Growth per State	3 Year %GDP Growth per State	1 Year %GDP Growth per State
% Growth in Industry	0.1570	-0.0230	0.0329
	(1.93)	*(-0.31)*	*(1.12)*
%Growth in Services	0.2584	0.0498	0.0890
	*(3.17)**	*(0.69)*	*(2.71)*
Casual Labour	*0.0040*	*0.0053*	*0.0042*
	*(4.01)***	*(4.03)***	*(3.89)**
Government Spending (*Social Security & Welfare)*	-0.0008	-0.0013	-0.0008
	(-1.14)	*(-1.30)*	*(-1.01)*
Constant	0.0470	0.2134	0.1809
	(0.64)	*(3.27)**	*(5.65)***
No of Obs	32	32	32
R-Squared	*0.5864*	*0.5864*	*0.5253*
R-Squared Adjusted	*0.5252*	*0.5252*	*0.4549*
Absolute value of t-statistic in parentheses			
*** significant at 99% level, *significant at 95% level*			

Table 4.5: Regression results using probability weighed observations from Round66 HCE Survey

Results of the amended regression 3, to include specific component of GDP growth yield similar results, as before. Although in this case, the 5-year percentage growth in services as part of the overall GDP growth per State, is significant within 95% confidence level, indicating some support for the hypothesis that growth in the services sector increases the chances for increase in inequality. The adjusted R-squared is improved in comparison to results using equation 2, indicating that breaking down growth to the separate components, explains more of the variance. Casual labour is positive and significant and Government spending is not significant.

7. Conclusion

By 2030, 40% of the Indian population will be urban (Mohan, 2012). It is therefore necessary to look at how economic liberalisation has interacted with urbanisation, in order to assess the framework needed for urban populations to benefit and urban households to protect themselves from the effects of inequality. I have shown that overall inequality amongst the urban population of India has decreased from 1994-95 to 2009-10 and that the range of inequality across Indian States has narrowed in the same period. I have showed that inequality within the bottom 10% of the urban population has decreased, while at the same time inequality amongst the lower middle class has increased. In doing so, I have dealt with non-random sampling of the HCE survey Round 66, by assigning probability weights to the bottom 30^{th}, middle 60^{th} and top 10^{th} centiles of the expenditure distribution. Although it has not been possible to correct HCE survey Round 50 for non-random sampling and the magnitude of results might be somehow affected, however, the overall direction and the intra-decile changes in inequality are both broadly consistent with other academic work (Mehta & Battacharya 2017, Maitra 2017, Banerjee & Duflo 2007).

I have shown that States with high percentage of casual labour, as part of their urban population, are more likely to experience in increase in inequality, while there is also some support around growth in the Services sector to have a positive effect on increasing inequality, within the 5-year time frame. This is consistent with the literature around MPT hypothesis that suggests that casual labour outputs are hard to predict, adding uncertainty in how much casual labour households earn and therefore spend in a given period of time.

I find no significant relationship between GDP growth and inequality at State level. This can partially be explained by the fact that the number of observations is low because there are only 35 states in India, however, the post-estimation residual plots demonstrate no pattern in the residuals against the fitted values, suggesting that there is no violation of the least-squares assumption that inequality is linear to the

independent variables. Further explanation can be provided by the fact that the Gini coefficient is constructed at State level, where the urban population is not necessarily completely homogeneous, due to the design of the HCE surveys, which consider smaller town of 5,000 the same as mega cities with millions of inhabitants. It is plausible that expenditure patterns amongst households living in smaller towns are different to those living in big cities, due to differences in local level of prices for goods and services, goods availability, climate and local cultural habits. Therefore, there is potential for a more localised measure of inequality to be used, provided that there is also GDP growth data at the same local level in order to carry out similar analysis. The low percentage of official declared for tax purposes in Indian national accounts is also a reason that might distort GDP growth data.

I have undertaken non-parametric decomposition of the Gini to further explore the relationship between growth and expenditure. By comparing the minimum and maximum annual per capita expenditure of each decile, per State, I have found that in the majority of States the range is narrow; this indicates that higher inequality is driven by some of the States, namely Himachal Pradesh, D&N Haveli, Daman & Diu, Lakshadweep, Chandigarh, A & N Islands and Sikkim and is not uniformly distributed across India. I have also shown that across all deciles, correlation between the maximum-minimum within-decile APCE difference and the percentage of GDP growth becomes stronger as I gradually move from 1-year GDP growth to 5-year GDP growth. There is a clear distinction in correlation between the lower three deciles and the remaining ones, indicating that the higher the GDP growth, the larger the expenditure disparity within the first three deciles.

Finally, I find no support for spending in the form of Social Security and Welfare to have an impact on inequality at State level. One of the reasons that could distort the effectiveness and measurability of government spending is corruption. There is potential to explore if corruption at State-level acts as a hindering factor for government spending to have a meaningful impact on inequality. Additionally, although according to the 11th Five-year plan, spending in Social Security made up the largest part of overall government spending, the share of government investment

declined slightly, while private sector investment increased. Therefore, there is also potential to look into the effect of private investment alongside government spending that could make growth meaningful provide some support for its' effect on inequality.

Chapter V

Conclusion

The datasets used for all three research chapters included in this thesis come from the National Sample Surveys of India, conducted by the Indian Ministry of Statistics and Programme Implementation. The datasets include a detailed schedule of household annual and monthly expenditure in foodstuff, durables, education, health, rent and utilities. Therefore, due to the comprehensive expenditure schedules, these datasets are often used in academic research and in drawing official poverty lines in India. Additionally, they include detailed expenditure on gold, silver and artificial jewellery, which was particularly useful for my analysis in Chapter II. It has been challenging to locate sources that include jewellery expenditure on household level, accompanied by other household characteristics and this has been a reliable source, with the sample covering all Indian States. The dataset is particularly extensive across all food-related consumption goods; hence these datasets can further be used to create alternative poverty lines utilising calorie intake and ultimately compare to the poverty lines produced by the Indian government, as well as to create asset-based indexes to measure inequality at a more localised level, beyond State-wide.

