TRADE-OFF BETWEEN PRICE AND IMPROVEMENT IN QUALITY OF SERVICE ON UTILISATION OF PUBLIC HEALTH FACILITIES IN THE ASHANTI REGION OF GHANA

BY

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DECLARATION

I declare that this thesis was written by me, and the ideas expressed in it are entirely mine except for references which have been duly cited. No part of this work has ever been presented elsewhere for the award of a degree.

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DEDICATION

For my mother, Ama Konadu.

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ABSTRACT

This thesis assessed quantitatively, the improvement of drug availability at two district hospitals, two urban and two rural health centres in the Ashanti Region of Ghana after the introduction of "Cash and Carry" policy in the country. The supply situation of these public institutions in both periods was compared to the coverage of the facilities by using panel data analysis. As an input to the debate on the design of the national health insurance scheme, the work also used contingent valuation methods to assess the willingness of patients to change their current out of pocket payment system for drugs.

On average the percentages of desired drug quantities and drug types that were supplied increased remarkably. The findings on coverage trends were mixed. One of each of the two facilities in the rural, urban and district communities had its coverage reduced in the post period while the other ones in the same community types had theirs improved.

The study re-emphasises the importance of drugs in the delivery of health care in the public health institutions in Ghana. The relative negative responsiveness of coverage to price changes in the pre-period was greater than the post-period, implying that patients are more likely to pay higher fees in improved quality periods. There was also high acceptance of pre-payment scheme for drugs in these communities.

The improvement in quality of care like drug availability has a big role to play in the delivery of health care in Ghana. There is the need to minimise the effects of the noticeable bottlenecks in the improvement of quality of care like management inefficiencies, under staffing in remote areas and the unfunctional credit facilities set up for the needy in society. It is also recommended that there should be a simple and selective, but affordable health insurance package for drugs to at least serve as a start for the implementation of the national health insurance policy that has remained a dream for more than a decade.

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CHAPTER ONE
INTRODUCTION

1.0 Background

Programmes to restructure the health sector in many developing countries in the 1980s were implemented within a macroeconomics policy environment that emphasized the limitations of government and the financial responsibilities of the citizenry. This emphasis was made because the implementation of the Primary Health Care (PHC) promoted by the World Health Organization (WHO) to improve access to health care was bedeviled by financial difficulties in the peak of the economic crisis in the period. Also in Bamako in 1987, the president of UNICEF proposed a scheme to the WHO regional committee concerning the financing of the PHC centres. This scheme, often referred to as the Bamako Initiative (BI) involved promoting health care by financing it through the sale of drugs to patients.

Charging for health services in Ghana has been in existence in the traditional set up in the form of payments in kind and others. The mission hospitals have also been charging for their services for many decades. The Hospital Decree of 1969 (NLCD 360) for the first time after independence introduced nominal fees as a form of partial cost recovery in the public sector. The schedule of fees was revised upwards by the Hospital Fees Act 325 of 1971 for curative services. The rationale for the act was to reduce the excess demand which was believed to be due to irrational use of services in the system (Knauth, 1990).

The economic crisis and the subsequent demands of the adjustment programmes in all sectors of the economy changed the rationale of charging fees when the PNDC Hospital Fees Regulations were made in 1983 and 1985, Legislative Instrument (LI) 1277 and Legislative

Instrument (LI) 1313 respectively. Among other reasons the acts had an explicit aim to recover 15% of total Ministry of Health (MOH) recurrent expenditure to improve services including drug supply (Asenso-Okyere, 1995). Under this scheme, drugs were supplied to each level of the health delivery system through Central and Regional Medical Stores free of charge and according to government budget allocation. All the drugs were to be supplied to patients at full costs with prices varying with inflation, while other charges remained fixed. The institutions were permitted to retain a fixed proportion of their revenue depending on the level of the institution.

After implementing this new decisive set up and also participating in the Bamako Initiative with the comprehensive essential drug list selection, drug supplies in Ghana still faced a number of problems. While Waddington and Enyimayew (1989) found the raising of revenue as being achieved, Vogel (1988) concluded that MOH "was approaching it ..., but at a slower rate than it had anticipated". Osore (1990) also reported that the efficient use of national estimates in procurement was not evident and it has resulted in an inequitable allocation of drugs to health facilities. It was well noted that many of these facilities were experiencing chronic shortage of funds for procurement of drugs (MOH, 1993).

The persisting nature of the problems of selection of drugs, estimation of drug needs, procurement, distribution, and use of drugs made the Economic Review Committee authorise the health institutions to retain 100% of fees collected. The directive was to enable them establish a revolving fund whose primary objective was to maintain a regular supply of drugs and other essential supplies.

Initially, the facilities were capitalised to enable them purchase drugs from the regional medical stores. They were asked to sell the drugs to patients under a "Cash and Carry" system so that the revolving fund could be maintained. The system was to become effective from June,

1989. Its implementation was delayed but in January, 1992 a complete cost recovery for pharmaceutical supplies with 100% retention of revenue was set into full swing nationwide.

Reports on the performance of the scheme talk of management problems of the fund which was meant to be self-sustaining (MOH, 1992; Asenso-Okyere et al.,1995). Other studies have also revealed new patient behaviours due to the cash and carry nature of the scheme at these public facilities (Asenso-Okyere et al., 1997).

These and other problems explain why Ghana is planning to use health insurance as a better alternative to deal with the severe economic constraints facing the running of her health ministry. A feasibility study for the scheme's establishment has been done and plans are far advanced for the formation of pilot areas for the scheme.

1.1 Statement of Problem

It is argued by Lavy and Quigley (1993) that important choices about the organisation of health care systems and the role of government in the provision of health care depend crucially upon citizens demand for health services as well as the efficiency of those services in promoting the well-being of the citizens. While such reforms are now generally acknowledged as having a positive effect on GDP growth, concern also has been expressed in several countries regarding the impact on the social sectors (Hill, 1996).

Enormous evidence exist which show the effects of price changes on the delay before seeking care, sharing of prescribed drugs and use of left over drugs (Weaver, 1995; Asenso-Okyere et al., 1995). Reduction in utilisation of public health facilities has also been observed as user charges are implemented especially in rural areas where such reductions can remain for a long time (Yoder, 1989; Waddington and Enyimayew, 1989 & 1990; Matji et al., 1995).

