The Experience of Slum Dwellers in Chennai under the Economic and Environmental Insults of 2008-9

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Abstract

This research uses evidence from 91 individuals in 58 households out of a sample of 800 in five of the 1230 slums of Chennai, Tamil Nadu. It finds both a considerable diversity of economic circumstances and of economic experiences during the growth slow-down, price rises, heat and floods of 2008-9.

The households of lead respondents ((LR): frequently the spouse of the head of the family) are classified in terms of the three broad industrial sectors in which the LR works: the service sector (defined here to include a mixture of paid and unpaid service work including domestic work), trade and retailing, and manufacturing (together with 'other') and further disaggregated in terms of the distinction between self employment of the LR in informal business (such as petty trading) and LRs who have wage work (including casual labour).

Qualitative comparative analysis (QCA) is used to compare the experience of households with that of a matched sample of individuals. It reveals the different characteristics of individual- from household experiences during 2008-9. Older individuals suffered more. More often than not, individuals whose households had higher than average consumer-to-worker ratios experienced downward change. The rarer upward changes in economic circumstance of households were associated more closely with the economic characteristics of the household than with demographic features such as their age composition.

High initial asset values (mainly property) were associated with not experiencing a deterioration in economic circumstances, and a decline in incomes generally was associated with experiencing downward change. However the majority of households which experienced 'downward' changes were concentrated in the wage-work group, implying that the remaining households that were self-employed or had small businesses were better protected from the combined economic and environmental insults. Households depending upon trading and retail income were more protected from the economic and environmental insults than those in 'services' and manufacturing sectors.

The data also show interesting patterns of savings (with some households locked into a pattern of monthly cash saving inter alia to cope with shocks like sickness or death), to which they kept contributing during this period (while very likely compensating by cutting basic consumption) and patterns of debt that were comparatively high in relation to income.

The Experience of Slum Dwellers in Chennai under the Economic and Environmental Insults of 2008-9

1. Introduction: the city, its slums and the 'accumulated disadvantage' of their workers

With a population of 62.1 million, Tamil Nadu is the sixth largest state in India. According to the 2001 census the proportion of urban population to the total is 44% - significantly higher than the national Indian urban average of 28%. Tamil Nadu's urban population is evenly spread across its six main cities, including Coimbatore (3.4% of urban population), Madurai (3.4%), Trichy (2.7%) and Salem (2.5%). But Chennai city's population at 4.2 million accounts for 15.5% of the state's urban population. The figure would be much larger if its surrounding suburbanized villages and towns were able to be included.[1]

Chennai is not only the fourth largest city in India in terms of population size but also one of the fastest growing metropolitan economies, due in considerable measure to its skilled manpower, its FDI-friendly environment and the flourishing IT/ITES related industry in the city and its hinterland. The rates of urbanisation of Tamil Nadu in general and Chennai in particular are among the highest in the country.

Chennai may be FDI-friendly, but, with its Metropolitan Agglomeration Area at its core, it is also one of the most densely populated cities in India. As per the census of India 2001, Chennai district is TamilNadu's densest district - with 24,231 persons per sq. km as against the State's overall population density of 478 - a differential maintained over three decades. From 1991-2001 Chennai district's density grew by some 10% - mainly due to migration from inside and outside Tamil Nadu state. Meanwhile within the city, rising land values and city beautification in the core extrude slum dwellers to the inner suburbs where they eke out livelihoods servicing, or servicing those who service the physical needs of the new knowledge economy.

Chennai district has 1230 slums in which 1.8 million people live in about 3 lakh households - giving an average household size of 4.5 members (Census of India, 2001). Chennai's slums are located on river banks, by the roadsides or on public lands (though slum land and property is often informally privatized and commercialised) and the economic, physical and political pressures on the inhabitants of these slums have major impacts on their lives. This is the context in which the current research of the impact of neo-liberal growth processes on the status and care of elderly poor in Chennai's slums is sited.[2] It is in such slums that dramatic social changes are occurring which disadvantage ageing workers. Vera Sanso (2010a) has discovered them and set them out elsewhere in a theory of the accumulation of disadvantage. We summarise its elements here.

[1] Census of India, 1961-2001; TNSCB-TNUIFSL, Table 2.2.2 and 2; Final Report Chennai Corporation Area

[2] Vera Sanso, 2010a

Older slum dwellers and workers 'accumulate disadvantage' over their life-course due to a set of factors, among which the most important are:

- Lack of rights to work, at work and obstruction to labour organisation;
- Changes in the structure of the urban economy in which their labour is displaced and demand for their skills evaporates;
- Changes in slum land values (which rise) and urban land use (malls, offices and new gated residential complexes);
- Removal of street markets by local government;
- Relocation of housing to sites from which previous work is inaccessible;
- Wage goods inflation;
- The privatisation of basic needs and essential infrastructure (further increasing household budgets);
- Growing credentialism in labour markets (replacing recruitment by affinity or ascribed status but raising minimum standards for labour market entry by slum children - and thus raising the cost of education and socialisation to work);
- Absence of entitlement to social security provision for maternity, sickness, unemployment, death of breadwinner or pensions;
- Thresholds for pensions entitlement which exceed life expectation; restrictive eligibility; access procedures which self-deny the poorest; stingy provision and rationed pension allocations.

Not only do such factors threaten self provisioning by ageing workers, they threaten filial support as well. Seriously inadequate old age support has a disproportionate impact on women because women outlive men. Life-course gender discrimination (in property relations, 'human development', wages and returns to self-employment) leaves older women relatively more deprived of resources than ageing men. Women retain a double burden of subsistence and household reproductive work - almost half the male slum-dwellers aged 75-9 had working wives not much younger than them. As they grow older women tend to become the primary earner; their deprivation increases with age; they work until they are seized by death.

In the randomly sampled slum population we studied (800 households and 3474 people), there were noticeably more women than men in the over-50 age groups. While this may result in part from the desertion of, or separation from women in this age group it is more likely to reflect a higher male death rate. We do not yet know the relative importance of each cause, because the recording of slum deaths is rare - hospital or morgue records cannot be used to determine the sex bias of death rates. In this sample, 11% of the slum population was found to be widowed or deserted – almost entirely women.[3].

[3] 364 widows – v- 29 widowers among 800 households. Nearly half the households were of five or more members In the smaller survey of 58 households carried out to explore the impact of extreme events in 2008-9, fewer were large households. Nonetheless the small households often consisted of a woman head and one kin member (non-spouse), whereas if the small household had a male household head then his wife was likely to be present

Over and above the secular changes resulting in the accumulation of disadvantage among ageing workers,[4] slum economies have recently been hit by a series of severe economic and environmental hazards.

1.1 Economic Threats and Shocks

There is no theory of the impact of a crisis in the formal economy on the informal economy. Mainstream economics failed either to predict the global financial crisis or to understand its prime movers. (An array of views has been tabled ranging - to name but a few - from contagion from sub prime lending, through business cycle explanations, misconceived expectations, mismanagement of reserves, Hayekian instability, to moral hazard in the financial sector, incompetence and stupidity among policy-makers.)[5] The science of economics also proved unable to ascertain either the likely extent of the slowdown or its impact on labour, a failure linked to the further failure to understand the dynamics of informal economies. And since labour economists do not generally distinguish between wage labour and 'self employment', this distinction, which is important to outcomes in the slums,[6] cannot be related to any evaluation of the shock to India's economy.

Given the well-acknowledged failure of economics, we will use the explanation for the financial crisis given by an international political economist, the late Peter Gowan as a backcloth to a brief summary of what is known about its impact on India's informal economy. Gowan situates the most destructive speculative bubble – in US housing - in a regular series that have been necessary to the new Wall Street financial system. The latter is dominated by an oligopoly of banks and their satellites which has been permitted to speculate on future assets and collateralised debts. [7]

Only a few Indian banks had a direct exposure to the financial collapse triggered by the new Wall Street system and its satellites. But while the Indian financial system had been

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[4] Vera Sanso, 2010

[5] Respectively Bouchard, 2008, Holland, 2009, Soros, 2008, Ackerman, 2008, Edmund Phelps and Joseph Stiglitz (both December 2008, presentations at the Cornell-IHD conference on Amartya Sen's 75th birthday – henceforth Sen-conf).

[6] Harriss-White, 2010

[7] Gowan argues that the structure and dynamics of the financial system have changed dramatically during the era of globalisation. It is characterised by the consolidation of what he calls the new Wall Street System involving the rise to prominence of money markets and their transformation into funders of speculative arbitrage and centralised, oligopolistic creators of asset-price bubbles (East European stock markets/ dot.com/coffee/cocoa/other newly securitised commodities - food/oil) which can eventually be burst without loss to them and which become the major element in their rents. The system also involved deposit-taking banks scaling up and transforming themselves into speculative proprietary traders in – and lenders for trading in - (future) financial assets and collateralised debt obligations (CDOs), the maximisation of balance sheet expansion and of leverage, and the outgrowth of 'shadow banking' entirely unregulated, with London fuctioning as a Wall Street satellite for regulatory arbitrage. Thus the housing bubble was engineered, like others before it, by the Wall Street banks. It is this integrated structure which collapsed in 2007-8, triggered by the realisation that 'the suppliers of credit funding…had no way of knowing how much of the CDO mountain was junk'. Lending and debt-fed consumption have now seized up (Gowan, 2009).

relatively well capitalised, it suffered directly from paralysis in lending, outflows from the stock market and shrunken flows of remittances.[8]

The major impact, however, was felt in the real economy where oil and food price instabilities were already generating inflation and slowing corporate investment. The Planning Commission's predicted 9-11% growth rate for 2008-9 was reduced to 6.7 % and hovers around an estimated 7% in 2009-10.[9] While this was recognized to 'hurt labour', the extent, sectors, sequencing and duration of the damage remain unknown. There was and appears still to be no theory of the likely impact on the unprotected informal economy where the reduction in growth rates mean livelihood losses and hardship.

Demand for exports was predicted to drop by anywhere from 10 to 40% during 2009 and IT exports, already under pressure in 2008, were expected to be badly hit (CLSA, 2009). The manufacturing growth rate halved from November 2007 to 2008 (GoI, 2009). Lack of export credit hit the smallest export firms disproportionately while the depreciation of the Rupee hit imported components. India's exports are relatively labour intensive (Sardar, 2008) – textiles, handloom garments, leather, gems and jewelry, metal-ware, carpets, agricultural products (spices, basmati rice and sea-food) together with IT/BPO services.