However, there are some limitations, primarily due to the survey design. Although, the geographic selection of households for the National Sample Surveys is designed to reflect the Indian Census in terms of population coverage across Indian States, the selection of households to be surveyed within cities or villages is designed according to a non-random sampling methodology. The sampling methodology further differs across the various rounds, often making comparability across rounds limited. The same issue also hinders utilising consecutive survey rounds to form panel data. Round 66 (2009-2010), used primarily across chapters II, III and IV, is considered more accurate to earlier rounds (Deaton & Kozel, 2005). The notes that accompany each round are not always clear enough around cut-off points used for household selection, hence it is not always possible to work backwards and correct for the non-random sampling. For example, in chapters III and IV of this thesis, I have shown how the non-random sampling can be adjusted, firstly in Chapter III, by adjusting the median

consumption, to reflect the actual median consumption of the sample and secondly, in in Chapter IV, by using weights to construct the Gini coefficient, to correct for the a priori weights assigned to different consumption strata of the sample. I have not been able to correct for the non-random sampling in Round 55, due to lack of sufficient information about the survey design.

In Chapter II, I have shown that within the context of Permanent Income Hypothesis, rural, non-regular income earning labour households have higher spending on gold jewellery, in order to mitigate against income uncertainty. This is particularly relevant for a developing economy such as India, where informal workers and other non-regular earners lack basic protection against income uncertainty. I find that education is a determinant of preferences, as households with an illiterate head of household have higher expenditures on gold jewellery. This supports the theory that uneducated individuals in India see gold jewellery not only as an ornament but also as a store of wealth and collateral for informal loans. Findings of the alternative hypotheses support that there is a cultural aspect in gold expenditure, as gold has an important role in Hindu and Muslim cultures and thus religion might be an important determinant for dowries. The second alternative hypothesis utilises existing research around women being more likely than men to save (Duflo & Udry 2004, Ashraf, 2009) and women having a stronger preference for gold as a luxury consumption good than men. The testable hypothesis is that households in which women have relatively strong bargaining positions are likely to spend more on gold. This paper finds relatively little support for this hypothesis. The proxy used to assess a woman's bargaining power within the household uses her education level in comparison to that of her husband's. This is somehow limited in taking into consideration income earning dynamics in-between souses, source and regularity of income for both spouses etc. It might be useful to test this hypothesis utilising a wider range of proxies for wife's bargaining power within the household, in order to understand if the wife's bargaining power is governed by other characteristics or if this circles back to the cultural hypothesis. This was not possible with the current dataset.

In Chapter III, the results of spatial analysis have identified that although neighbouring States have similar annual per capita expenditure, they do not necessarily have similar poverty rates. There is a local State-wide element that could be influencing poverty rates. I have shown that GDP growth at a state level has a lagged effect on poverty. Following this, there is potential to examine if public spending at a State level has an effect on poverty. For example, does spending on education have an effect on poverty rates, within the context of economic liberalisation? Additionally, through the growth-poverty model regression analysis, I have shown that growth in the services sector in particular, as part of State-wide GDP growth also has an effect on poverty. The services sector in Indian accounts includes a variety of sub-sectors, such as banking and transportation, alongside tourism and real estate, all of which are diverse in terms of skills and capital investment needed. Therefore, it would also make sense to examine growth in the sub-sectors to determine if growth in a particular one is more directly related to poverty.

Finally, in Chapter IV, I have shown that conditions existed within the Indian post-liberalization time for urban inequality to reduce. I have found that urban inequality reduced by 12% between 1994-95 and 2009-10. Although, I have only been able to adjust the 2009-2010 urban sample, because of the expenditure strata weights and cut off points being clearly specified, I have not been able to adjust the 1994-95 urban sample. My results are consistent with those of Maitra (2017), who has found urban inequality in India to have reduced between 1994-95 and 2004–05, while also using the HCE dataset and an asset-based index methodology. On the contrary, my findings are not consistent with those of Chauhan and Mohanty's (2016), who have found inequality to have increased within the same timeframe as Chapter IV and also utilized the same HCE datasets for a similar period of time to this paper, but have worked on the entire sample not just the urban one and it is unclear in their paper, whether the non-random sampling in all HCE rounds has been accounted for. A limitation of the dataset is that it does not include slum dwellers, which could skew inequality results. There is potential for further research on urban inequality using a wider dataset that takes into account a random sample of urban population, that includes slum dwellers. Another limitation of this dataset, relevant to measuring inequality, is that I have not been able to adjust the rural sample, because a more complex marking system is

used, where “affluent” households are preferred to be surveyed, however, the definition of “affluent” cannot be clearly deconstructed, in order to adjust the rural sample accordingly.

Appendix

A. Appendix to Chapter II

1. Data Definitions

"Size of a household" is the number of its members.

"Type of household" is determined by the main source of income within 365 days preceding the survey; if multiple income sources exist, the one that contributes more than 50% is used as primary source. For example, "labour households" are households both rural and urban that receive their income through casual, that is irregular labour activity.

In case no source of income contributes more than 50% to the household's total income, the NSS Round 66 supporting documentation does not clarify how the main source of income is determined.