Nolan and Turbat (1995) raised two important questions concerning user fees and utilisation. They asked whether the observed declines are as a result of increased fees because there were times when utilisation did not fall. It even rose in some situations. They suggested that factors other than fees which could have affected utilisation were not controlled for when some "before-and-after" univariate analysis were done. The absence of clear counterfactual in cash and carry studies also makes it difficult to wholly associate the various behavioural developments to its price and payments effects. Creese (1991) summed this tenuous experience in modeling by saying that the importance of perceptions of quality of care as influence on service-use remains inadequately modeled.

The arguments on price/quality trade-off have not been fairly exhaustive in the Ghanaian context. While before-and-after univariate studies of price effect on demand patterns have been done, little is known on multivariate effects on attendance and for that matter coverage of public facilities in a longitudinal context. For example, the effects of brain drain of medical officers and staffing in general as well as pronounced deterioration of infrastructure have not been isolated from the price effects.

What happened after introducing this quality improving policy (cash and carry) in Ghana has also not been exhaustively studied. If drug supply has improved, has there been any corresponding improvement in public health facilities' coverage? On the other hand, if public facilities' share of visits has not increased considerably, or continues to fall, can we attribute it to stock-outs of drugs at the facilities? Are Ghanaians willing to join and pay for the proposed health insurance scheme if we are not responsive to price changes despite the perceived improvement of quality? This study looked at the aforementioned issues and tried to provide some answers.

1.2 The Relevance of the Study

Ghana's Health Sector 5 Year programme of work proposes to strengthen district capacity to improve the coverage and quality of health care, and to promote it in an efficient and effective manner. Probably because of the large scale delays in reporting cases and the continued use of self-medication, the Ministry has set a target to raise per capita OPD attendance at public institutions from 0.3 to 0.5 by the year 2001 (MOH, 1996) to increase the accessibility of the citizenry to these institutions.

Any change in the allocative principles of the health sector has both cost and benefit. As a more market-type system may contribute to better care by encouraging quality-based competition among providers, it may also exclude the poorest, and neediest. The distinction between net and gross yield is important but the difficulty in measuring this distinction, as noted by many authors like Creese (1991) makes it imperative for studies to reveal by how much demand responds to a price change, and in which social groups.

Focused on this policy need the study examined whether fee collection in the sector has been an instrument of health policy or is just a means of fiscal policy. Although fee collection improves the fiscal balance of the ministry, there is the need to compare the associated effect on service delivery. It has been argued that ensuring a regular supply of useful drugs, even at a price to the patient, improves the quality of care and attendance at peripheral health facilities (Litvack and Bodart, 1993). Other studies have also concluded that willingness to pay for government health services is heavily conditioned by perceived quality and "value-for-money" (Shaw, 1995). This work will therefore help us to verify this simultaneous impact of higher prices and improved quality after the implementation of cash and carry as others have suggested that user fees represent a barrier to attendance especially for the poorest families. It will also

give a very useful clue to the organisers of the National Health Insurance scheme regarding pricing of their packages and treatment of drugs in the design of payments options for subscribers.

1.3 Objectives

The general objective of the study is to assess the supply of drugs in public health facilities and examine its effects on health care coverage.

Specifically the study will:

1. Determine the regularity of drug supply in public health care facilities.
2. Determine the effects of price changes and drug availability on coverage[1].
3. Assess the willingness of patients to join and pay for a prepayment scheme to obtain prescribed drugs as an alternative payment scheme.

1.4 Hypotheses of the Study

1. The drug situation in public facilities has improved.
2. Patients are more likely to pay higher fees when drugs are available at the public facilities.
3. Patients are willing to join a well established insurance scheme for prescribed drugs.

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[1] **Since health facility coverage is more important from a public health perspective than facility utilisation, the study looks at the proportion of a facility's catchment population who uses its services.**

1.5 Organisation of the Study

The rest of the thesis is organised into five chapters. Chapter two reviews the various options of health care financing Ghana adopted after it attained independence in 1957. Brief discussions of the financial roles of the actors (patients and providers) in the Ministry is done. Chapter three gives a review of the literature and some of the studies done in the area of health economics regarding utilisation of health services. A brief conceptual framework for assessing the issues and research priorities on the economics of tropical diseases starts the chapter. Chapter four deals with the methodology used to achieve the objectives of the study. This chapter also contains the description of data sources and the study areas. The results are presented and discussed in chapter five while summary of the findings, policy recommendations, limitations and conclusions of the study are presented in chapter six.

CHAPTER TWO
POST INDEPENDENCE PHASE OF HEALTH CARE FINANCING IN GHANA

2.0 Introduction

The emphasis of Ghana's health policy is basically on prevention of diseases, health promotion and basic primary health care. The sector's medium and long terms policy objectives aim at ensuring healthy life for all persons resident in Ghana regardless of age, sex, origin, ethnic group, religion, political beliefs or socio-economic standing (MOH, 1996). Also implied in this policy is the provision of services that fall outside the health sector like good water, balanced nutrition and efficient sewerage.

Health care financing in Ghana has passed through different phases. Before independence, the colonial government provided limited health care facilities for its employees, the civil servants and their dependants. This was financed largely through general taxation, while non-civil servants attended mission/private clinics and government hospital at their own expense. The funding of the health care service infrastructure was made by the government and the mission/private practitioners.

The present pattern of health care financing has not changed much from what existed in the past. It is being financed by the owners of the various health institutions from their own resources, from fees collected from users of the facilities, and from grants and receipts from external donors.

2.1 Financing by Government

Ghana's post-independence policy on the provision of health services and medical care to her citizenry has been influenced by social considerations to provide basic health and medical care almost free of charge in government hospitals and clinics for the purpose of improving the health status of the population.

The government's financing commitment in health services delivery is the largest and it covers the following areas:- provision of health services infrastructure, provision of drugs and other medical supplies for government health institutions and quasi-government hospitals on request, payment of salaries and wages of health personnel in all government health institutions as well as those in non-governmental health institutions, payment of other running costs (transportation, utilities, stationery) of the government health institutions, payment of training expenses (tuition, boarding and lodging) for health personnel and financing of health education and promotional programmes.