By December, 2008, 100,000 jobs were known to have been lost in the diamond industry in Surat and 750,000 in power loom weaving (Alagh, 2008). A survey of 11 states in October-December 2008 recorded significant drops in capacity in the automobile, metals and export industries with about 500,000 job losses in the automobile, transport and gem/jewelry sectors. The rate of job losses in the informal sector ('contract work') was estimated to be 6 times greater than in the formal sector (GoI, 2009). WIEGO's responsive research during 2009 showed a rapid and dramatic drop in demand and prices for recyclable waste from the informal economy – metals, cloth, plastics and glass – more insecurity in contracts and greater delays in payment in informal textiles and garments production and reductions in days worked and wage rates in the construction industry.[10]

In theory then, the informal economy in Chennai's slums will be threatened through five pathways. First, a shortage of formal business credit will have a negative multiplier effect on informal credit and hamper informal transactions and inventory holding. A credit shortage might also raise real interest rates. The Asian Development Bank has documented the formal credit shortages in India in 2008-9.[11].

Second, price rises resulting from the continuing depreciation of the Rupee will affect the urban consumer through the rising costs of imported goods. Meanwhile in the domestic economy,

[8] ADB, 2009
[9] Ahluwalia (Sen-conf)
[10] WIEGO, 2009. WIEGO does not distinguish pcp from labour.
[11] ADB, 2009

exposure to volatile international prices, mediocre to stagnant performance in food and agricultural production (except in a few northern states) and constraints imposed by the central government on the operation of the Public Distribution System have allowed a widening wedge to be shoved between farm gate wholesale prices and destination wholesale prices and also between the latter and retail prices. For southern food zone rice in early 2010, the wholesale-retail margin had risen 63% over its size in early 2009. That for atta and sugar declined so the patterns are not stable.[12] Food price inflation has not returned to the *status quo ante* the global speculative price spike in 2007-8[13]; nor are food prices stable. Food price inflation was at 17.5% in the year between November 2008-9 and the wholesale price index rose at 17.9% between February 2009-10.[14] There are 4 food zones in India. Chennai is in the southern zone. Here the average retail price of rice has shot up by 69% in the two years to January 2010. That for wheat/atta has increased by 13%; that for sugar by 109%.[15] Inflation was the most commonly cited reason for a deterioration in economic circumstances among the slum dwelling people who spoke to us.[16]

Thirdly, unemployment due to a reduction in activity in the construction industry and IT related services will affect both the hourly and weekly earnings of wage workers such as *kuulies* (those working on casual arrangements as labourers) as well as service providers. Most cities in India had a rapid downturn in construction investment in 2008-9, leading to a reduction in new investment, a slowing of development and negative multipliers in transport. The return to their original homes of migrants from building sites elsewhere will raise the supply of labour while the demand for casual wage labour falls - affecting both wage-rates and the level of underemployment. For a household dependent on unskilled wage labour, such underemployment may be masked by returning a wage woman/women to unpaid reproductive work at home.[17] By early 2009, our field research in Chennai slums had revealed that the negative multiplier of the decline in IT exports not only reduced demand and finance for construction, it also reduced demand for auto- , transport, and domestic services, street vending, laundry and ready made food supplies (Vera-Sanso, Pers. Comm., 2009).

Fourthly, in the face of changes to the second and third pathways, families with a larger proportion of old people, a higher consumer-to-worker ratio or containing widowers or widowed people may be more vulnerable to a changing economic situation than others.

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[12] Ghosh and Chandrasekhar 2010

[13] This was a concatenation event involving among other factors : poor harvests worldwide, land competition between food and biofuel, conversion of food to biofuel, rising petro-based input costs; plant and animal diseases, and speculation in food futures markets.. India stopped grain exports. The Public Distribution System is the policy instrument protecting the calorie supply of people below Poverty Lines.

[14] Times of India March 4th 2010; India Awake Dec 16th 2009

[15] Ghosh and Chandrasekhar, 2010

[16] See Appendix 4.

[17] It is tricky to measure such a change because there were already housewives in nearly every slum dwelling household in the sample in early 2008, so a change in their prevalence would be hard to measure accurately. However, since 'difficulties finding work' were mentioned by some respondents, we can explore and test whether 'workers' suffered worse during 2008-9 than 'self-employed' (i.e. trading and business) households.

The reasoning is that a healthy mid-life adult may be able to turn their hands to new activities more easily than either the oldest or youngest family members.

In the longer run a fifth factor is likely to affect the Chennai slum dwellers: the negative employment multiplier arising from a downturn in the demand for luxury goods and high-end consumer goods in the whole of the OECD. But while exports of Indian manufactures is known to have declined, this sector is only represented in a small and rather indirect way in the slums we have researched (most slum-based manufacturing is for domestic use and not for export, e.g. juice, flowers, netting, construction and fish selling. The only export industry noted is export tailoring - we have neither sites nor sectors nor data to research this fifth pathway.

1.2 Environmental threats

Not all events that battered the slums were economic, however. Some were weather related. Whether these are accurately conceptualised as 'shocks' when they happen regularly may be debated; the point is that their precise date is unknown, they are severe, they increase daily costs of survival for – and reduce the incomes of - most slum households. We can discuss them under temperature and rainfall.

While low temperature is not regarded as a shock, high temperature (especially when combined with humidity) grinds outside activity - even auto-rickshaw drivers with inadequate cover - to a halt (with the exception of sales of water, fruit juice and water-laden and juicy fruit such as melon and mango). It reduces work in the open air to a minimum and will therefore reduce the incomes of those depending on work outside. While 2008-9 did not have higher monthly maximum temperatures or lower minima than other years in the preceding decade,[18] maximum mean monthly temperatures have risen steadily over the period 2005-9 from 28.8 degrees to 31. April and May are inexorably hot: May18th 2008's average exceeded 42 with humidity above 58% and April 18th 2009's average exceeded 39 degrees at over 69% humidity. These are severe weather conditions for human beings.[19]

Rainfall threatens non-agricultural urban livelihoods directly and indirectly through both quantity and distribution. Low rainfall affects dry season water tables and triggers food price inflation due to speculation on anticipated harvest shortfalls - and on actual shortfalls. Mal-distributed rainfall leads to flooding not only from overflowing rivers in spate but also from clogged drains, collapsed culverts and burst sewage mains. At 1181mm, while the rainfall for 2008-9 was the second lowest in the previous decade, Chennai slums fell prey to the outer tendrils of cyclone Nargis in May 2008 (which devastated the south of Myanmar) and much more severely to the clutches of cyclone Nisha in Nov-December 2008. Some people in slums lost their homes; others had to stay in cramped quarters for long periods with relatives; for yet others it was impossible to leave home. Income was threatened. Damage needed repair, ruined possessions and tools needed replacement, sickness added to costs. 'Demand' – in fact need - for cash doles

[18] The highest daily average was 45 in 2003 and the lowest was 17.9 in 2004. http://www.kea.metsite.com/monthly_summaries.htm

[19] http://www,thaiindian.com

and relief packages was such that it had to be rationed by the Tamil Nadu Government.[20] Many of the urban poor are trapped in seasonal cycles of extreme events and insults which loweri incomes and raise costs.

In this research we set out to investigate whether and how the well-established impact of the global financial crisis on the slowing of India's growth rates had indirectly affected slum workers and their households. But we rapidly discovered first, that the slum economy had been affected by all the insults discussed above and second, that it would not be possible to disentangle these shocks and to make detailed cause-effect analyses of every pathway. What follows then is an assessment of the overall impact of these combined environmental and economic insults to individual workers and to households in a set of Chennai slums.

2. Survey Methods, Evidence and Initial Results

At the outset, let us recognise some characteristics of the slum and the 'slum economy' in general. Slums are residential sites in which economically productive work can take place; however since they are integrated into local, national and even international markets and since slum dwellers will also work away from the slum site, there is no hard and fast boundary to a slum economy.

The same applies to the slum household. While a household is a residential unit, a unit of reproduction and a unit of commensality, it may be provisioned - and its assets may be controlled - in many ways. Individual household members may have their own separate assets, their individual (seasonal) portfolios of production, services, trade on own account together with wage work for others.[21] Even wage workers may possess work-related assets. A household's economy will then not be the pooled aggregate of the assets and net incomes of its economically active individuals – which is how the concept of a household is generally understood by economists. There may indeed be a pooled set of assets and incomes but not all assets and income will be pooled. No household head - indeed no household member – will necessarily know the assets and net incomes of all economically active household members. The only occupation that will be fed directly into the household economy is the housewife's efforts (paid or not) to meet immediate food consumption needs. The conceptual and practical difficulties of obtaining 'household' level data may start to be appreciated. We experimented with classifications of households according to their average age, but finally worked with a classification in terms of the lead respondent's occupation because there was less occupational diversity inside a household than we had expected – discussed below.

The slums were studied in several stages. It was neither practical nor ethical (given the intimacy of the questions on individuals' livelihoods) strictly to match the three surveys. First of all five slums were chosen: two previously researched by Vera-Sanso together with two founded in the 1940s in the old centre of Chennai and one abutting the new IT

[20] http://www.tn.gov.in/gorders/rev/rev_e_738_2008

[21] While younger people tends to be in directly productive work older women tend towards street vending or services such as domestic help and men towards services like the night watch.

corridor on the periphery. Then, from the electoral registers, 800 households were selected by systematic sampling with an interval of 8 in larger slums (to reach 200 households in each) and random sampling up to two thirds of the population in three smaller settlements. Missing households were replaced by *in situ* residents and the few refusals by next door neighbours. Lead representatives (mostly the female spouse of the household head but in some cases the male or female head of household) answered questions about their age, caste, religion, families, work, education and about the poverty, incomes and supporting of the parents of the household head and those of their spouse – their pensions, tenurial status, rent and ration access.

Second, 165 willing individuals – generally older people – spoke about the settlements they lived in, their work history, livelihoods, access to pensions, health care and inter-generational relations. In the third stage, a further sample of 120 people were chosen to represent a range of ages and occupations, for the study of the hardship period, allowing through quota sampling for a distinction between self-employment (or small businesses) and wage work. Some, but not all, of these individuals matched the households which volunteered data in earlier stages. Details of their economic circumstances including income were elicited. In a moral economy where alcohol, poor money management and second families result in hand to mouth existence, economic circumstances are understood by slum dwellers to involve the capacity to balance income and expenditure, to reconcile combinations of assets and liabilities (including loans), and to control outlays (and savings may even be conceived as an outlay) and expenditures. [22]

We examined the change in the economic circumstances of individual workers and of households as reported by their lead representatives (LR) by asking for recall over the year preceding each of three reference periods: November 2008, January 2009 and May 2009. The one year reference period is one which represents a moving average during the periods of shocks and it was also a type of time-period about which respondents felt comfortable recalling and calculating. We can also study reported changes in economic circumstances 'overall' by averaging the levels of reported monthly household incomes and assets for the three recorded end-dates.