2. Summary Total Consumption Table according to main Income Source

Household Main Source of Income	Sector	Mean Total Consumption (in rupees)
Self Employed in non-Agriculture	rural	18,716
Agricultural Labour	rural	8,660
Casual Labour (excl. agricultural)	rural	11,489
Self Employed in Agriculture	rural	18,716
Others	rural	24,619
Self Employed	urban	27,816
Regular Wage/Salary Earning	urban	31,304
Casual Labour	urban	10,069
Others	urban	23,489

Source: NSS Data Round 66 (2009-2010)

3. Benchmarking Jewellery Expenditure

Although India is at the lower end of the "GNI Atlas per capita" distribution, while USA and UK are at the higher end, all three countries have similar "Gold per capita" expenditure, as per figure 1.1. Therefore, it is useful to use consumer surveys from all three countries, in order to understand how much jewellery expenditure makes up as part of total household consumption.

One of the drawbacks of following this method is that although consumer surveys are quite similar, they are not identical in each country; hence I have matched the items appearing in US and UK Surveys to mirror the complete list of durables consumption in India. A second drawback is that jewellery in US Survey appears as part of "other apparel products and services" and includes all kinds of jewellery, precious or non-precious metals alike; as such consumption results will be pushed upwards.

Average annual expenditures of all consumer units, Consumer Expenditure Survey, 2006-2011						
Item	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Housing Maintenance, repairs, insurance, other expenses	$1,115	$1,131	$1,176	$1,138	$1,112	$1,120
Household furnishings and equipment						
Household textiles	$154	$133	$126	$124	$102	$109
Furniture	$463	$446	$388	$343	$355	$358
Floor coverings	$48	$46	$45	$30	$36	$20
Major appliances	$241	$231	$204	$194	$209	$194
Small appliances, miscellaneous housewares	$109	$101	$113	$93	$107	$89
Miscellaneous household equipment	$693	$840	$749	$721	$657	$744
Apparel and services						
Other apparel products and services	**$280**	**$276**	**$248**	**$249**	**$261**	**$226**
Transportation						
Vehicle purchases (net outlay)	$3,421	$3,244	$2,755	$2,657	$2,588	$2,669
Cars and trucks, new	$1,798	$1,572	$1,305	$1,297	$1,219	$1,265
Cars and trucks, used	$1,568	$1,567	$1,315	$1,304	$1,318	$1,339
Other vehicles	$54	$105	$134	$55	$51	$64
Vehicle finance charges	$298	$305	$312	$281	$243	$233
Maintenance and repairs	$688	$738	$731	$733	$787	$805
Vehicle rental, leases, licenses, and other charges	$482	$478	$465	$447	$423	$433
Entertainment						
Audio and visual equipment and services 2/	$906	$987	$1,036	$975	$954	$977
Pets, toys, hobbies, and playground equipment	$412	$560	$704	$690	$606	$631
Gifts of goods and services						
Jewellery and watches	$26	$21	$18	$14	$17	$18
Total Durables per annum	$11,641	$11,650	$10,648	$10,207	$9,933	$10,174
Jewellery as % of total durables consumption	**2.41%**	**2.37%**	**2.33%**	**2.44%**	**2.63%**	**2.22%**

Source: U.S. Bureau of Labour Statistics

Components of household expenditure, 2010 Households Surveyed 5,260			Average weekly expenditure all house-holds (£)	Total weekly expenditure (£ million)	Recording house-holds in sample
4.2	Household Maintenance				
	4.2.2	House maintenance etc.	3.60	94	960
	4.2.3	Paint, wallpaper, timber	1.00	27	380
	4.2.4	Equipment hire, small materials	0.80	20	380
5.1	Furniture and furnishings, carpets and other floor coverings				
	5.1.1	Furniture and furnishings			
		5.1.1.1 Furniture	12.50	329	1,100
		5.1.1.2 Fancy, decorative goods	0.80	21	620
		5.1.1.3 Garden furniture	0.10	4	50
	5.1.2	Floor coverings			
		5.1.2.1 Soft floor coverings	3.00	78	600
		5.1.2.2 Hard floor coverings	0.20	6	40
5.2	Household textiles				
	5.2.1	Bedroom textiles, including duvets and pillows	0.70	18	370
	5.2.2	Other household textiles, including cushions, towels, curtains	1.10	30	630
5.3	Household appliances				
	5.3.1	Gas cookers	0.20	[5]	..
	5.3.2	Electric cookers, combined gas/electric cookers	0.30	8	40
	5.3.3	Clothes washing machines and drying machines	0.50	13	60
	5.3.4	Refrigerators, freezers and fridge-freezers	0.60	16	60
	5.3.5	Other major electrical appliances, dishwashers, micro-waves vacuum cleaners, heaters etc.	1.50	40	130
	5.3.6	Fire extinguisher, water softener, safes etc	0.00	[0]	..
	5.3.7	Small electric household appliances, excluding hairdryers	0.40	11	180
	5.3.8	Repairs to gas and electrical appliances and spare parts	0.30	8	50
5.4	Glassware, tableware and household utensils				
	5.4.1	Glassware, china, pottery, cutlery and silverware	0.50	14	620
	5.4.2	Kitchen and domestic utensils	0.50	14	870
	5.4.3	Repair of glassware, tableware and household utensils	-	-	0
	5.4.4	Storage and other durable household articles	0.40	10	470
5.5	Tools and equipment for house and garden				
	5.5.1	Electrical tools	0.20	6	50
	5.5.3	Small tools	0.30	9	340
	5.5.4	Door, electrical and other fittings	0.60	15	410