The Ministry of Health (MOH) recurrent expenditure averaged about 87% of government's total annual expenditure on the health sector from 1991 to 1995 (MOH Resource Envelope, 1991-2001). This constitutes a considerably large component of the resources given to the sector leaving very little for major maintenance and development of infrastructure in the sector. It is however quite small as compared to the government total recurrent expenditure for the period. The sector's share of the government's recurrent expenditure fell from 9.4% in 1991 to 5.2% in 1995. Its share of government's capital also continued to fall from 3.9% in 1991 to 2.4% in 1995. The sector's total expenditure as a proportion to the country's domestic product (GDP) varies narrowly from 1.77% to 1.05%.

On the international scene, Ghana's health sector expenditure is among the lowest. With exception of Nigeria, Ghana's per capita expenditure on health, amounting to US$14 in 1990 was among the lowest in the West African sub-region. It was 50% and 58% of that of La Cote d'Ivoire and Burkina Faso respectively in 1990 (MOH, 1995). This figure is also less than the US$24 for Sub-Saharan Africa. The current figure has not changed much. It was about US$15 in 1997 (MOH, 1998).

2.2 Financing By Private Sector Providers

As owners of health service institutions, the private practitioners provide their own infrastructure and facilities, bear maintenance and running costs, and also pay salaries and wages of their staff. However, most of the private practitioners get their training through government's budgetary allocations. They fix charges to recover full operating costs including reasonable profit margins and as a result, charge higher fees than the government and mission facilities.

2.3 Financing By Non-Governmental Organisations (NGOS)

The non-governmental organisations include mission hospitals and clinics and social service health institutions like the Red Cross. These providers finance their establishments from their own resources, mainly through grants and receipts from user charges. In some cases the government supports their operations by bearing the cost of health care personnel. A number of major hospitals are owned and run by these NGOS and they constitute a major source of health

care facilities in certain parts of the country, particularly in Brong Ahafo, Volta, Northern, Upper East and Upper West regions.

2.4 Donor Assistance and Foreign Loans

In addition to budgetary allocations, assistance from the donor community has been a major source of funds for the Ministry of Health. For instance, in 1992 it constituted about 28% of government expenditure on the health sector. It was 32% and 29% in 1994 and 1995 respectively when commercial loans are deducted from it. This formed about 6% of the total project aid given to the country in the period.

Donor assistance has been in the form of supply of equipment and essential drugs, rehabilitation of health care facilities, and training of human resources, as well as technical assistance in the area of disease prevention, organisational reform and institution building. A number of loans have also been obtained by the government on concessionary terms from international finance institutions, such as the World Bank and African Development Bank, for infrastructure and equipment. The major donor agencies include the WHO, UNICEF, ODA, EEC, CIDA, JICA and DANIDA.

2.5 Cost Sharing

User charge is the main source of revenue for the private health care providers. In the case of private practitioners, the charge is fixed at the level that fully recoups operational costs with a margin to cover overheads. For the mission health institutions, the aim is to break even and therefore, user charges do not include any significant margins (MOH, 1995). For the publicly

owned institutions, a user charge is levied at heavily subsidised rates making it a minor source of financing.

The cost of providing free health services to the citizenry has been a major expenditure item in the government annual budget since the late 1960's. It was in recognition of this fact, and the need to reduce the financial burden, that the government, by the Hospital Decree of 1969 (NLCD 360), for the first time in the post-independence era introduced nominal fees to be paid by patients as a means of partial cost recovery. The schedule of fees was further revised upwards by the "Hospital Fees" Act 325 of 1971 and PNDC Hospital Fees Regulations of 1983 and 1985, LI 1277 and LI 1313 respectively.

The health sector reforms that came with the structural adjustment programme in the 1980's had policies which sought to address the problem of resource allocation, insufficient spending, cost effectiveness, inefficiency and equity (World Bank, 1987). They culminated in the institution of several programmes which directly or indirectly impact on the health sector. Among these are the user fees, the revolving drug fund (RDF) and the essential drug list. Other areas have included the involvement of communities in the health care delivery system and a proposed National Health Insurance Scheme.

2.5.1 User Fees in Health Care Facilities

This policy followed a recommendation by the World Bank as one of four policy reforms to restructure the financing of health services in Ghana (World Bank, 1987).

The policy allows for full cost pricing of utilities including drugs and pharmaceuticals. The objective is not only to reduce irrational use but also to recover at least 15% of Ministry of Health (MOH) recurrent costs (Asenso-Okyere, 1995). It was envisaged that this could sensitise the populace about paying for health care as they go through a situation of virtually no payment

to almost full payment under the intended health insurance which had been scribbled on the drawing board in the second republic. Two opposing views underscore the 1985 policy. Proponents claimed that such a policy deter irrational usage and generate revenue which can be used to improve the scope and efficiency of services. Opponents were of the view that such charges are unequitable and may lead to a decline in health services utilisation, particularly among vulnerable groups mostly in the rural areas.

The guidelines of the policy which are stated in the Hospital Fee Regulation 1985, brought into force in July, 1985, specified prices according to the following criteria:

1. Service level (Teaching hospitals, Regional hospitals, District hospitals, Urban health centres, Rural health centres and Health posts).
2. Treatment location (urban vrs. rural)
3. Age (children vrs. adults)
4. Nationality (Ghanaians vrs. Non-Ghanaians)
5. Service (Curative vrs. preventive, type of disease)
6. Health personnel were exempted except for special amenities.
7. Immunisations were exempted except for international travel.

It was assumed that the less privileged are closer to the less equipped hospitals, while the more privileged get access to the better equipped hospitals and therefore can afford to pay relatively higher fees. In the legislation, children pay fees ranging from 50 percent to 67 percent of adult fees depending upon the service level and treatment location. Non-Ghanaians pay fees that range from 133 percent to 267 percent of the fees paid by Ghanaians. There were some exemptions to these fees. Immunisation against any disease except for international travels are exempt from any fees. Exemption from immunisation fees was to achieve a target of

immunising about 80 percent of pregnant women, and children under two years against the six childhood killer diseases under the Expanded Programme of Immunisation (EPI) (Okyere, 1991). Patients suffering from certain diseases were subject to pay charges for drugs but were exempted from all other fees.

2.5.2 Revolving Drug Fund (RDF)

This is a user charge system organised specifically to finance pharmaceutical supply. The RDF follows a suggestion by UNICEF Director, Mr. J.P. Grant when he visited the Conference of African Health Ministers in Bamako, Mali, hence its name "Bamako Initiative". The basis of the fund is that patients had already demonstrated their ability and willingness to pay for drugs (Botchway, 1990). The main features of this fund included:

1) an initial stock donated by the community, government or other donors;
2) sale of drugs to community members;
3) pricing for full recovery of drug costs; and
4) use of sales revenue to replace stock and finance other operating and distribution costs.