Households: The first interview concerned the person's household. The questionnaire contained 26 detailed questions on the following topics. First the job, income, and monthly contribution to collective household living expenses of each earning or working individual was recorded. Contributions in kind from the individual to the household were recorded, along with their approximate Rupee value. Other income from businesses and rented-out property was listed. Income from state transfers, political parties, sanghams and other sources was recorded. Second, savings in banks, chit funds, cooperatives and other were reported. Third, the value of each of 26 different assets or consumer durables was recorded (for example: stoves, washing machines, water purifiers, computers,

[22] To explain the question in Tamil we asked unga tharam mela poyerukka, keela erangiyurukka, illa appadiye erukka? Or 'varumaanam in the place of 'porulatharam'.. To ask the question of wage workers we said either : unga velaila yethavadhu maatram irruka, or, unga velai nalla poitrukka, illa yethavadhu vithyasam irruka? To ask the question of self employed people we said either unga viyabarathula yethavadhu maatram irruka, o,r business nalla poitrukka, illa yethavadhu vithyasam irruka?

bicycles, auto-rickshaws, property (the estimated values of plots and houses), jewelry (gold, silver and other)). Fourth, debts from various sources were listed. Fifth, monthly household expenses (under 26 headings). Sixth, whether bribes were paid during the reference period. Seventh, a special subjective question (addressed to lead respondents regarding their whole household): **Have your economic circumstances changed much in the last 12 months?** The survey was implemented for these households three times in the months of November 2008, January 2009, and May 2009.

Individuals: After the household survey, individuals were identified for interviews about their trajectories under the economic and environmental insults, according to quota sampling such that about 40 business owners and 80 workers were chosen. These 120 people were also interviewed privately thrice, in November 2008, January 2009, and May 2009. The same subjective question, **Have your economic circumstances changed much in the last 12 months?**[23] was now taken to refer to their individual circumstances. It is standard practice in surveys of wellbeing to question lead respondents about the experience of themselves and their households. From among the 120 individual respondents whose jobs are listed in the appendix 2 (no housewives or retired people being chosen for this particular set of surveys), 30 were not able to provide complete household-level data. So the number of cases we use is 91 for the individual data, and 58 for the household cases, 49 of which proved to be ones where the LR did wage work while 9 had LRs who were self employed.

Information about jobs was allocated into sectors and industrial locations (see Appendix 1 for the key to sorting jobs into sectors and the use of NIC 1998 for industries). Salaried wage workers were imputed into the dataset using a limited set of job titles (see Appendix 2 for them). The households were classified according to the occupation of the lead respondent rather than by income dominance.

2.1 Chennai's Slum Economy

On homogeneity: Cluster analysis was used to check for the homogeneity of cases within the sample of 91 individuals and thus for the homogeneity of households in the slums. If the most important component of total assets – the value of property - is used, one large cluster emerges containing 85% of cases, and the richer households then fall into 2-3 smaller clusters outside that.[24] So there is a differentiated inequality within the set of five slums and a minority of households are not poor in either assets or income. They tend to be larger households and small households tend to be poor. Inequality is on a scale that is large relative to absolute poverty, but small relative to India's overall income inequality. Table 1 shows that the inequality within the slums involves some inter-sectoral

[23] Note: In this paper we refer sometimes to Periods 1, 2 and 3. The end-dates of the respective periods are November 2008, January 2009 and May 2009. In the subjective question about the change in economic circumstances, a one-year recall was used for each period.

[24] This is a very similar structure to that obtained by a cluster analysis of rural households in northern Tamil Nadu using 17 theorised variables where an elite minority were distinguished in singular ways (in differentiated differentiation) while the vast bulk of households – some 85% - formed a single cluster, only breaking along dimensions of landlessness and small property holding when the clustering process was winched up to 16 (Colatei and Harriss-White, 2004)

differences. Those households whose lead respondent was in trading and retail had assets valued at 2.5 times greater than those in manufacturing.

Table 1: Household Average Levels of Wealth and Income 2008-9 (Rupees)

Class	Income (Rs/Month)	Wealth (Rs.)	Number of Households
Wage worker	5,950	300K	49
Self-employed	8,130	380K	9
Industrial Sector (Collapsed into three main sectors; according to the lead respondent's occupation)			
Trading & Retail	6,130	519K	3
Manufacturing	6,550	202K	15
Services*	6,200	236K	40
Overall	6,290	301K	58 households

Notes:
* Services includes household work, retirement, and unemployment.
N=58

Assets are held in the form of property (85-90% of the total), jewels and gold and consumer durables (equal residuals). Table 2 shows that asset inequality far exceeds income inequality. Across the slum household sample, the Gini coefficient of inequality of property is 0.59. By contrast, the Gini co-efficient for monthly income overall (including income from state pensions and transfers and all averaged across the 3 periods) is only 0.37.[25] By industrial sector there is least asset inequality in trading and retailing, most in services; least income inequality in manufacturing, most in trading and retail.

Table 2: Inequality Measures for Slum Dwellers in Chennai 2008-9

	GINI among trading & retail	GINI among manuf.	GINI among services	Overall GINI
Total wealth	.26	.54	.60	.59
Monthly income 2008-9	.41	.29	.39	.37

On class and work status: Inequality is not a matter of income alone, it is also a matter of relationship to the means of production – or class. In the slums people work on their own account or on wages for others. Self-employment is conflated with wage work by labour economists and in many work-related statistics in such a way that these slums would be glossed as housing employed and underemployed workers. However self employment is a different category, not insofar as assets are required for it – for many workers are forced to own a hod, a knife, a head–loading basket, a pickaxe or a hoe – nor because it is a discrete livelihood - for many workers move seasonally between working on own account and wage work for others. Rather self-employment differs from wage work for two

[25] Gini co-efficients could be computed for each sectoral and work status sub-group. However they are not additive nor can they be averaged, since classifications overlap.

further decisive reasons. First because self-employment embodies both capital and labour in a single minute enterprise it straddles class and it operates according to a distinctive logic. It may be more vulnerable to exploitation than wage work since workers will self-exploit until the extra value of what they produce approaches zero. Second self-employment differs from wage work by being exploited on at least four markets, whereas wage work is exploited on one.[26] Self-employed people may pay rent, they may borrow money for working costs, they have to purchase raw materials and to sell finished products or services. They may be exploited through adverse terms and conditions on all these markets daily – before they can engage with markets for food. However, in being more vulnerable to self-exploitation the self-employed may also be more resilient to shocks such as those which occurred in 2008-9.

We will refer to self-employment and wage work as work status groups. Table 1 reveals that income is not evenly distributed between these two work status groups. While average household assets were 125% higher for self employed LRs than for those in wage work, average monthly income (which are quite similar across the sectors of the economy) was 133% higher for self-employed lead respondents. [27]

On diversity: Slum households are characterized as having multiple and diverse sources of income and we hypothesise that this endows them with robustness in the face of shocks. But the attempt to create a proxy variable for 'having multiple diverse livelihoods' failed for the households we sampled - and in a surprising way. First, only 8 out of 91 individuals (9%) lived in households that had people in 3 different sectors.[28] The fact that most households had one person working as a 'housewife' reduced both the number of economically active people and the range of occupational/sectoral diversity. However when we reduced the criterion for 'livelihood diversity' in a household to its having workers in 2 different sectors, then most households were diverse. This results from women frequently working in services (indeed their unpaid home-work was classified as a service) while men predominate in trading and retail, and in manufacturing. Having a worker in just one sector usually implied one or more of these conditions: a tiny household, unemployment, retirement and old age, and a single earner. So in these slum households, diverse livelihood combinations were not common and tended to be found only in the very largest households. Having 3 different sectors in the household overlapped with having a household size of 5 [29] or more together with relatively high levels of absolute wealth and income. It was therefore not possible to test for the impact of diversity in livelihoods on the change in economic circumstances – or vice versa.

On Slum Incomes and Debt: Chart 1 compresses information about household income, savings and debt. State transfers, such as the pension are an exceedingly small component

[26] Harriss-White, 2010

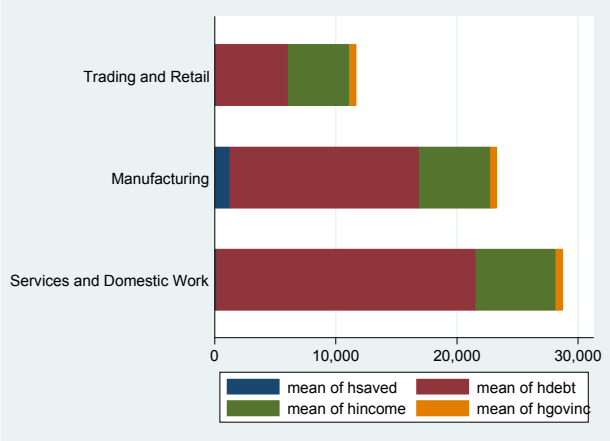
[27] There may be some correlation of income with household size here. BUT HOW CAN WE KNOW? DELETE? I think the correlation would need to be size/higher median age as it will give an idea of where in the family cycle a family is.

[28] using the 9-sector 1-digit NIC 1998 based system of classifying work

[29] presumably with a higher median age reflecting one or both of two conditions: either adult children working to make up the 3 sectors or an older parent working.

of income while savings are even smaller. All pensions are Rs 400/m.[30] Just 6 LRs received pensions – all widows' pensions. In 4 further households there are 4 further pensions. In the 9% households with pensions, an average of Rs 700/month were received - and right throughout the income distribution, including in the richest single household averaging Rs 24,000 per month. But of the 25 poorest households getting under Rs 5000 per month, 11, or 44% - or nearly half - received no state transfers. Table 3 not only shows the exiguity of savings in relation to debt, it shows that in all industrial sectors a substantial minority of households continued to save during the period of economic and environmental insults - locked into a pattern of monthly cash saving inter alia to cope with shocks like sickness or death. By contrast, in trading households debts to various sources equal the amount of income. Debts are double income in manufacturing households; they are three times income in households in services.

Chart 1: Income and Debt by Industrial Sector



Key: Blue at left = average bank savings. Red (2nd item) = average debt.
Green (3rd item) = average monthly iincome. Yellow (last item) = State pensions and other state transfers.

[30] No larger pensions show up in our data though Indian Railways pensions exceed the standard state pension.

Table 3: Savings and Debt

Class	Mean Bank Savings	Mean debt (Rs.)	% with rising savings P1-p3	Total Number of Individuals
Wage workers	331 Rs.	13,685	30%	74
Self employed	98 Rs.	37,480	35%	17
Sector				
Trade and retail	333 Rs.	19,444	50%	6
Manufacturing	825 Rs.	15,100	52%	21
Services	107 Rs.	18,990	22%	64
				91

NOTE: In this table N=91. The debt and savings had been reported and summed across the whole household. These are then averaged across individuals.