	5.5.5	Electrical consumables	0.50	14	960
5.6	Goods and services for routine household maintenance				
	5.6.2	Household goods and hardware	1.30	33	3,250
	5.6.2.1	Kitchen disposables	0.70	19	2,730
	5.6.2.2	Household hardware and appliances, matches	0.20	6	630
7.1	Purchase of vehicles				
	7.1.1	Purchase of new cars and vans			
	7.1.1.1	Outright purchases	4.20	111	110
	7.1.1.2	Loan/Hire Purchase of new car/van	2.30	61	180
	7.1.2	Purchase of second hand cars or vans			
	7.1.2.1	Outright purchases	8.30	218	520
	7.1.2.2	Loan/Hire Purchase of second hand car/van	3.90	102	410
	7.1.3	Purchase of motorcycles			
	7.1.3.1	Outright purchases of new or second hand motorcycles	0.30	8	30
	7.1.3.2	Loan/Hire Purchase of new or second hand motorcycles	0.10	[2]	20
	7.1.3.3	Purchase of bicycles and other vehicles	0.40	12	40
7.2	Operation of personal transport				
	7.2.1	Spares and accessories			
	7.2.1.2	Car/van spare parts	1.50	39	230
	7.2.1.3	Motorcycle accessories and spare parts	0.10	3	20
	7.2.1.4	Bicycle accessories, repairs and other costs	0.20	[5]	90
	7.2.3	Repairs and servicing			
	7.2.3.1	Car or van repairs, servicing and other work	6.90	183	1,610
	7.2.3.2	Motorcycle repairs and servicing	0.10	2	20
9.1	Audio-visual, photographic and information processing equipment				
	9.1.1	Audio equipment and accessories, CD players			
	9.1.1.1	Audio equipment, CD players including in car	0.70	17	100
	9.1.1.2	Audio accessories e.g. tapes, headphones etc.	0.80	20	510
	9.1.2	TV, video and computers			
	9.1.2.1	Purchase of TV and digital decoder	1.50	40	100
	9.1.2.2	Satellite dish purchase and installation	0.00	[0]	..
	9.1.2.3	Cable TV connection	0.00	[0]	..
	9.1.2.4	Video recorder	0.00	[0]	..
	9.1.2.5	DVD player/recorder	0.20	5	30
	9.1.2.6	Blank, pre-recorded video cassettes, DVDs	0.80	21	640
	9.1.2.7	Personal computers, printers and calculators	2.50	65	340
	9.1.2.8	Spare parts for TV, video, audio	0.10	3	70
	9.1.2.9	Repair of audio-visual, photographic and information processing	0.10	3	30
	9.1.3	Photographic, cine and optical equipment			

		9.1.3.1	Photographic and cine equipment	0.50	13	90
		9.1.3.2	Camera films	0.00	[0]	20
		9.1.3.3	Optical instruments, binoculars, telescopes, microscopes	0.00	[1]	10
9.2	Other major durables for recreation and culture					
	9.2.4	Musical instruments (purchase and hire)		0.20	5	40
	9.2.5	Major durables for indoor recreation		0.00	[0]	..
	9.2.6	Maintenance and repair of other major durables		0.30	9	30
9.3	Other recreational items and equipment, gardens and pets					
	9.3.2	Computer software and games		1.50	39	350
		9.3.2.1	Computer software and game cartridges	0.90	24	310
		9.3.2.2	Computer games consoles	0.50	14	60
	12.1.5	Hair products, cosmetics and electrical appliances for personal care				
		12.1.5.3	Electrical appliances for personal care, including hairdryers, shavers etc.	0.20	6	110
12.2	Personal effects					
	12.2.1	**Jewellery, clocks and watches and other personal effects**		**1.90**	**51**	**940**
	12.2.6	Repairs to personal goods		0.10	2	30
			Total Durables	**73.90**	**1,939**	
			Jewellery as % of Total Durables	**2.57%**	**2.63%**	

ONS, Family Spending 2010

Source: National Statistics Office, UK

B. Appendix to Chapter III

1. Indian GDP Component Definitions

Source: OECD, “National Accounts of OECD Countries 2009”, -Volume I, Main Aggregates, OECD Publishing 2009

Household Final Consumption Expenditure: covers all purchases made by resident households (home or abroad) to meet their everyday needs: food, clothing, housing services (rents), energy, transport, durable goods (notably cars), spending on health, on leisure and on miscellaneous -services. It also includes a number of imputed expenditures, for example agricultural products produced for own-consumption but the most significant imputation is typically owner--occupiers' imputed rents. The other main imputed item of expenditure relates to income in kind (employees may receive goods and services either free of charge or at very low prices as part of their wages). Households' actual individual consumption is equal to households' consumption expenditure plus those (individual) expenditures of general government and NPISHs that directly benefit households, such as healthcare and education.

Government Final Consumption Expenditure: General government final consumption is equal to total general government output minus market output minus own-account production of gross fixed capital formation minus depreciation plus market goods and services purchased for distribution directly to households as social transfers in kind. It can be broken down into two distinct groups. The first reflects expenditures for collective consumption (defence, justice, etc.) which benefit society as a whole, or large parts of society, and are often known as public goods and services. The second reflects expenditures for individual consumption (health care, housing, education, etc.), that reflect expenditures incurred by government on behalf of an individual household (see also Section 10). This category of expenditure is equal to social transfers in kind from government to households (see Section 5) and so includes expenditure by government on market goods and services provided to households.

Gross Capital Formation: is defined in the national accounts as acquisition less disposals of produced fixed assets, i.e. assets intended for use in the production of other goods and services for a period of more than a year. Acquisition includes both

purchases of assets (new or second-hand) and the construction of assets by producers for their own use. Acquisition prices of capital goods include transport and installation charges, as well as all specific taxes associated with purchase.