The Policy was expected to free about 21 percent of health budget spent on drugs for other developmental programmes, like the building of more hospitals and clinics, especially, in rural areas. The objective of this policy among others was to make for easy accessibility to modern health facilities by all categories of people including children. This policy has however made drugs very expensive, from a point of low drug cost to a full cost of drugs, discriminating against the poor who cannot afford, and a negative impact on children, majority of whom are children of the poor.

2.5.3 Essential Drug List

In June 1988, the Ministry of Health adopted a list of Essential Drugs to be used in both private and public health centres. The criteria used for the selection was based on the WHO Model List (WHO, 1987). These drugs were to be exempted from import taxes. The objective was to make drugs easily available and affordable to the public.

2.5.4 Risk Pooling Schemes

2.5.4.0 Community Involvement

Communities have been encouraged to participate in the health care delivery system in Ghana. This is mainly in the areas of the provision of physical infrastructure, disease control programmes, improvement of sanitation and the provision of water, and payment of health attendants. Through these efforts, many communities have provided for themselves many of the social amenities. These have been done through contributions and levies by the Town and Village Development Committees, and with the assistance of PAMSCAD. Projects such as health posts and centres have been completed through this co-operation.

By this policy the government relieved itself of the burden of health attendants wages and salaries and other recurrent expenditures. However, in as much as it brought some relief to the government and some communities made every effort to make it succeed, it led to the break down of most of the community health clinics, since it became a big drain on the scarce resources of the rural folk. In fact most communities were unable to remunerate their health attendants. The objective therefore of bringing health care to the door steps of the rural community faltered (Okyere, 1991).

2.5.4.1 National Health Insurance Scheme

Just like the cost of other utilities, it is very unlikely that the cost of health care will decline in the future and so ingenious ways of financing health care that will reduce both the chronic and transitory burdens on households have to be devised. Health insurance which spreads the risk evenly among policy holders has been identified as a viable option for financing health care in Africa (Griffin and Shaw, 1995). Other writers in Ghana have also expressed patients' willingness to join such solidarity groups than to paying out of pocket user fees (Arhin, 1994 and Asenso-Okyere et al., 1997). Arhin's study suggests that where quality of care provided to the insured were perceived by them to be adequate, health insurance for populations in rural Africa would be effective.

A national health insurance (NHI) scheme was proposed for Ghana in 1985 after a feasibility study was completed by a commission set up by the government. Consideration of this option arose out of the difficulties to finance health care both at the national (macro) and individual or household (micro) levels in the second republic. Although the health sector expenditure has risen dramatically over the years, health services remain poor and there is inequity in the availability of facilities and quality of services provided between the rural and urban areas. In trying to institute an NHI scheme, the Government of Ghana is trying to mobilise funds from the communities to improve health care delivery in the country and increase access of health care to people of different socio-economic status.

The earlier proposals centred around a scheme that would cover the 200,000 - 300,000 private cocoa farmers registered with the Ghana Cocoa Board, the 2 million employees in the formal labour markets registered with the Social Security and National Insurance Trust and the country's almost 200,000 civil servants (Asenso-Okyere, 1995). The scheme was designed so

that the policy-holders themselves did not contribute to it. The government was to pay for civil servants, the Ghana Cocoa Board for the registered cocoa farmers and employers for their employees. These proposals that did not include the large informal sector could not be implemented because of problems involved in organising and managing the scheme and some unresolved questions about its design (Vogel, 1990 and McGreevy, 1982).

After several agitations have been made to include the informal sector in the scheme the government is making arrangements to implement a broader voluntary scheme to cover the majority of Ghanaians. Feasibility studies to ensure all formal workers and the willing informal workers have been completed. Pilot areas have been selected and preparations are being made for the full brown out of the scheme to cover the whole nation.

2.5.5 Full Cost Recovery for Drugs (Cash and Carry)

Studies done and anecdotal information available after implementing the user fees policies found that the raising of revenue was being achieved but at a social cost. Utilisation levels dropped initially and in some areas, especially in rural communities, such drops were sustained. Delay in seeking care became rampant and sharing of prescription was very common in households. The implementation of the exemption policy for paupers and others has not been easy because of problems of identification and lack of clear guidelines as to who would pick up the bill (Asenso-Okyere et al., 1997). Even for those who are relatively wealthy, the high cost of health care creates transitory access problems when a serious illness afflicts a household member. These made the apparent gains seemed negative when one looked at it from a different perspective.

Others suggested that the obvious reason for this negative impact was the inability of the sector to improve its service quality. The immediate solution was therefore the 100% retention of revenue by health facilities to maintain regular supply of drugs and the strict adherence to the full payment of drug fees by patients. This is known as the "cash and carry" system, which got started in all public facilities in January 1992.

As an extension to the user fees policy and the Bamako initiative, its main objective is to sustain revolving funds at each level of the MOH system and capture enough revenue to sustain the restocking of drugs sold.

To achieve this aim it was planned that the cash and carry funds can be used only for the purchase of drugs, and not for other institutional or MOH purposes. The facilities were initially capitalised by the central government and were asked to charge a mark-up of 5% to care for inflation and other possible eventualities. The mark-up is now 10%. This was after the Central Medical Stores (CMS) in Tema has charged a mark-up of 25% to 35% depending on the source of supply. The facilities could purchase drugs only from the CMS through their respective regional medical stores. However, there is a provision to buy elsewhere under rare acute shortages at the CMS. The programme is also organised in such a way that personnel and other operating costs are borne by the Ministry directly. It is also not supposed to incorporate the cost of free drugs into sale prices. Initially the MOH staff was to pay themselves and go for reimbursement from the central government.

For equity purposes, the exemption policy under the user fees regulation was expanded. Patients suffering from diseases like TB and leprosy, national service personnel, and paupers are exempted from paying. Accident and other emergency cases are to be attended to before payments are demanded. Very recently, under quite restrictive guidelines the aged (over 70 years old), children under five years of age and pregnant women are also exempted from paying.

MOH staff also falls into the exemption group. The facilities are supposed to serve these people with drugs and later go for reimbursement. The delay of reimbursement from central government and the difficulty in identifying the paupers make the implementation of these policies quite difficult.