2.2 Mobility in Economic Circumstances: Fuzzy Variables and Logic:

Under conditions of complexity and when data varies both in its precision and its mode of assessment or measurement, it is difficult to make precise statements about behaviour. The concept of 'economic circumstance' is an evident example of complexity. *Fuzzy variables* are concepts that simplify complexity in precisely specified 'if-then' ways. If numerical values can be assigned with reasons to a complex set of measured and intuitive conditions, they unblock the road to further analysis. A fuzzy variable has been constructed as follows from the combinations of upwards and downwards trajectories in reported economic circumstances of individuals and of the households of lead respondents:

0 if an individual or household's economic circumstances went 'down' in 3 periods,
.17 if they went 'down' in 2 periods and were neutral or were not able to give answers in a third period,
.33 if they went 'down' in 1 period
.50 if they were neutral or gave no answer in any period,
.67 if circumstances went up in 1 period, and were neutral or down in the other periods (i.e. if 1 'up' was mentioned at all).
.83 if they improved in 2 periods, and were neutral or down in a third period (i.e. if 2 'ups' were mentioned at all). [31]
1.00 if in all three periods they reported their economic circumstances as having gone 'up' .[32]

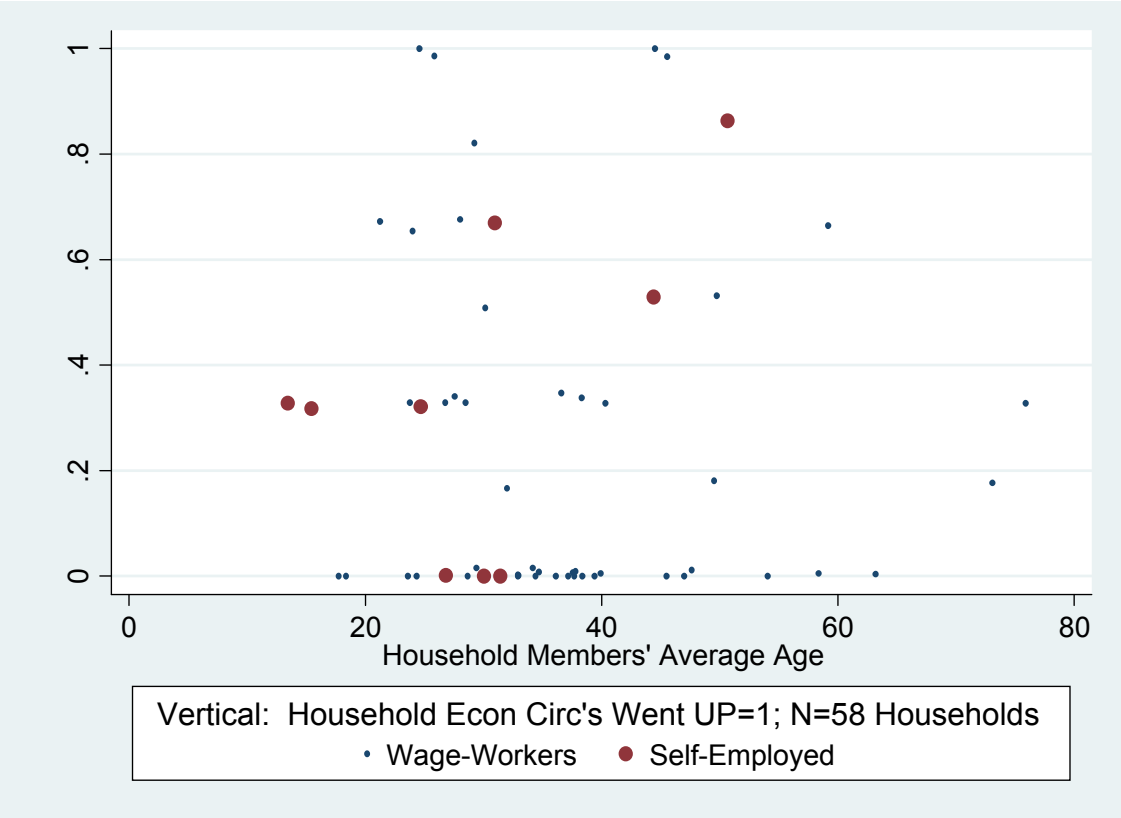
[31] Extremely few cases were not able to give answers.
[32] This is denoted by the variable 'sumup' when aggregated over the whole of the three periods.

Changes in economic circumstances: A summary of the movement of the household economic circumstances 'up' or 'down' by the average age of the respondent's household, N=91, is also presented in Figure 1 and by the age of individual respondents in Figure 2.

Powerful answers to the principal research question emerge from them. First there is clearly much deterioration in economic circumstances during 2008-9 – the majority (82% of wage working individuals and 72% of those who were self employed) experienced no improvement in economic circumstances while a subset of over 20% went continually downwards. While a fifth of individuals has episodes of improvement in downward or stagnant trajectories, only four out of 91 individuals' economic circumstances improved throughout this period. And the trend for households (as opposed to individuals) was even more unambiguously downwards. A third had absolute declines in household incomes from November to March, the median being Rs 500 and the most severe drop exceeding Rs 5000. Forty per cent of households faced absolute decline in incomes from March to May 2009, the median being about the same as the first period while the most extreme crash exceeded Rs 10,000.

Second it is evident that while the economic circumstances of a few households with higher average ages improved; most deteriorated – indicating that old age dependency tended to make a household vulnerable to a decline in economic circumstances. Third, the older the individual respondent the less likely s/he is to have reported any upward change in economic circumstance during the period. **Of the 30/91 individual respondents whose age exceeds 60 years only 3 reported anything but deterioration in all of the 3 periods**

Figure 1: Change in Economic Circumstances of Households by Average Age of Household



NOTE: the figure shows, for each of 58 households, the household head's employment status (large dot= self-employed household (on the right of the key); small dot = wage worker household on the left of the key); the **average age of household members** on the x-axis, and whether their economic circumstances improved at all on the vertical axis. The vertical axis scale is 0 = (down, down down) to 1= (up, up, up) in the three periods during 2008-9.

Figure 2: Change in Economic Circumstances of Individuals by Respondent's Age

NOTE: the figure shows, for each of 91 respondents, their household head's employment status (large dot= self-employed household (on the right of the key); small dot = wage worker household (on the left of the key); the **respondent's age** on the x-axis, and whether their economic circumstances improved at all on the vertical axis. The vertical axis scale is 0 = (down, down down) to 1= (up, up, up) in the three periods during 2008-9.

Appendix 4 shows box plots of the relations between outcomes in terms of the dynamics of economic circumstance by industrial sector and by work status and Table 4 presents summary measures of outcomes for economic circumstances and for incomes.[33]

There are discrepancies between trajectories tracked using fuzzy variables of perceived economic circumstances and those according to reported monthly incomes. The two right hand columns showing the fuzzy variables reveal that for households where the lead respondent was self-employed, there was general downward movement in the year preceding periods 1 and 2, while some recovery was reported for period 3. This tendency to a U-shaped trajectory is much more marked for households where the lead respondent worked in the trading and retail sector. The service sector persists in recording deterioration before and throughout the rounds of surveys. Wage workers have less dispersed values for economic circumstances, declining less dramatically than did the self employed in the early phase and recovering less dramatically in the later one.

[33] These constitute the dependent variables in the later QCA – see section 4.

By contrast average reported monthly incomes (in the two left hand columns) *rose* slightly throughout the period with two exceptions: i) households with a self employed lead respondent, or one in services and domestic work, where some plunged later – from March to May 2009 (and the services average is affected by a few outliers with extreme negative trajectories) and ii) households with a lead respondent in trading and retail (where they nose-dived between November 2008 and March 2009 and many did not recover in the later period).

The two methods of experiencing this period of insults can be reconciled either by attributing the differences in results to errors, or – we think more likely – by appreciating the fact that the perception of economic circumstances includes the aggregate effect of incomes and expenditures under conditions of rapid inflation of basic wage-goods prices, whereas the absolute averages are confined to incomes and exclude the expenditure effect.

Table 4: Changing Economic Circumstances in 2008-9 in Slums of Chennai (Rs.), N=58 Households

Class	Average Change in Monthly Income Period 1 to 2	Average Change in Monthly Income Period 2 to 3	Overall Movement of Econ. Circs* **0=DOWN. 1=UP.**	Movement of Econ. Circs in Periods 1, 2, and 3 **0=DOWN. 1=UP.**
Wage worker	+192	+147	.24	.22, .26, .28
Self-employed	+386	-1,105	.34	.17, .23, .45@
Industrial Sector (Collapsed into three main sectors; head of household's occupation)				
Trading & Retail	-333	+1,350	.53	.17, .17, .84@
Manufacturing	+83	+783	.35	.30, .30, .37
Services*	+262	-171	.19	.18, .24, .24
Overall	+185	+155	.25	.20, .25, .30

* the subjective question about changing economic circumstances is described in detail earlier. The question uses a one year recall (approximately) for each of 3 dates: Nov. 2008, Jan. 2009, May 2009, respectively called Periods 1, 2, and 3.
@ the use of a fuzzy set for each period gives a simple coding which is averaged out here using the mean: 0 = went down. 0.51 – neither went down nor up, or weren't sure. 1.0 = went up.
Note: Due to large standard errors, the differences of means are not statistically significant.

So the aim of the more detailed analysis that follows is to find out whether and why there may be differences in the patterns of deterioration in economic circumstances during 2008-9 among the people and households represented in these diagrams.

3. **Further Data Analysis and Methods**

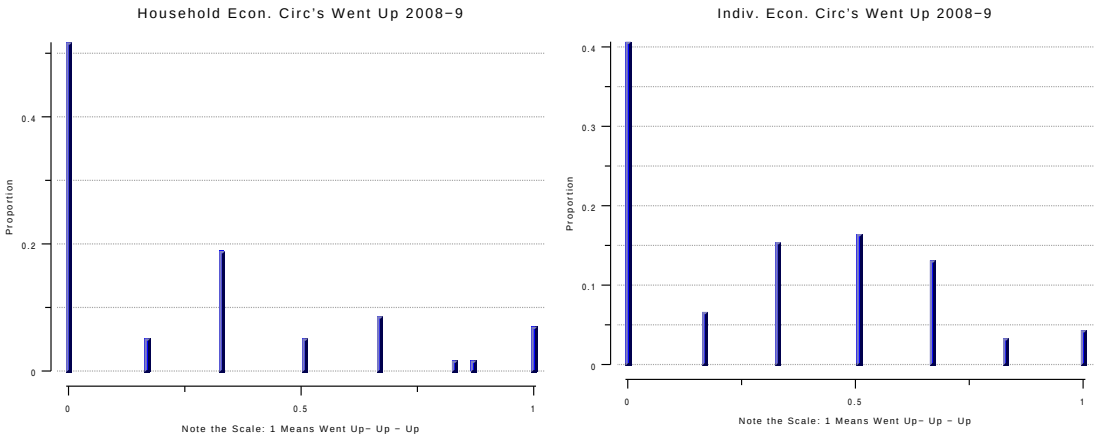
To answer these questions in the next stage of the research, the data on individuals (N=91) needed to be merged into the household database. Those households without any individuals surveyed were dropped, leaving 58 households which had had 1 or more respondents covered in the individual survey.