GCF can be broken down into particular asset groups. Dwellings (excluding land); Other buildings and structures (roads, bridges, airfields, dams, etc.); Transport equipment (ships, railway, aircraft, etc.); Other machinery and equipment (office machinery and hardware, etc.); Cultivated assets (managed forests, livestock raised for milk production etc) and intellectual property type fixed assets (mineral exploration, software and databases, and literary and artistic originals, etc.). An additional important grouping of Information and Communication Technology (ICT) products has three components: information technology equipment (computers and related hardware), communications equipment and software.

GCF can also be broken down into institutional sectors. For government this typically means investment in transport infrastructure and public buildings such as schools and hospitals. For households, GCF generally equates to dwellings, although investments made by unincorporated enterprises in other products do occur.

Trade: is the sum of exports and imports of goods and services measured as a share of gross domestic product. Exports of goods and services consist of sales, barter or gifts or grants, of goods and services (included in the production boundary of GDP) from residents to non-residents. Equally, imports reflect the same transactions from non-residents to residents.

2. GDP Growth Rates per State

GDP Growth			
State	1Year (2008-2009)	3Years (2006-2009)	5Years (2004-2009)
Jharkhand	10.14%	30.42%	29.26%
Assam	9.00%	20.79%	30.71%
Manipur	6.89%	20.69%	30.91%
Jammu & Kashmir	4.50%	18.38%	32.67%
West Bengal	8.03%	22.12%	39.92%
Uttar Pradesh	6.58%	22.38%	40.86%
Punjab	6.29%	22.69%	43.16%
Arunachal pradesh	9.44%	33.33%	44.21%
Andhra Pradesh	7.24%	23.90%	44.69%
Nagaland	6.89%	21.98%	44.94%
Bihar	27.37%	27.37%	45.48%
Rajasthan	6.70%	22.38%	45.79%
Meghalaya	6.56%	25.78%	46.22%
Madhya Pradesh	9.56%	29.00%	48.38%
Karnataka	1.30%	22.17%	48.48%
Kerala	9.17%	25.34%	48.89%
Orissa	4.55%	24.97%	49.04%
Chattisgarh	3.42%	21.75%	49.06%
Himachal Pradesh	8.09%	26.04%	49.10%
Tripura	10.65%	17.86%	49.45%
Goa	10.20%	27.97%	51.40%
All India Average	11.20%	30.38%	54.76%
Chandigarh	5.48%	22.33%	55.29%
Mizoram	13.34%	41.36%	58.43%
Haryana	11.72%	31.05%	59.17%
Maharashtra	9.30%	24.74%	60.52%
Tamil Nadu	10.83%	24.03%	62.84%
Gujarat	11.25%	31.86%	64.29%
Delhi	8.25%	35.91%	68.09%
Pondicherry	16.28%	36.52%	76.86%
A & N Islands	13.20%	42.53%	76.98%
Uttaranchal	12.65%	57.19%	104.14%
Sikkim	73.61%	117.46%	153.06%
Daman & Diu	no data	no data	no data
D & N Haveli	no data	no data	no data
Lakshadweep	no data	no data	no data

3. Discussion of changing consumption patterns for Indian households between 1995 and 2009, using HCE data.

It is evident that “food” is one of the main components in both Rounds 50 and 66, but the important thing to note is that in 2009-2010 R66 HCE Round, Indian households seem to have diverted almost half of their 1993 expenditure to other goods and services. While “food” expenditure used to be almost 60% of overall household expenditure in 1993, it has dropped down to 27% in 2010. “Transport”, “Communication”, “Education”, “Recreation” and “Miscellaneous goods and services” seem to have benefited, in particular, form this shift in expenditure. Bearing in mind the increased headline income, shown in Figure 3.2 earlier, it is credible to believe the body of literature that suggests that as consumers become more sophisticated, their choice of goods shifts away from basic articles such as food. Sophistication can be due to increase in real income or improved education, or both. On the other hand, inflation also plays an important role, especially if it has risen slower than real income, for example. In this case there has been a shift in spending patterns, but we cannot say with certainty whether this is purely due to an increase in disposable income. In the timeframe examined in this paper 1993-2010, big advances have been made in technology and IT services, making goods such as cars, motorbikes and PCs cheaper and more attainable for the masses. Similarly, a lot of work has been done in India in particular, with charities and NGO’s about the importance of education, as such it is encouraging to see a shift towards more expenditure on education for example, by Indian households. One more overall observation is that consumers have diverted their funds to goods and services that are generally speaking non-household related. Weights for both rounds relative to “furnishings” and “housing” seem to have remain almost the same, whereas recreation activities, but also durables seem to have increased. We can say with certainty that Indian consumers have altered their choice of how to dispose of their income with time, but we cannot conclude yet that this is purely due to an increase in disposable income.