2.6 Conclusion

It is clear that an ingenious way of financing health care should be evolved since the nation cannot continue to rely on the meagre tax payers' money and the insufficient out of pocket finance by patients. For example, as between 1991 to 1995 the percentage of internally generated funds in the sector to total health expenditure ranged from 5.5% to 6.7% (MOH, op cit.). As we plan for a programme like the national health insurance scheme, we need to investigate critically what happened after we introduced cash and carry as literature indicates that willingness to pay for government health services is heavily conditioned by perceived quality and value-for-money.

CHAPTER THREE
LITERATURE REVIEW

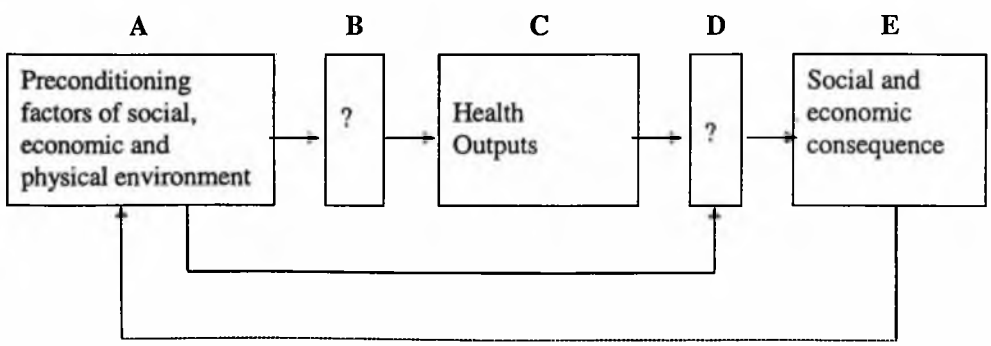
3.0 Introduction

The first part of this section looks at the conceptual framework examined and some general literature on the theoretical developments in the formulation of demand for the health sector. The second part reviews some studies done on demand patterns and health services utilisation. The relationship between demand for health services and price changes, personal characteristics and facility characteristics including drug availability as examined by writers in this area, are reviewed.

3.1 Conceptual Framework

Herrin and Rosenfield (1988) used a simplified version of Rosenfield, Golladay and Davidson's framework to organize the various issues on the economics of tropical diseases (Figure 3.1).

Figure 3.1: Conceptual framework for assessing the issues and research priorities on the economics of tropical diseases.



Source: Herrin and Rosenfield (1988).

The framework highlights the missing link between the individual characteristics, individual endowments, community environment and health outputs. It also talks about the consequences of these outputs on general socio-economic factors that in turn affects the preconditioning factors in various ways. The precondition factors include individual characteristics as unobserved biological endowments, age, sex, education, preferences, beliefs, and attitudes. There are also household important features such as age-sex composition, human capital of household members, and non-human assets such as land, housing and working capital. The community factors include aspects of the physical environment, the structure of markets and prices for products and factors of production, and the size and structure of the population. The others in this category include social structure and organisation, physical infrastructures, economic and social services.

The main components of the health outputs are measured in terms of mortality and morbidity. The social and economic consequences on the individual, household and the community are normally reflected in such measures as income, savings, physical and human capital, production in market and non-market activities, health consumption and social interaction. These consequences are produced via a variety of response mechanisms depending on the severity of the disease or how the disease manifests itself. They are behaviourally determined by individual and household preferences, attitudes and the constraints they face. The factors are represented by the black box D because the operations of these feedbacks are not yet very clear.

The preconditioning factors determine the health outputs through several types of proximate determinants which themselves are also behaviourally explained by the precondition factors. These proximate variables are represented in the framework by a black box B because they are also not exhaustive and their effects on the health outputs demand strong theoretical

explanation. Some of these factors have been identified as exposure to contaminated environment, dietary and nutrient intake, time allocation of family members in health activities and availability of services and supplies of health facilities. Many theories have been used to study this information gap since the 1960s. This study also seeks to provide some empirical evidence on the effects of some of these proximate determinants.

3.2 Developments in the Demand Analysis of the Health Sector

In an attempt to provide some theoretical answers to the needed gap in block B, various studies on behaviour associated with exposure to disease vectors and health seeking patterns have been handled by standard economic models. The theoretical developments in this area have looked at the influence of many factors including financial costs, both direct and indirect, and quality in relation to service utilisation.

The models used in the early 1960s when economists gained much interest in estimating demand for health services involved very simple reduced-form equations derived from the assumptions of utility maximization (Mwabu et al., 1995). Writers like Feldstein hypothesized that demand for a particular health care service, as measured by number of visits to the health facility depends on own-price, prices of alternative services, household income, and tastes. These formulations excluded from the demand equations, variables that measured time costs and important demographic characteristics of patients such as age and education. Acton (1975), Christianson (1976), and Grossman (1972) altered this formulation substantially to allow for inclusion of demographic and time variables.

Many authors have also followed Acton and Christianson in using discrete choice formulations of health care decisions (Akin et al., 1985; Heller, 1982; Gertler and van der Gaag,

1990). Efforts have also been made to incorporate quality indicators in the explanatory variable specifications to capture the apparent price/quality tradeoff in the event of households making health care decisions (Mwabu et al., 1995; Lavy and Germain, 1995).

For example, Grossman (1972), in a theoretical study of the factors that influences the demand for "good health" postulates the investment model and the consumption model. This approach was utilised by Diop et al. (1991) in their Child Investment framework in Sub-Saharan Africa for analysing the impact of economic crisis, structural adjustment and health in Africa.

Grossman's behavioural model was within the framework of maximising utility over a bundle of commodities subject to budgetary constraints. He assumed that individuals inherit an initial stock of durable health that produces an output of healthy time and derives utility over a life time from the flow of services attributable to that stock. This stock depreciates over time at an increasing rate, at least after some stage in the life cycle and can be increased by investments. Direct inputs into the production of gross investment in the stock of health include own time, medical care, diet, exercise, housing and other market goods. The production function also depends on certain "environmental variables", the most important of which is the level of education of the producers, that alter the efficiency of the production process.