3.1 Concepts and Methods of Qualitative Comparative Analysis (QCA)

The qualitative comparative analysis (QCA) method formalizes the logic of qualitative analysis. It is appropriate for problems in which the researcher assumes a depth ontology where factors operating at different 'levels' or 'scales' or 'dimensions' (such as region, occupation, household, sector, and individual) work in tandem to cause outcomes that emerge at the various levels. The standard texts on QCA argue that a 'configuration' – a set of circumstances – may have a strong or weak tendency to produce a particular outcome, known as an 'instance'. The frequency of instances among all the cases of one configuration (i.e. one type) is known as the consistency of that set. This ranges from 0% to 100% and the detailed formulae for consistency differ depending on whether the consistency of the causal circumstances is theorized and intended to be *sufficient* to bring about the outcome, or whether we are arguing that the consistency measure is to check how frequently the causes appear to have been *necessary* to bring about the outcome. In these claims about configurational causality, a prior qualitative (and partly theoretical) step is clearly needed to develop views about what may be causing the outcome, and how sensibly to delineate that outcome.

Primary data of the kind used here is ideal for making comparisons of causality across sub-groups in a population because the in-depth field research provides confidence in reasons for claiming that A, B and C may be sufficient causes for an outcome Y. In sum, the QCA approach involves searching for sufficient causes of an outcome Y, which in our case is the changes in economic circumstances (described retrospectively and subjectively) in 2008-9 using one-year recall and summarized by the fuzzy variable. This particular kind of causality is called 'conjunctural causation'. Causality here is conjectured as being substantive but the data are relatively simple proxies for complex aspects of the economic and demographic reality.

Figure 3: Fuzzy Set of Economic Circumstances Improving over Three Periods in 2008-9 [34]

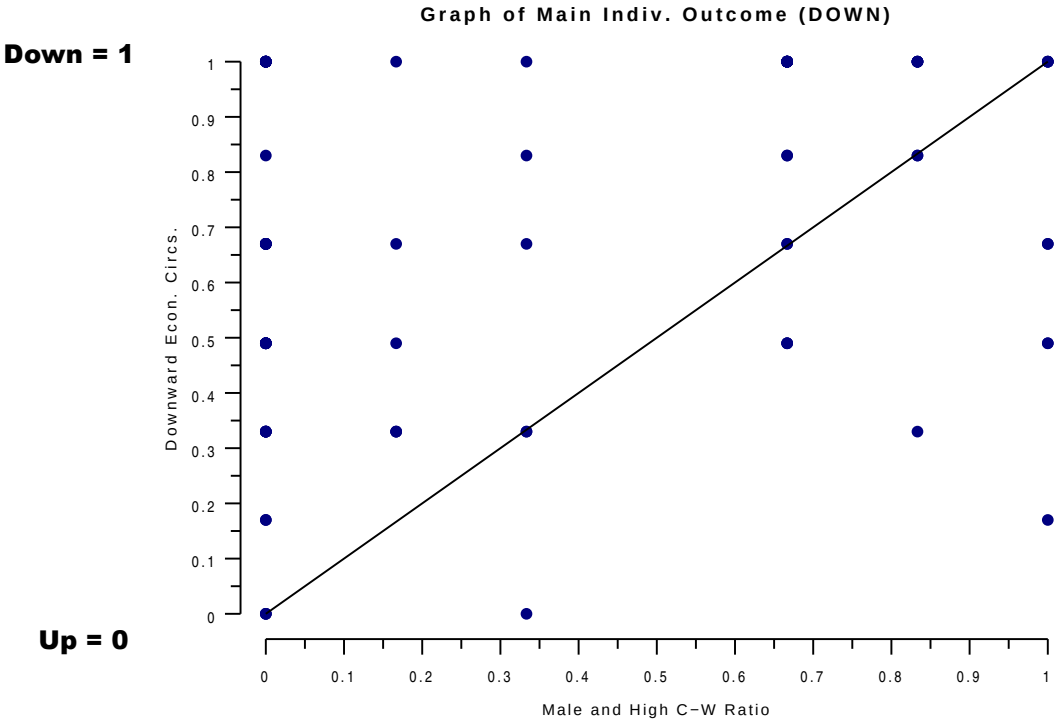


For QCA to work, it is necessary to deploy separate and mutually exclusive units such as households. Scoping the analysis is called 'casing' and may involve multiple causal pathways - Ragin (2009)[35] affirms that 'casing' the units for QCA is a complex act of theoretical description. Casing also invokes consideration of problems of sampling and representativity. In the research reported here, individuals form a second layer of cases about which we have considerable information. The samples are carefully chosen using quota sampling from existing, randomly sampled lists and include cases of both upward and downward movement in economic circumstances (Y) as well as a wide variety of underlying configurations (X) as illustrated in Figure 3. There are men and women, workers and self-employed, old and young (with roughly equal parts of the sample in each main age group), and relatively rich and poor from among the slum-dwelling population.

[34] In QCA, it is advisable to run all the model tests for both UP and DOWN i.e. one way and then its opposite. We test the models for configurations associated with UP, then run them for NOT-UP. In fuzzy sets, there are 3 technical steps which involve user input which can also cause the results for UP and NOT-UP to be asymmetrical i.e. not simply the reverse of each other. These technical steps involve i) the treatment of remainders, ii) the setting of a minimum threshold for a configuration to matter (which here is always at 1 case, ie. all cases matter) and iii) the threshold for the fuzzy cut-off for counting a configuration as a positive instance. Because of these technicalities, the results for UP were not exactly the same as for NOT-UP. The results for DOWN emerge as stronger than for UP. This may relate to using the figure 0.51 for the SUMUP and HSUMUP variables if they were NOCHANGE in all 3 periods - but in any case this is rare.

[35] In Byrne and Ragin, 2009

Figure 4: The Fuzzy Outcome (Downward Econ. Circumstances) For One Configuration, Showing Sufficiency[36]



Note: The x axis is the combination of male and high consumer-worker [37]ratio (fuzzified); the y axis is the reverse of the UP measure shown in Figures 1 and 2. This variable, the set (Down, Down, Down), is used in the modeling exercise which follows.

Figure 4 illustrates sufficient causality using a fuzzy combination of the respondent's gender and the consumer-worker ratio of their households on the horizontal axis,and the outcome on the vertical axis measured as a fuzzy set, in the way explained earlier. The horizontal axis here is a vector which combines one fuzzy set and one binary (the gender of respondent). This combination is done using the criterion of 'fuzzy and'. In Boolean algebra[38], 'fuzzy and' is obtained by taking the minimum of two values, where 1=male and 0=female (for gender in our case). Counterintuitively, men reported more frequently than women that their economic circumstances had deteriorated. Figure 4 is divided into two triangles; from the perspective of the kind of causality, the upper left is known as the sufficiency triangle while the lower right is the necessity triangle. If all cases lie in one or the other the interpretation of causality is unambiguous. Figure 4 shows a prevalence of responses in the upper left sufficiency triangle, but there is a mixture.

[36] See footnote 32 for the reasons for the reversal of scale for 'up' and 'down'.
[37] In the consumer-worker ratio older people who did not list any current occupation are classified here as 'consumers' although a few bring in a pension of Rs.400/month.
[38] A term for the analysis of a class of mathematical structures that can be described in terms of an ordering or in terms of operations on a set.

When there is a mixture, other concepts and measurements are needed. The consistency level of a ratio on the scale from 0 to 1 indicates the strength of the tendency for X to be sufficient for Y. The 'coverage level' is the percentage of cases that lie in the sufficiency area (that triangle). High coverage is often associated with lower consistency. Low coverage would be obtained if consistency was required to be very high across different configurations. In a typical QCA result, a set of possible sufficient causes are identified, and their net causal coverage is measured (for sufficiency). The coverage figure is the sum of the individual configurations' coverage, netting out any overlap that may exist between the configurations.

Returning to the questions of causality, in the case where A (but not B and C) are present, the outcome might not occur, because A may require a *conjuncture* with B and / or C to cause Y. To test for conjunctural causality, every permutation of the A B C Y set may need to be tested. According to standard texts (Ragin, 1987, 2006), we need to test for permutations that exist, and compare the number of cases in which the outcome occurs with the number of cases in which it does not occur. *Necessary* causality is seen when X is associated with Y but not-X appears to cause not-Y, as evidenced by the presence of X-Y pairs and X-Not-Y pairs, but an absence or rarity of Not-X, Y pairs. *Sufficient* causality is the converse (in this simple X-Y notation): to find support for X being sufficient to cause Y, we need cases of X and Y, cases of Not-X and Not-Y, and some cases of Not-X and Y but no cases of X and Not-Y.

The subtlety of this distinction has led to a strong debate about the sampling methods used in qualitative comparative research. On the one hand, if there are just a few cases, there may not be enough evidence to check for the tendency for each of the 4 combinations (X,Y; Not-X Not-Y; and the two mixed combinations) for every permutation including not only single X's but also A and B, A and B and C, B and C, and so on. On the other hand, if larger sample sizes exist, then it may be possible to use regression methods and QCA could be discarded. The debate however has not been able to show how traditional regression analysis can capture the particular distinctions about causality so carefully defined by QCA's set theory (Ragin, 2005, 2008).

When fuzzy sets are used, the combination of several conditions is carried out using Boolean algebra. In this algebra, the word 'OR' is represented by the maximum of two sets, meaning the maximum level reached by a case in either set. The word 'AND' (already deployed here in 'fuzzy and') is represented by the minimum level of two sets. X and B thus implies the highest lowest level reached by **both** X and B. Boolean logic is used once to create causal configurations, and a second time to reduce the simplified fuzzy 'truth table'[39] to get a more parsimonious summary of the situation.

We can proceed to test certain hypotheses about the impact pathways theorized from the economic and environmental insults reviewed at the outset. That is, we test whether being female, being old, and being a wage worker and membership in a household with a high ratio of dependents to workers will not lead to an improvement in economic

[39] A 'truth table' is a term of art for a table with information regarding the different combinations of conditions that produce a specific outcome

circumstances. The service sector is hypothesized as being more robust than manufacturing or trade, as are salaries on monthly contract and transfers or pensions from the state. For a given level of income, multiple and diverse sources of income will protect a household more than a single source (and their incomes will be likely to aggregate to a higher total)..