WORLD BANK BASKET OF GOODS & SERVICES USED IN 2011 ICP ROUND	Round 50 (1993-94) Weights	Round 66 (2009-10) Weights
1. FINAL CONSUMPTION EXPENDITURE BY HOUSEHOLDS		
FOOD AND NON-ALCOHOLIC BEVERAGES	0.590	0.270
Food		
Non-alcoholic beverages		
ALCOHOLIC BEVERAGES, TOBACCO AND NARCOTICS	0.024	0.010
Alcoholic beverages		
Tobacco		
Narcotics		
CLOTHING AND FOOTWEAR	0.091	0.107
Clothing		
Footwear		
HOUSING, WATER, ELECTRICITY, GAS AND OTHER FUELS	0.118	0.118
Maintenance and repair of the dwelling		
Water supply and miscellaneous services relating to the dwelling		
Electricity, gas and other fuels		
FURNISHINGS, HOUSEHOLD EQUIPMENT AND ROUTINE MAINTENANCE OF THE HOUSE	0.050	0.050
Furniture and furnishings, carpets and other floor coverings		
Household textiles		
Household appliances		
Glassware, tableware and household utensils		
Tools and equipment for house and garden		
Goods and services for routine household maintenance		
HEALTH	0.007	0.089
Medical products, appliances and equipment		
Out-patient services		
Hospital services		
TRANSPORT	0.048	0.110
Purchase of vehicles		
Operation of personal transport equipment		
Transport services		
COMMUNICATION	0.011	0.058
Postal services		
Telephone and telefax equipment		
Telephone and telefax services		
RECREATION AND CULTURE	0.000	0.027
Audio-visual, photographic and information processing equipment		
Other major durables for recreation and culture		
Other recreational items and equipment, gardens and pets		
Recreational and cultural services		
Newspapers, books and stationery		
Package holidays		
EDUCATION	0.030	0.097
RESTAURANTS AND HOTELS	n/a	0.001
Catering services		
Accommodation services		
MISCELLANEOUS GOODS AND SERVICES	0.031	0.063
Personal care		
Prostitution		
Personal effects n,e,c,		
Social protection		
Insurance		
Financial services n.e.c.		
Other services n.e.c.		
Total	1.0000	1.000

World Bank's basic heading categories under "Final Consumption Expenditure by households" and consumption weights for Household Consumption Expenditure R50 and R66

C. Appendix to Chapter IV

1. Indian National Accounts Components definitions – Expenditure side

Gross Capital formation

(formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation.

General government final consumption expenditure

(formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defence and security but excludes government military expenditures that are part of government capital formation.

Household final consumption expenditure

(formerly private consumption) is the market value of all goods and services, including durable products (such as cars, washing machines, and home computers), purchased by households. It excludes purchases of dwellings but includes imputed rent for owner-occupied dwellings. It also includes payments and fees to governments to obtain permits and licenses. Here, household consumption expenditure includes the expenditures of non-profit institutions serving households, even when reported separately by the country. This item also includes any statistical discrepancy in the use of resources relative to the supply of resources.

Final consumption expenditure

(formerly total consumption) is the sum of household final consumption expenditure (private consumption) and general government final consumption expenditure

(general government consumption). This estimate includes any statistical discrepancy in the use of resources relative to the supply of resources.

Trade

is the sum of exports and imports of goods and services measured as a share of gross domestic product.

2. Items from Round 66 of Household Consumption Expenditure Surveys included in calculations.

Round 66 - Schedule of Items from the HCE Survey, used to calculate Annual Household expenditure	For example
cereals	rice, wheat, etc.
cereal substitute	tapioca, etc.
pulses & products	arhar, gram, peas, etc.
milk & milk products	milk, ghee, butter, etc.
sugar	sugar, gur, honey, etc.
salt	salt
edible oil	margarine, mustard oil etc.
egg, fish & meat	eggs, fish, goat, beef, etc.
vegetables	potato, radish, cauliflower, etc.
fruits (fresh)	banana, coconut, papaya, leechi, etc.
fruits (dry)	copra, dates, cashews, raisin, etc.
spices	garlic, ginger, turmeric, dry chillies, etc.
beverages etc.	tea, coffee, biscuits, cake, pickles, etc.
pan	leaf and finished
tobacco	bidi, cigarettes, hookah tobacco, etc.
intoxicants	ganja, toddy, beer, foreign liquor, etc.
fuel and light	coke, firewood, electricity, dung cake, etc.
medical (non-institutional)	medicine, x-rays, doctor's fee, etc.
entertainment	cinema, fair, VCD.DVD hire cable TV, etc.
minor durable-type goods	spectacles, torch, umbrella, lighter, etc.
toilet articles	soap, toothpaste, hair oil, shaving cream, etc.
other household consumables	bulbs, glassware, incense, flowers, etc.
consumer services excl. conveyance	sweeper, barber, telephone charges, etc.
conveyance	air/train/bus/rickshaw fare, diesel, etc.
clothing	dhoti, sari, cloth, headwear, etc.
bedding etc.	bed sheets, rug, mats, etc.
footwear	leather boots, shoes, second-hand inc, etc.
education	books, newspapers, school fees, etc.
medical (institutional)	medicine, x-rays, doctor's fee, etc.

durable goods	furnishings, electronics, jewellery, etc.
rent	house rent, hotel, land rent, etc.
consumer taxes & cesses	water charges, consumer taxes, etc.

3. Round 66 Sampling Methodology Summary

Round 66 2009-10 Sampling Design		Adjusted Weight to be assigned to Household
Per Capita Expenditure (PCE) Group	Percentage of Households at Sampling	
Top 10% PCE	25%	-15%
Middle 60% PCE	50%	10%
Bottom 30% PCE	25%	5%

Data Source: *Round 66, HCE Survey, Indian Ministry of Statistics, "Note on Sample Design and estimation Procedure for NSS 66th Round"*

4. Round 50 Sampling Methodology Summary

	Round 50 1994-95 Sampling Design			
First Stage Stratum	if Population < 1million Blocks 1,2,3,4,5 Stratum 1		If Population > 1million Blocks 6,7,8,9 Stratum 2	
Second Stage Sub-Stratum	if PCE>1200r Sub-Stratum 1	if PCE<1200r Sub-stratum 2	if PCE>1500r Sub-stratum 1	if PCE<1500r Sub-stratum 2
Number of Households selected for all Blocks *(i.e. 1,2,3,5,7,9)*	2	8	2	8
Number of Households selected for "affluent" Blocks *(i.e.:4,6,8)*	4	6	4	6

Data Source: Round 50, HCE Survey, Indian Ministry of Statistics, "Instructions to Field Staff, Volume I, Design, Concepts, Definitions and Procedures"