According to Grossman, an increase in human capital is bound to increase an individual's productivity in the market economy, where he produces money earnings, and in the household sector where he produces commodities entering his utility function directly. He argued that the demand for health is negatively related with its shadow price. The shadow price depends on many other variables besides the price of medical care. Shifts in these variables alter the demand for health and also the derived demand for gross investment, measured by the medical expenditure. He showed that the shadow price rises with age if the rate of depreciation on the stock of health rises over the life cycle and falls with education if more educated people

are more efficient producers of health. This price may also be related to wealth which is equated with income, wage rates, and other variables. Of particular importance is the conclusion that, under certain conditions, an increase in the shadow price may simultaneously reduce the demand for health and increase the demand for medical care.

Acton (1975) also analysed demand for health services at the outpatient departments of New York city hospitals and in municipal hospitals in the same city. He postulated that people are rational and do respond to health incentives that include non-monetary factors. Simultaneous equation system using TSLS method was used to estimate demand effects of money prices, time prices, non-earned income and other socio-economic variables.

His results indicated that private outpatient care was a normal good but municipal health care was an inferior good. The study showed that travel time discourage demand for medical services even when the care is free and that time costs are also inversely related to demand for medical services. The important aspect of this study is its implication that in most developing countries when monetary prices are small, the price of time (opportunity cost of time used in obtaining the good) rations the demand for medical services.

3.3 Some Studies on Health Care Demand Patterns.

Shaw reports in his review work of 1995 that much of the evidence on the issues concerning demand patterns especially price elasticity are conflicting. He attributed this development to methodological differences and careless interpretation of results that are derived from inconsistent data sources. The issues which have drawn the attention of policy analysts include factors like prices, income and assets, opportunity cost of travel and waiting time, quality of

service, type of illness and cultural perceptions or acceptance (Shaw, 1995). Some of the studies on these factors are reviewed below.

Akin et al (1985) formulated a model to analyse demand for Primary Health Care (PHC) in the developing world. They utilised data from both community and household surveys in one of the poorest regions in the Philippines. They studied factors affecting demand for the following types of health services, namely, outpatient, prenatal, maternity, and immunisation services. Discrete choice provider models were used except for prenatal care that called for Tobit analysis.

Unlike many other studies, this work and others like Schwart et al (1988), Birdsall and Chuhan (1986), and Heller (1982) found lack of statistical significance for the economic variables used. The quality variable used, number of physicians was also found insignificant. Cash costs of visits, travel cost and travel time, waiting time and insurance all had very little explanatory power in their study. Gertler and van der Gaag (1990) attribute this to the low levels of income and non-use of insurance packages in developing countries. In almost all the models the demographic variables like mother's knowledge, attitudes and beliefs were the significant factors.

Mwabu (1986) estimated a discrete choice model for patients in a situation of choosing between multiple health care facilities. Contrary to Akin and others conclusion's, he found that economic variables such as time and money costs influenced demand for medical services, but the estimated effects, especially that of income, are very small. Health care demand was observed to decrease with increased fees and with greater distance to the provider, but increases with income. It was also found out in the study that quality of health care is a very significant factor affecting demand.

Asenso-Okyere, Dzator and Osei-Akoto (1997) estimated a disease specific demand function to study the determinants of demand for the services of a health care provider or a treatment regiment for malaria. The study adapted a multinomial logit framework to look at both facility characteristics and individual patient features on demand for malaria care in Ghana. The study confirmed the popular use of self-medication as a first choice of action in treating malaria due to rising cost of health care. The choice of malaria care providers was found to be influenced by facility price, travel time, waiting time for treatment, education and quality of care measured in terms of drugs availability. They further found that as income increases, the odds are in favour of self-medication when people get malaria.

Asenso-Okyere, Osei-Akoto and others (1997) also used qualitative research techniques to investigate the behaviour of health workers after the introduction of Ghana's drug cash and carry system. Both in-depth interviews of health workers and selected opinion leaders and focus group discussions with patients were used to collect data from rural and urban health care facilities in three districts of Ghana. The study showed that one could imply from the perceptions of both patients and health workers that cost recovery policy has improved the drug supply situation but the induced behaviour of health workers towards patients has been mixed.

Waddington and Enyimayew (1989, 1990) and Dakpallah (1988), found out that immediately after the introduction of the user fees, attendance at health centres generally fell but recovered only in the urban areas. Sowa (1993), using Ghana living standards survey (GLSS, 1987-1988) also showed that the introduction of fees had been a disincentive to the use of health services. According to him, the decline in hospital attendance before 1984 can be attributed to the overall crisis in the economy, but the continued drop through 1986 was due to the introduction of the fees. He further stated that in rural areas, outpatient attendance dropped by 50 percent and an average of 48 percent of all sick Ghanaians did not consult a health provider

of any kind. Other patients simply visited dispensaries and pharmacy shops in order to avoid consultation fees. Many patients could not afford to buy drugs because the essential drug policy did not make these drugs any less expensive.

Matji and others (1995) assessed the impact of increased fees on the utilisation of health services in Lesotho. Apart from mobilising revenue and shifting demand to private operators, the institution of user charges was made to help rationalise the referral system. It was expected that with higher fees at the tertiary facilities, people would visit primary and secondary facilities first before being referred if it becomes necessary. They analysed facility level statistics and indicated that higher fees resulted in a drop-off in utilisation, while making no improvement in referrals. They cautioned the use of facility-based information for analysis that do not allow for controls of other factors. But suggested that this type of studies have the potential to inform short- and medium-term administrative decision-making. The study could not examine the effects of quality of care on the utilisation levels because of non-existence of data on features like supply of drugs and equipment, the number and type of health care providers, the attitude and friendliness of medical staff, type of treatment provided, and the amount of medicine prescribed. They however indicated that if quality of services did not improve then there is no reason to believe why utilisation figures would not fall.

To estimate the neutralising effects of quality improvement on price increases, Lavy and Germain (1995) and Mwabu et al. (1995) utilised household and facility data to assess the effect of these policy changes. Both studies used nested multinomial logit with simulation analysis to demonstrate the potential tradeoffs in cost, quality and accessibility in utilisation of health facilities. Using a national representative sample in Ghana, Lavy and Germain found that availability of drugs, number of health personnel, availability of key services like immunization

and quality of infrastructure, and other quality variables have positive and statistically significant effect on choosing modern health care.