An individual model of improving economic circumstances 2008-9 : There are data to test the following variates: being female, being older (fuzzified age), being a worker (versus self-employed), having a household of higher than average age, being in the trading and retail sector, being in the service sector, having a salary that is regular (but usually these are informal sector salaries, with a few exceptions notably railway salaries and pensions see appendix 4); having a high level of state transfers and / or pension in the income in 2008-9, together with the consumer-worker ratio of the household.

A household model of improving economic circumstances 2008-9: The variates tested include being in a household that has a regular salary (as explained above and in Appendix 2), average age of the members of the household, household size, having the household head work in the trading and retail sector, being in the manufacturing sector, being in the services sector (a definition construed as involving all remaining job-types plus household work); the total value of all mobile and immobile property including jewelry and 17 other assets; scale of the government subsidy income; whether the household was putting regular savings into liquid or illiquid formal-sector destinations on a rising basis over 2008-9; whether the household had been made to pay bribes in the last year; the consumer-worker ratio of the household, and last but not least whether the head of the household is self-employed or a wage worker.

The fuzzy set for several variables was arranged to split the sample into six equal parts using seven dividing boundaries. Age, Average household age, household size, income, total property value were put onto this scale with values 0 0.17 0.33, 0.51 (to avoid the ambiguity of 0.50), 0.67 0.83 and 1.0 to correspond with the outcome fuzzy set.[40] . The data were examined using regression methods, with logged income and wealth, but, with small sample sizes, no strong results emerged. Some variables were expressed as binaries (the household containing a widower, the respondent being a widower or deserted; the gender of respondent; being cheated; and self-employment vs. wage-work status as two fractions within the slum working class.

[40] In making a fuzzy set, two calibration decisions were made here. Firstly it was useful to have seven boundaries for these sets since there were seven natural boundaries for the DOWN fuzzy set. It was considered desirable to split up the variables' histograms approximately into six equal parts for these fuzzy sets. Other calibration decisions could lead to different results. Secondly, for the middle part of the set, if the variate is set at 0.50 then that case will be considered to be 'in' more than 1 configuration at a time. It is considered to be both 'in' and out' of that set and thus both 'in' and 'out' of any configurations of which that variate is a part. Therefore fuzzy set analysis may need to be simplified slightly by setting the neutral middle values to a number other than 0.50. In this case, 0.51 was chosen on each scale. As a result of these decisions, Table 5 below can be interpreted by summing up the number of respondents to 91. If the value 0.50 were chosen for some variates, the apparent N would exceed 91. The impact of this change on the results is small. For discussion, see Rihoux and Ragin (2009); Rihoux and Grimm (2006).

4.**Results of QCA Models**

Much stronger results were obtained with QCA than could be obtained by examining individual cases. Firstly, there were individual results which could be differentiated from the economic circumstances of the households. Secondly, although experience was diverse, there were some patterns which QCA can notice but which the human eye would struggle to discern.

4.1. Individual level results:[41] Table 5 presents a parsimonious intermediate 'truth table' which summarises the conditions (from those theorized and for which we have data) which produce deterioration in individual economic circumstances. Data collected from individuals and data about their households give a picture of the findings focused firstly upon the 91 individual respondents.

Table 5: Intermediate Truth Table for Individual–Level Fuzzy Set Analysis of Declining Individual Economic Circumstances

male	Lead Respondent Does Waged work	Fuzzy Consumer-Worker Ratio	Number of Respondents	Went Down (3 Period Summary)	Consistency Index
0	0	1	17	0	0.635
0	0	0	10	0	0.674
1	0	0	17	0	0.720
1	1	1	14	1	0.874
1	0	1	23	1	0.881
0	1	1	3	1	0.904
1	1	0	2	1	0.919
0	1	0	5	1	1.000
Overall Total			91		

Notes:

1. The elements in column 5 are entered by the operator (Olsen) after observing the gap between 0.72 and 0.87 which indicates that a 0.86 cut-off level will work well for 'instances' in which decline occurred compared with. 'non-instances' in which there was no decline.
2. Being a wage worker, in most cases means not being from a household in which the lead respondent is self-employed.

These results can then be simplified to a simple two-part explanation. Either X1 or X2 is sufficient to cause a decline in 60% of cases. See Table 6.

[41] In QCA these are termed 'fsQCA' results – 'fs' means 'fuzzy set', a set in which individual cases can take any form in between full and zero membership according to the reasoning and judgment of the analyst.

Table 6: Two Configurations Causing Declining Individual Economic Circumstances, Slum Dwellers of Chennai, 2008-9

Configuration X	Coverage (% of Cases which are Covered by This Configuration **X**)*	Consistency for Sufficient Causality (depending upon the Boolean combination of Y and **X**)
X1 Household has a wage worker	32%	.84
X2 Respondent is male and the consumer-worker ratio is high	44% (of which 16% are in the Salaried configuration too)	.88
Overall with these two configurations	60%	.86

*Note that in the fuzzy Boolean algebra the meaning of coverage varies slightly from its usage in crisp set analysis / QCA. However its scaling from 0 to 1 and its meaningfulness as an indicator of a configuration's relative size to the whole set of configurations is common to both crisp and fuzzy modes of measurement. The unique coverage is in column 2.

The first row, X1, shows that those individuals whose referent household occupation was wage work were badly affected – with a three period decline in 2008-9. The second row, X2, reveals a larger group comprising men in households with a high consumer-worker ratio who were also badly affected. [42] In such cases regardless of changes in income there could be a rise in household costs, caused by prices rises and exacerbated by consuming non-earners. However if other kin were employed (i.e. they were not the sole earner) men in households with these demographic attributes were more likely to report an improvement in economic circumstances..

Examples and case studies of these conditions can be found in Appendix 5.

4.2. Household Level Results: The results for the model for households indicate that having a lead respondent who is i) a wage worker ii) in the service sector is sufficient to cause a three period decline in economic circumstances.

Table 7 presents the results in a truth table format while Table 8 summarises the information. Either X1 or X2 is sufficient to cause deterioration in 71 % of cases. The first row, X1, shows that the large group of individuals whose lead household respondent was a wage worker in services had a three period decline in 2008-9. The second row, X2, reveals a very small group comprising relatively young households (not necessarily small

[42] The unique coverage ratio is 0.28 for the vector X2, i.e. for the Male*HighCWRatio configuration, and this outcome is depicted in Figure 4 of sufficiency (see above). The unique coverage provided by the X2 group is less than 44% because of the overlap with individuals whose households had a salary.

ones) where the lead was self employed in sectors other than services. This group was also badly affected

Table 7: Intermediate Truth Table for Household–Level Fuzzy Set Analysis of Declining Individual Economic Circumstances

Fuzzy Set of Average Age in Hhold	Lead Respondent in Service Sector	Self-Employed Class Fraction @	Number	Went Down (0=Up, 1=Down)[43]	Consistency	Row Number
1	0	1	2	0	0.478	1
0	0	0	9	0	0.647	2
1	1	1	1	0	0.742	3
1	0	0	5	0	0.763	4
0	1	1	4	0	0.775	5
1	1	0	27	1	0.869	6
0	1	0	8	1	0.890	7
0	0	1	2	1	0.919	8
	Overall Total		58			

Notes:
1. Note: As in Table 5, a distinct dividing line is set by the operator (Olsen) between those judged to not decline, and those who are judged to have declining economic circumstances (consistency >.86 is the cutoff).
2. @ Column 1 indicates average age above 0.50 for all cases in the configuration; column 2 indicates the lead respondent is in the service sector; column 3 indicates whether the household's lead respondent is self-employed (1) or waged-worker (0). Thus for example 27 waged-worker households had Downward movement (row 6)

[43] In QCA, it is advisable to run all the model tests for both UP and DOWN i.e. one way and then its opposite. We test the models for configurations associated with UP, then run them for NOT-UP. In fuzzy sets, there are 3 technical steps which involve user input which can also cause the results for UP and NOT-UP to be asymmetrical i.e. not simply the reverse of each other. These technical steps involve i) the treatment of remainders, ii) the setting of a minimum threshold for a configuration to matter (which here is always at 1 case, ie. all cases matter) and iii) the threshold for the fuzzy cut-off for counting a configuration as a positive instance. Because of these technicalities, the results for UP were not exactly the same as for NOT-UP. The results for DOWN emerge as stronger than for UP. This may relate to using the figure 0.51 for the SUMUP and HSUMUP variables if they were NOCHANGE in all 3 periods - but in any case this is rare.

Table 8: Two Configurations Causing Deteriorating Household Economic Circumstances, Slum Dwellers of Chennai, 2008-9

Configuration X	Coverage (% of Cases which are Covered by This Configuration **X**)*	Consistency for Sufficient Causality (depends upon the Boolean combination of Y and **X**)
X1 Household lead is in services and household head is a wage worker (not self-employed)	67%	.82
X2 Household lead is not in the service sector, but is self-employed and HH has a low average age	4%	.92
Overall with these two configurations	71%	.83

*Note that in the fuzzy Boolean algebra the meaning of coverage varies slightly from its usage in crisp set QCA. However its scaling from 0 to 1 and its meaningfulness as an indicator of a configuration's relative size to the whole set of configurations is common to both crisp and fuzzy modes of measurement. The unique coverage is in column 2.

5 Conclusions

We set out to examine the impact on the economic circumstances from November 2008 to May 2009 (and by recall during the lead-up to this 7 month period) of individuals and households living in five Chennai slums in Tamil Nadu.[44] While economists still tend to examine welfare outcomes through income, the concept of income ignores expenditure.[45] By contrast the idea of 'economic circumstances' was well understood by slum dwellers to involve the capacity to balance income and expenditure, to reconcile combinations of assets and liabilities (including loans), and to control outlays (and savings may even be conceived as an outlay) and expenditures. Our research uses both etic and emic concepts to trace outcomes.

At the start, these households were expected to be challenged by the local effects of the national slow-down in growth predicted in late 2008 to be due to multiplier effects on India's real economy of the global financial crisis. During the real-time of the research it

[44] Here we analyse 91 individuals from the 3474 studied by the NDA-Birkbeck College project and the 1.8 million estimated slums dwellers in Chennai and take 58 households from the 800 studied in the main project – in turn selected from about 3 lakh households in Chennai slums.
[45] The analysis of expenditure is a future project.

so happened that these households also had to confront resurgent price inflation in basic wage goods such as food, together with intense heat-waves, cyclone and floods.

We found no existing theory to frame this research so developed some of our own. Since the data were unsuitable for standard analysis using regression, we also applied novel methods involving fuzzy variables and Qualitative Comparative Analysis (QCA). This is the first such application to slum research.

5.1 Substantive Conclusions

Our analysis has three stages. First, to make this diversity and complexity tractable, we classify occupations - most of which were in the informal economy - in terms of the three broad *industrial sectors* in which the lead household respondent (LR) works: the service sector (defined here to include a mixture of paid and unpaid service work including domestic work); trade and retail; and manufacturing, together with 'other'.[46] We further disaggregate households in terms of the *'work status'* distinction between the LR's self employment in informal business (such as petty trading) or wage work (including casual labour).