5. Intra-decile minimum and Maximum Annual Per Capita Expenditure (in Indian rupees) per State, Round 66

Round 66 Decomposition Minimum APCE per State per centile

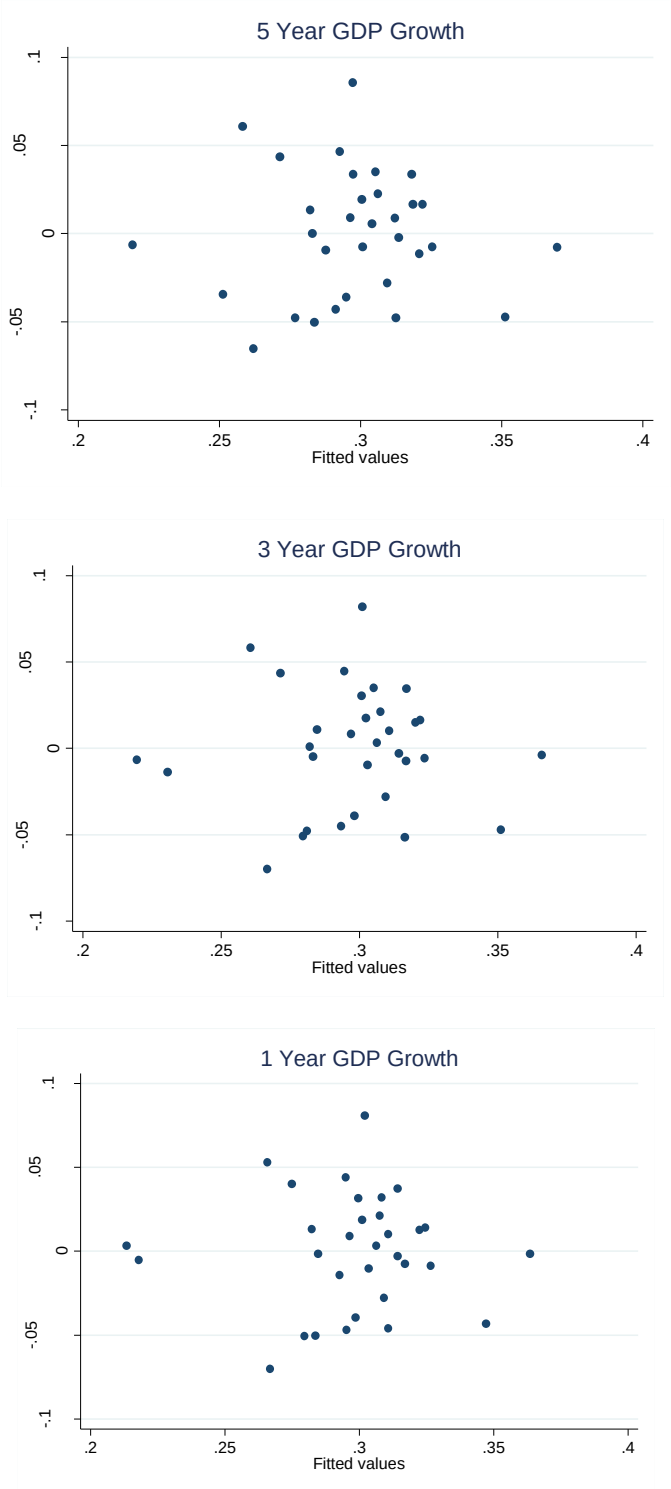
State	10 Min	20 Min	30 Min	40 Min	50 Min	60Min	70 Min	80 Min	90 Min
A & N Islands	13,698	19,094	22,648	25,504	29,439	36,162	41,444	48,060	60,064
Andhra Pradesh	8,341	11,151	13,664	16,224	19,501	23,430	28,988	35,563	46,137
Arunachal Pradesh	7,221	9,359	11,497	13,699	16,283	18,457	22,023	26,336	33,006
Assam	6,278	7,809	9,571	11,422	13,882	16,766	19,787	23,662	31,524
Bihar	5,112	6,383	7,737	9,251	10,882	12,884	15,835	20,726	29,190
Chandigarh	9,448	12,564	16,579	19,479	24,649	32,412	42,727	55,093	67,551
Chhattisgarh	5,039	6,958	8,730	10,601	13,000	15,903	19,325	23,674	32,015
D & N Haveli	8,522	9,900	11,494	12,946	13,988	16,563	19,021	23,040	37,014
Daman & Diu	6,885	7,994	9,750	10,940	12,351	15,348	17,976	27,570	32,418
Delhi	10,644	14,089	18,249	21,207	24,710	29,570	36,289	44,078	55,338
Goa	9,298	14,464	19,345	22,070	24,952	28,347	32,202	35,653	40,808
Gujarat	8,278	10,349	12,806	15,533	18,546	21,568	25,298	29,299	37,111
Haryana	8,532	11,082	13,423	15,873	18,794	22,526	26,661	32,499	41,168