Like Lavy and Germain Mwabu et al. showed that there is wide scope for financing quality improvements in the public health sector through raising user fees. The study used randomized household survey in Kenya that links household and individual characteristics with the attributes of health facilities. The results indicated that broad availability of drugs in a medical facility is found to be positively related to medical care use. They illustrated the importance of selecting truly exogenous indicators of service quality for demand analysis. This study was quite different from Denton and colleagues' work in 1990 where drug availability was the only measure of quality used.

Litvack and Bodart (1995) used a controlled experiment in five public health facilities in Cameroon to provide a net assessment of how user fees and improved quality affect health facility utilisation. The study did not make it possible to disaggregate the size of the price and quality effects. It is also unclear the extent to which the increase in demand arose from shifts among health care alternatives, as opposed to generation of new demand for health care Mwabu (op cit.). However, the result of this study that has a clear counterfactual goes contrary to previous ones that found out that the poorest income quintile is most hurt by user fees. It was shown that the probability of this group seeking care increases at a rate proportionately greater than that of the rest of the population.

Asenso-Okyere, Osei-Akoto and others (1997) used contingent valuation method with ordered probit model to find out the informal sector's willingness to join and pay for health insurance. They used focus groups discussions, in-depth and structured interviews to study the demand for an insurance scheme in 420 households in the both rural and urban communities in the Eastern Region of Ghana. They found out that 80% of the respondents expressed difficulty

in paying for their hospital/clinic bills for some time in the past. Payments for drugs pose the most difficulty for them (about 65% of sample), followed by laboratory services and then admissions. Their results indicated a high degree of acceptance of the scheme among the people. Over 90% were willing to participate and up to 63.6% of the respondents were willing to pay a premium of ¢5000 ($3.03) a month for a household of five persons. The level of premium was found to be influenced by dependency ratio, income or whether a household has difficulty in paying for health or not, sex, health care expenditures and education.

3.4 Conclusion

The overview of the literature shows that different analytical approaches starting from very simple graphical and tabular representations to more complex methods employing advanced models have combined both demand and supply factors to study the issues in figure 3.1 especially service utilisation which is a direct input in health production. While the directional influence of price and other factors is clearly documented, the needed emphasis on quality has not been adequately stated or policy concerns have not noticed such emphasis properly. This work highlights this important need to devote more attention to raising the value of money and other resources people want when they visit public facilities.

CHAPTER FOUR
METHODOLOGY

4.0 Theoretical Framework

A theoretical model of demand for health services in the public sector is specified below. Following many others (Lavy and Quigley, 1993; Mwabu, 1991; Heller,1982; Gertler and van der Gaag,1990), it is assumed that consumers derive utility from their health status, H, a numeraire good, X, and leisure, L:

$$U = U(H,X,L) \quad (1)$$

The health status of an individual who has suffered an illness or injury is explained by a vector of preexisting exogenous factors (for example, health capital, severity of illness, etc.), denoted by A, and the quality (T) and intensity (N) of medical care chosen:

$$H = H(T,N;A) \quad (2)$$

The individual's income, Y, is spent on health care or the numeraire good, whose price is equal to one:

$$Y = X + P(T,N;A) \quad (3)$$

P(T,N;A) represents the hedonic price relation between the qualities and attributes of medical treatment and the price. An individual with some given illness or injury can choose a type of treatment, T, and an intensity of treatment, N, by making this cost. In a competitive market, the price function represents the envelope of consumer' bids for different combinations of treatment and money, depending upon the seriousness of illness.

The individual also incurs a time cost (opportunity cost) when he enjoys the services of a particular health facility for a certain number of times. This is a represented by a time

expenditure, M(T,N). For fixed working hours, non-working time (LL) is spent on leisure (L) or health care;

$$LL = L + M(T,N) \quad (4)$$

Thus in general, a consumer of income Y chooses T, N and X to maximize (1) subject to (2), (3) and (4). By substitution, the indirect utility function is:

$$U\{H(T,N;A),Y-P(T,N;A),LL-M(T,N)\} \quad (5)$$

This is a well behaved utility function conditional upon exogenous health factors and prices. For given state of nature A, utility is increasing in household income, net of expenditure on health care, and in the quality and intensity of medical care. By assumption, the selection of T, N and X represents the complete range of consumer choice in the market.

The consumer's utility is maximised when he equates the marginal productivity of T and N in the production of health care to the marginal cost in terms of the goods and time.

As Lavy (1993) pointed out, there are several empirical issues involved in using the model: (a). It requires knowledge of the seriousness of illness that does not confound the effects of medical treatment. (b). It requires knowledge of the menu of prices and alternatives available to the consumer, that is the form and the parameters of the hedonic price function. (c). It also requires knowledge of the form and the parameters of the utility function itself.

The subsequent sections partially analyse the role of service quality (T) in influencing the aggregate intensity of use (N) of health care services that directly affects health outputs of individuals. The study also uses contingent valuation methods to assess the importance patients attach to quality of care when they are asked to pay for the services they receive.

As an input in the health status function, the demand for health services is stated as an input demand function which has personal, facility features and other environment factors (see Fig.3.1) as arguments.

The model is:

$$C=C(P,F,E) \quad (6)$$

where C is the aggregate intensity of use proxied by the coverage of the facilities, P is vector of personal features, F is a vector of facility features and E is a vector of environmental factors.

Essentially the coverage of a health care facility depends on the price patients pay at the facility and existing price of other competing facilities. Other factors are time costs (travel and waiting time) associated with the facility and quality of care provided by the facility. Coverage also depends on severity of illness, income levels, other economic factors, and preconditioning of social and other physical environmental factors. The attendance at growth monitoring clinics offered by the facility is also examined in this study to see whether it significantly affects the number of consultations at the facility. It is known that mild cases of diseases like malaria and diarrhea are attended to when the mothers visit these clinics. The growth monitoring clinics also offer educative sessions on preventive practices. The above are likely to reduce outpatients visits at the facilities. However, the MCH nurses also advise the mothers to avoid unnecessary self-care and also patronise the health facilities. It is therefore considered important to isolate the effect of the MCH visits from the influence of price and quality on the general outpatient attendance at the facilities.

The estimation of the above relationship assumed a function that is linear in the parameters of the model. This specification is similar to the simple linear analytical framework used by Mwabu et al. (1991) to estimate the effect of user charges on daily and weekly demand of health services in Kenya. The estimated model is derived from the partial adjustment framework.