Our descriptive research reveals deep structures of inequality, diversity and complexity. Workers are spread across a wide spectrum of assets, debt status, household sizes together with the average age of the household. They are differentiated in differentiated ways – as has also been observed for rural Tamil Nadu.[47] Assets inequality exceeds income inequality. Incomes of self employed households exceeded those of wage workers by a third. Slum occupations are also highly diverse.[48]

Second we analyse economic trajectories during the period of environmental and economic insults. For these we use monthly incomes together with a fuzzy variable for economic circumstances at three points in time from November 2008 to May 2009. The results are clear but nuanced. We find a difference between trajectories traced through *income* and those from perceived / experienced *economic circumstance*. There were further differences according to economic sector / industry groups and also in the two work status groups. There was deterioration or stagnation in the economic circumstances of 80% of individual cases. Age mattered. Of the third of individuals who were over 60, only 10% (i.e. 3% of individuals sampled) reported anything but decline in the three periods. Incomes in self employment and in trade and retail nosedived in the early phase. Economic circumstances in self employment plunged early but by May there was some recovery. In the service sector economic circumstances declined in the early phases and tended to stagnate later on.

Third, using Qualitative Comparative Analysis (QCA) we compared the experience of subgroups of households with that of a matched sub-sample of individuals. This revealed the different characteristics of *individual* from *household* experiences during 2008-9. This confirmed that older *individuals* suffered more – both men and women according to

[46] See Appendix 1.
[47] Colatei and Harriss-White, 2004
[48] See Appendix 2.

our data, though 11 % of our sample of individuals were women who had been widowed or deserted. And small households tended to be poorest at the outset.

Just as we theorized in the third and fourth impact pathway at the start of this paper, we find that LRs in wage work whose households had higher than average consumer-to-worker ratios i.e. more non-earning dependents more often than not experienced deterioration in their economic circumstances. They are more likely to have older people in their households.

Among the 58 *households*, the rarer upward changes in economic circumstance towards mid 2009 were associated more closely with the economic characteristics of the household than with demographic features such as their age composition. This strongly confirmed that wage work in the service sector spelt deterioration during the period of insults. A small group of young households, self-employed in other sectors (manufacturing and trade and retail), also deteriorated badly. However in general the reverse is true and households which had a self-employed LR and those depending on trade and retail were better protected against economic and environmental insults than those in manufacturing and services.

5.2 Policy Conclusions

Policy conclusions to both exploratory and hypothetico-deductive research are usually residual and made in ignorance of the politics of policy and the common technologies of power operating within policy processes. These result in capture and subversion and in unintended and unexpected outcomes.[49] A quarter century ago this conventional tendency to residualise policy implications and conclusions was criticized in public administration research as being irresponsible, on the grounds that residual policy-suggestions create plenty of escape hatches for the researcher and policy maker alike.[50] Meanwhile evidence-based policy continues to be rejected in favour of policy-based evidence. All we can do here is to examine aspects of state provisioning that would need to be solidly in place before other policies for slum dwellers have any chance of being implemented as intended**.**

The physical fabric of slums are by definition sinks of infrastructural neglect, on top of which slum-dwellers are vulnerable to many insults – including the environmental and economic ones discussed here. While India's national financial arrangements turned out to be relatively well protected from the crisis for the wrong reasons (their global integration was insufficiently rapidly advanced) the global financial crisis hit the real economy and rippled through the slums, compounded the effects of cyclones and heat-waves. Wage work (which 84% of households were providing) proved more vulnerable than self-employment; services (which 69% of slum households engaged in) proved more vulnerable than manufacturing or trade. Tamil Nadu's economic agenda provides little effective protection for people at work, particularly in wage work – outside state work-

[49] Fernandez, 2008.
[50] Schaffer, 1984

fare (e.g. the NREGA[51]). *Effective protection at work could include the enforcement of Minimum Wages, three elements of the ILO's Decent Work agenda[52] (rights to work, at work, and to organization and 'dialogue') and even the extension of the Employment Guarantee to slums to improve their physical infrastructure.*

However Tamil nationalist political parties have for decades been locked in competition developing a wide-ranging project protecting people *outside work*. Its scope extends not only (often hardly at all) through the health and education system but more distinctively through noon meals, subsidized essential commodities and the beginnings of a BPL welfare state, including pensions. Lately (with revenues from alcohol) the state has even started to subsidise consumer durables - newly conceived as 'basic' - such as TVs and stoves. Tamil people have referred to this project as 'our socialism'. Although their effect is to stabilize income, state transfers are currently a minute component of slum income. *If these transfers were no longer rationed in various ways they would relieve the distress of most vulnerable people. Measures to stabilize the prices of basic wage goods would also protect slum households from punitive economic and environmental circumstances.* Apart from the consumer durables, none of this is other than the project of promotive, preventive and protective social security developed in the 1990s by the late S. Guhan, let us not forget.[53] And rights to social security are the fourth strand of the ILO's Decent Work agenda which the National Commission for Enterprises in the Unorganised Sector has also championed for self-employed workers.[54] In these Chennai slums, all these projects have a long way to go.

[9.6k words without references and appendices]

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[51] Reddy and Upendranath, 2009

[52] http://www.decentwork.org/

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[54] http://nceus.gov.in/Report_Bill_July_2007_index.htm

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APPENDIX 1: The Classification of Industries and Broad Industrial Sector

NIC Industry and Which Broad Sector it Was Allocated to

***Principal industry (NIC-1998)*:**	***Broad Sector:***
1 A AGRICULTURE, HUNTING AND FORESTRY 2 B FISHING	***Not found in the slum***
7 G WHOLESALE AND RETAIL TRADE; 8 H HOTELS AND RESTAURANTS	***Trading and retail***
3 C MINING AND QUARRYING 4 D MANUFACTURING 5 E ELECTRICITY, GAS AND WATER SUPPLY 6 F CONSTRUCTION Special part of NIC 7: REPAIR OF MOTOR VEHICLES, MOTORCYCLES AND PERSONAL AND HOUSEHOLD GOODS	***Manufacturing***
9 I TRANSPORT, STORAGE AND COMMUNICATIONS 10 J FINANCIAL INTERMEDIATION 11 K REAL ESTATE, RENTING AND BUSINESS ACTIVITIES 12 L PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY 13 M EDUCATION 14 N HEALTH AND SOCIAL WORK 15 O OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICE ACTIVITIES ** 20 ** Not reported to be economically active	***Services***

Appendix 2: **Salaried Job Key**

Salaried work is work on a regular – generally monthly – pay contract. In formal sector employment there is actually no requirement for the salary to be regular. Conversely in informal sector work there is a sizable category of workers who are not paid by piece- or daily-rates but are paid at regular intervals. Thus maids / domestic helpers can count as salaried. At the same time there is a broad range of tasks which might be paid on piece-rate but may on occasion be salaried e.g. electrician. In our research on 800 households in the slums, the salaried jobs (held by anybody in any household) include these:

S Lorry driver
S Railways
S Bus (PTC / Transport / Conductor/ driver)

S Watchman/security
S security agency

S Call centre/BPO
S Bank employee
S Education
S Engineers
S Advocate
S Social worker/ngo
S Health/Medicine
S Entertainment (TV,singer, musican)
S IT/data entry
S Religious services/OdhuvarAdvertising
S Hotel and formal catering
S Politics
S Accountant
S Balwadi teacher, teacher
S Helper, nurse, ayurvedic doctor
S Party worker

S Post office
S Govt. employee
S Military services
S Clerk (working in company)
S Maid / domestic help

From the more restricted sample of individuals and households narrating their experience of economic circumstances, only 17 households with salaried workers had matching Individual and Household surveys. Thus our analysis of salaried work includes a receptionist; railway mechanic; Pco attendant; MTC conductor; accountant; office assistant; watchman; social worker; domestic help; clerk; corporation sweeper and an electrician together with those living off stable income from rents and from pensions.

Appendix 3 Details of the Fuzzy Variable for Economic Circumstances

Individual Respondents' Economic Circumstances:

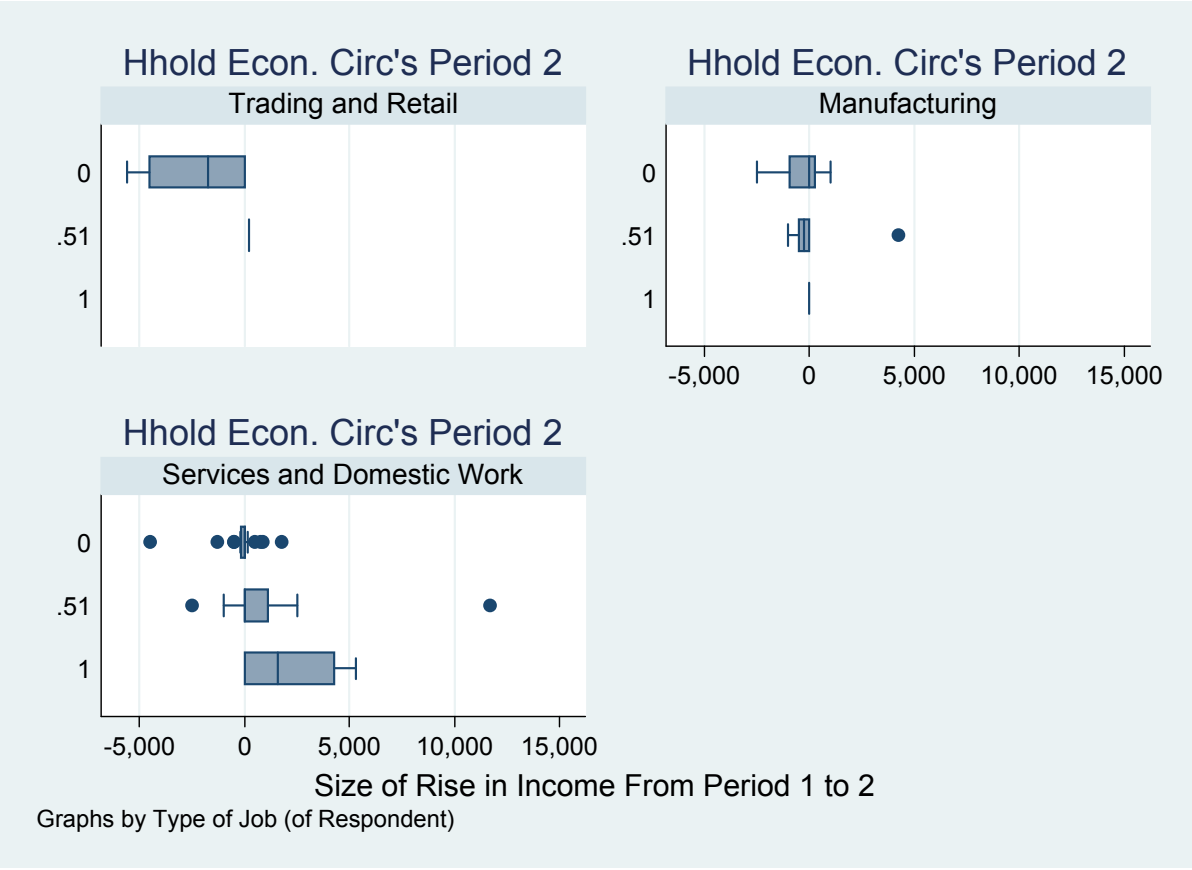
	WAGE-WORKER			SELF-EMPLOYED	
	% of individuals	Number of individuals		% of Individuals	Number of Individuals
Down down Down (0)	45%	33		24%	4
0.17	3%	2		24%	4
0.33	15%	11		18%	3
0.51 (no change or did not reply)	19%	14		6%	1
.67	12%	9		18%	3
.83	1%	1		12%	2
Up up up (1.0)	5%	4		0%	0
	100%			100%	
Subtotal	Overall, 0.30 average on a 0-1 scale with UP=1	74		Overall, 0.34 average on a 0-1 scale with UP=1	17
Total			91		