Himachal Pradesh	8,991	11,165	14,361	18,154	21,351	25,677	31,429	38,024	49,190
Jammu & Kashmir	8,742	10,281	12,068	13,592	15,160	17,396	19,654	23,369	28,729
Jharkhand	6,044	7,223	8,817	10,685	13,198	15,862	19,626	24,193	31,125
Karnataka	7,515	9,364	11,781	14,286	17,282	20,469	25,200	31,351	41,311
Kerala	8,614	10,493	12,967	15,852	19,492	23,681	29,797	37,477	50,676
Lakshadweep	10,201	12,945	15,438	17,087	19,476	22,652	27,458	32,584	45,267
Madhya Pradesh	6,073	7,718	9,568	11,396	13,333	16,111	19,068	22,907	31,357
Maharashtra	8,701	11,416	14,253	17,023	20,178	24,216	28,771	35,842	47,933
Manipur	7,083	8,879	10,016	10,950	11,771	12,573	13,672	15,646	18,056
Meghalaya	8,511	9,495	11,934	13,976	16,665	19,865	23,475	25,962	31,112
Mizoram	9,669	11,380	13,937	16,789	19,529	21,929	24,476	28,340	34,377
Nagaland	11,539	12,406	14,137	16,752	19,193	20,767	22,550	27,334	33,507
Orissa	5,336	6,869	8,327	10,174	12,665	15,567	19,082	23,640	32,136
Pondicherry	11,356	13,876	15,922	19,177	23,242	26,726	32,357	37,266	48,166
Punjab	8,802	11,263	13,703	16,288	19,031	22,305	26,972	32,273	41,124
Rajasthan	7,604	9,654	11,627	14,042	16,647	19,638	23,470	28,617	38,469
Sikkim	9,609	13,528	18,237	21,518	24,733	28,669	31,132	37,076	42,616
Tamil Nadu	7,471	9,590	11,943	14,157	17,393	20,547	24,704	30,117	38,795
Tripura	6,917	8,703	11,624	13,840	16,374	19,803	23,403	26,433	33,086
Uttar Pradesh	6,054	7,623	9,052	10,580	12,487	14,790	17,997	22,903	30,821
Uttaranchal	7,554	9,674	11,609	13,920	16,547	19,365	23,046	26,712	34,396
West Bengal	7,194	9,201	11,267	14,099	16,644	20,337	24,398	30,268	40,585

Round 66 Decomposition Maximum APCE per State per centile

State	10 Max	20 Max	30 Max	40 Max	50 Max	60 Max	70 Max	80 Max	90 Max
A & N Islands	21,544	25,875	30,551	37,000	42,747	48,701	56,434	73,086	115,174
Andhra Pradesh	9,629	12,661	15,440	18,436	22,279	27,210	33,009	40,455	53,513
Arunachal Pradesh	9,552	12,283	15,061	17,400	20,693	23,980	28,165	33,788	42,850
Assam	7,682	9,854	12,075	14,938	17,687	20,573	24,288	31,136	40,682
Bihar	6,146	7,647	9,324	11,067	13,061	15,860	20,358	27,013	36,581
Chandigarh	15,827	19,919	26,142	35,138	45,702	55,788	65,866	83,424	125,682
Chhattisgarh	6,978	9,070	11,291	14,250	17,643	20,590	24,769	32,105	44,377
D & N Haveli	13,137	15,446	18,304	21,299	31,576	37,876	45,462	53,340	84,322
Daman & Diu	12,698	16,864	22,261	28,982	32,700	36,453	46,299	65,468	78,851
Delhi	13,862	18,821	22,247	26,322	31,183	38,075	45,256	54,773	77,687
Goa	17,507	22,146	25,274	29,349	33,316	35,767	40,063	46,549	63,648
Gujarat	9,704	12,253	15,197	18,356	21,348	24,903	28,431	33,974	45,106
Haryana	10,452	13,399	16,008	19,374	22,895	26,883	32,387	39,063	56,399
Himachal Pradesh	12,992	17,096	21,040	25,537	31,123	36,558	42,067	54,372	77,162
Jammu & Kashmir	9,753	11,950	13,655	15,268	17,585	19,719	23,054	27,096	36,149
Jharkhand	7,069	9,053	11,223	13,713	16,790	20,227	24,495	30,502	39,097
Karnataka	8,668	11,134	13,850	16,836	19,969	24,462	29,881	36,663	49,870
Kerala	9,790	12,293	15,451	19,099	23,246	28,754	35,768	45,553	62,301
Lakshadweep	16,210	19,780	23,492	28,608	33,906	42,994	50,412	64,883	118,193
Madhya Pradesh	7,006	9,039	11,082	13,044	15,811	18,384	21,883	27,279	40,518
Maharashtra	9,897	12,920	15,799	18,865	22,621	26,810	32,012	39,956	57,587
Manipur	8,485	9,980	11,037	11,927	12,672	13,775	15,607	17,521	20,529
Meghalaya	10,339	13,501	16,223	19,668	22,798	25,318	28,504	34,313	45,776
Mizoram	11,164	14,400	17,337	20,189	22,580	25,214	28,817	34,047	42,394
Nagaland	13,139	16,598	19,324	21,023	22,769	27,253	31,869	36,693	43,795
Orissa	6,613	8,423	10,438	13,124	16,372	19,558	23,747	30,874	43,253
Pondicherry	14,353	17,839	21,844	26,270	30,609	35,274	41,369	52,182	69,670
Punjab	10,444	13,231	16,040	18,985	22,141	26,643	31,494	37,519	51,956
Rajasthan	9,008	11,328	13,918	16,534	19,552	23,216	27,891	34,581	51,047
Sikkim	19,933	24,491	28,640	31,110	36,367	39,977	44,864	51,586	67,713
Tamil Nadu	8,401	10,802	13,249	16,171	19,479	23,166	27,635	33,912	45,231
Tripura	9,449	12,555	15,179	18,762	21,550	24,583	28,043	34,887	43,373
Uttar Pradesh	6,783	8,432	10,020	11,821	14,067	16,849	20,586	26,135	36,876
Uttaranchal	9,696	12,093	14,781	17,901	20,748	23,900	27,513	34,551	47,118
West Bengal	8,365	10,590	13,149	15,967	19,280	23,077	27,884	35,056	47,674

6. Postestimation Robustness Plots



Plotted residuals vs. fitted values for results using regression (2), Table 4.3

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