Households' Economic Circumstances:

	WAGE-WORKER			SELF-EMPLOYED	
	% of Households	Number of Households		% of Households	Number of Households
Down down Down (0)	55%	27		33%	3
0.17	6%	3		0	0
0.33	16%	8		33%	3
0.51 (no change or did not reply)	4%	2		11%	1
.67	8%	4		11%	1
.83	2%	1		11%	1
Up up up (1.0)	8%	4		0	0
	100%	49		100%	9
Subtotal	Overall, 0.24 average on a 0-1 scale with UP=1	49		Overall, 0.36 average on a 0-1 scale with UP=1	9
Total			58		

Appendix 4 Box Plots of Trajectories during period of Economic and Environmental Insults 2008-9

Box Plot Table A4.1 By Industrial Sector, 2009, period 2 the year to January 2009



Notes:
Box plots show the mean and four quartile points as well as outliers.
0 = down; 1 = up
N =58

Box Plot Table A4.2 By industrial Sector, year to June 2009

Table A4.3 By Work Status group Period 2 , year to January 2009

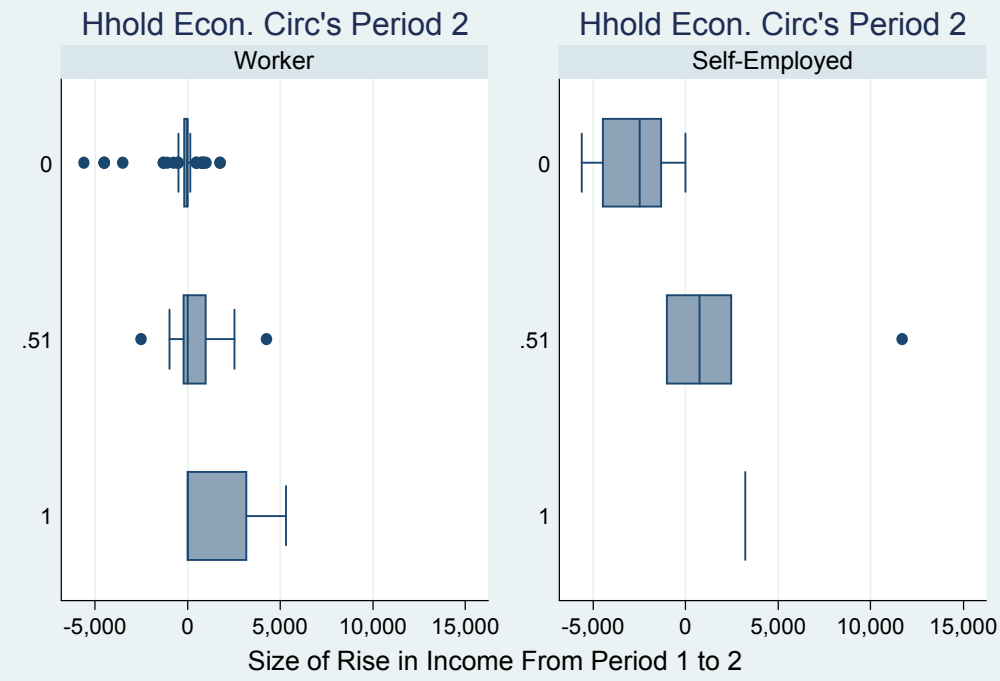
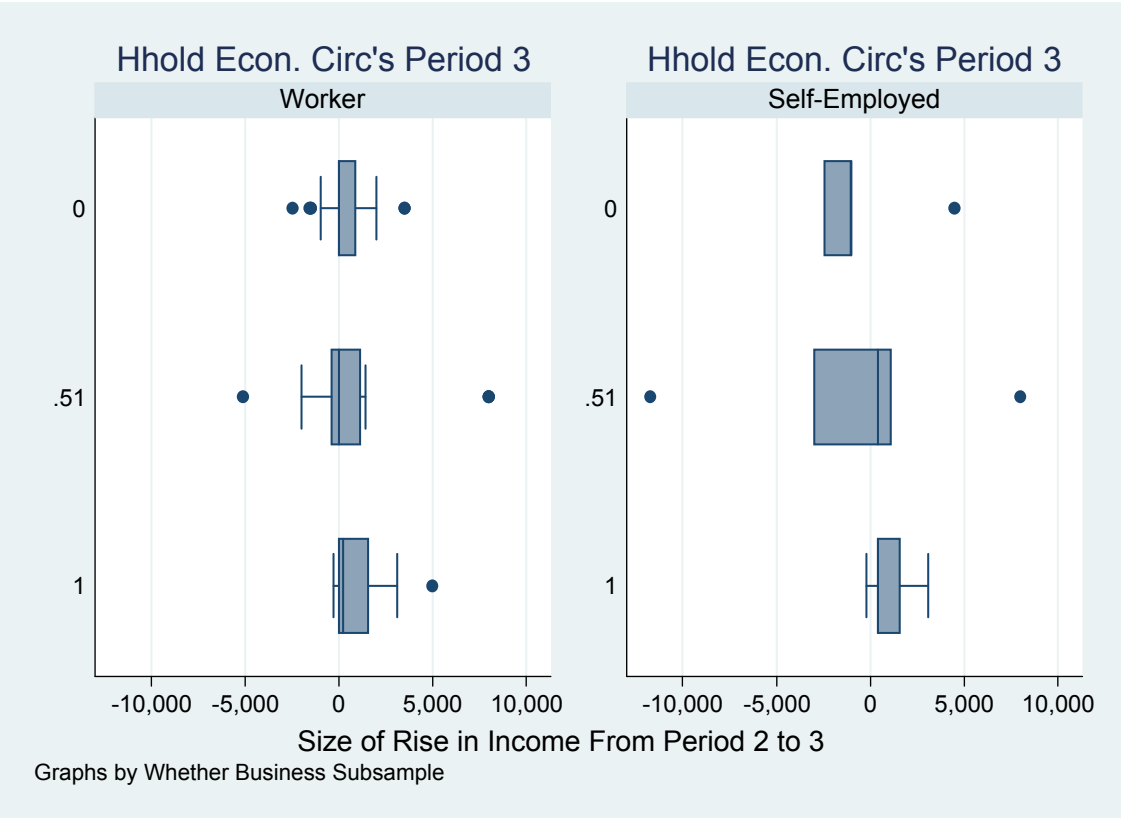


Table A4.4 By Work Status Group Period 3, year to June 2009



Appendix 5 – Case material

MEN WITH HIGHC-W RATIO: down down down

1. Pari owns a tiled house from the Tamil Nadu Slum Clearance Board where he lives with his mother, wife and three children two of whom are educated to a high standard. Dalits from an agricultural labouring background in rural Tamil Nadu, he migrated with his mother on the death of his father and has been employed as gardener in a Chennai hotel ever since. He is 53 and addicted to alcohol to ease the pain in his joints from the work he does. For his habit he takes over half his monthly salary Rs4,500 – providing Rs 2000 for a family budget. From that is paid the Employee State Insurance of Rs 360 which covers the medical expenses of his mother. Two of his children have been educated with loans. Over and above these conditions, the hardship of the 2008-9 period means his wife has been forced to take employment as a petty shop assistance – earning Rs 1300. She is also leader of a self help group into which she must pay Rs 1700 per month. The hardship has also meant that the youngest child has been taken out of school and will not have as high educational qualification as their siblings.

2. Ravi has his own thatched house complete with fridge, fan, TV and LPG cooker. A dalit agricultural labouring family from coastal Tamil Nadu he is a building painter, keeping a wife and two children at school and remitting money to parents. and his wife's parents one of whom still works as a watchman. His mother lives with them. She is between 70 and 80, sleeps on the floor, is going blind and unable to walk or to wash herself. Her husband who had another 'kept' wife and family died 'at work' in the construction industry

WAGE WORKER IN SERVICES down down down

Kamala is in her 70s and lives in rented terraced accommodation (at Rs 1000/m) – there are four units with 8 households. They are a dalit household from agricultural labouring stock from a village near Chennai. Her husband worked for over 40 years as a welder but for some 13 years had been a watchman and has developed diabetes (for which he is treated free). One of their sons lives with them along with his wife and three children. The son works as a sweeper for a small foreign company. While Kamala knows his earnings (Rs 3000 / month), she has no idea of those of her husband. They have no remittances from children who have left the household. Her son provides her with Rs 1200 / m with which she feeds the entire household. She is dependent on the PDS and FPS though she has plenty of grumbles about the quality of the rice and the quantities of other comestibles - dhal , onions and oil – which the ration shop has started to provide as a reaction to the price inflation. The limiting consignments (quantities below which the PDS will not sell – typically 20-25 kgs of rice) are too large for 'daily wage people' which is how she conceives of her family. She is a member of a self help group into which she pays Rs 60/week.

Raman and his wife, mother and daughter live in a tiny, clean thatched hut without electricity under the MRTS railway bridge. They are in their sixties but have no pension. Both are from Chennai, their families having migrated from there when they were children. Theirs is a cross caste love marriage (they are from backward castes). Raman

has spent his life in physical labour – loading, painting, eventually in construction - but for some time has been working as a guard for an IAS officer. He works through an agency which skims half his pay and he nets Rs 2000/m. His wife has been working for some years as a domestic help for 4-5 hours a day for a Muslim family which pays her Rs 400/m together with some things in kind (clothing). 'I am part of their family'. Rain damage has been costly to repair (Rs 300) and they are severely dependent on the ration shop – which they also criticise for poor quality food. They can make one meal a day.