The primary long-run equation of interest is:

$$C^d_t = \alpha_1 + \alpha_2 P^e_t + \alpha_3 Z_t + u_t \quad (7)$$

where C^d_t is the desired coverage of a health facility in period t; P^e_t is a vector of the price and value of drugs patients expect when they visit the facility; Z_t is a set of other exogenous variables; α_i's are parameters (or elasticities if the variables are expressed in logarithms) with α_2 being the long-run coefficient (elasticity) of coverage.

Full adjustment to the desired coverage may not be possible in the short-run due to search cost on the part of patients and also due to the fixed inputs at the facility which cannot be changed immediately. Therefore the actual adjustment in coverage will only be a fraction of the desired coverage:

$$C_t - C_{t-1} = \theta(C^d_t - C_{t-1}), \quad 0 \leq \theta \leq 1 \quad (8)$$

where C_t is the actual coverage and θ is the partial-adjustment coefficient.

Since Ministry of Health sets general fee levels at the facilities and the fees stay for a long time, patients are not expected to form expectations about price levels. It is also assumed that patients naively form expectations about the value of drugs received at the facilities. These means that $P^e_t = P_t$ for price and $P^e_t = P_{t-1}$ for the value of drugs. We eliminate P^e_t and C^e_t from (7) and (8) to get the reduced form:

$$C_t = \pi_1 + \pi_2 P_{t-1} + \pi_3 C_{t-1} + \pi_4 Z_t + w_t \quad (9)$$

where $\pi_1 = \alpha_1\theta$, $\pi_2 = \alpha_2\theta$, the short-run coefficient (elasticity) of coverage, $\pi_3 = (1-\theta)$, $\pi_4 = \alpha_3\theta$, $w_t = u_t$

The structural coefficients can be solved with the following equations: $\alpha_1 = \pi_1/(1-\pi_3)$, $\alpha_2 = \pi_2/(1-\pi_3)$, $\alpha_3 = \pi_5/(1-\pi_3)$. The short-run price response is estimated by π_2, and the long-run price response is calculated as α_2.

4.1 Analytical Framework

The empirical analysis uses three different models to assess the objectives in chapter one. The improvement in drug supply to the facilities was tested by using an Analysis of Variance (ANOVA) model. Two specifications of Panel Data models were used to study the effects of price and service quality on coverage, and a discrete response model was utilised to assess the willingness of patients to join and pay for drug insurance premium.

4.1.1 Analysis of Variance for Testing the Improvement in the Supply of Drugs

The objective one and the corresponding hypothesis, hypothesis one, was assessed with an ANOVA test by studying the differences in drug supply to the facilities in the 'pre' and 'post' cash and carry periods. This test was controlled for facility differences. I used two ratios to measure the supply of drugs in this case. They are the proportions of requested drug types obtained in a month and the proportion of each requested drug quantities obtained in a trip. The hypothesis is upheld if the average figure for these two measures are significantly different in the two periods and the post-period average is higher than the pre-period average. The computer software, Statistical Analysis System (SAS) was used for this analysis. There were some missing figures for some months of almost all the facilities surveyed. Generalised linear models were therefore used for the analysis because of the imbalance nature of the data (see SAS/STAT user's manual, version 6.03).

4.1.2 Panel Data Analysis of the Effects of Price and Quality on Coverage

The empirical model for objective 2 uses a panel data specification to study the effects of price and service quality proxied by aggregate supply of drugs and also by supply of anti-malaria drugs to the facilities on coverage of the facilities.

A panel or longitudinal data analysis involves a class of linear econometric models that commonly arise when time series and cross-sectional data are combined. These models give several advantages over the usual cross-sectional or time series data sets. For example, a typical panel data set follows a given sample of individuals over time, and so as a result gives the analyst a large number of data points to improve the efficiency of the estimates.

The analysis also helps to resolve the difficulty of making inferences about the dynamics of change from cross-sectional evidence. A simple cross-sectional data set usually gives estimates that are likely to be reflective of inter individual differences inherent in comparisons of different units of the analysis (Hsiao, 1986). By following one unit over time as they change status in a panel data set, one can construct a recursive structure to study before and after effects in the analysis. The use of panel data also provides a means to minimize the effects of omitting variables that are correlated with explanatory variables in empirical studies. Through the act of differencing dummy variables are used to account for variables that are either individual or time invariant but not observed.

Alternative models for combing time series and cross-sectional data follow two main assumptions on the parameters and the covariance structures of the models. The first category assumes that the covariance structure follows the classical regression specification and relaxes the assumption that the parameters that characterise all temporal cross-sectional sample

observations are identical and vary the models to account for differences in behaviour across individuals as well as over time. The four specifications are as follows:

a. Slope coefficients are constant, and the intercept varies over individuals:

$$C_{it} = \alpha_i + \sum\beta_k X_{kit} + u_{it}, \qquad i=1, \ldots, N, t=1, \ldots, T.$$

b. Slope coefficients are constant, and the intercept varies over individuals and time:

$$C_{it} = \alpha_{it} + \sum\beta_k X_{kit} + u_{it}, \qquad i=1, \ldots, N, t=1, \ldots, T.$$

c. All coefficients vary over individuals:

$$C_{it} = \alpha_i + \sum\beta_{ki} X_{kit} + u_{it}, \qquad i=1, \ldots, N, t=1, \ldots, T.$$

d. All coefficients vary over individuals and time:

$$C_{it} = \alpha_{it} + \sum\beta_{kit} X_{kit} + u_{it}, \qquad i=1, \ldots, N, t=1, \ldots, T.$$

C_{it} is the dependent variable for unit i for time t;

X_{it} is the set of independent variables;

α,β are the coefficient vectors.

In each of these versions the model can be classified further depending on whether the coefficients are assumed to be random or fixed. The fixed assumption leads to dummy variable models and Zeller's seemingly unrelated regression estimation (SURE). The random assumption leads to error components models and Swamy Random Coefficient Model (RCM).

4.1.3 Groupwise Regression Models

The second category of models of panel data analysis assumes that all the coefficients in the model are constant but the covariance structure differs from the classical assumptions. The specifications in this case use the groupwise regression techniques that account for

hetereoscedastic and autocorrelation in the error term. Greene (1997) suggests that for situations where the individuals are relatively small as compared to the time points, one should study the disturbance term in the context of stochastic process. In such cases the appropriate model to use also falls into this category.

The data sets used here (for objective 2), are typically "long" enough to study the disturbance term in the context of stochastic process. We therefore use the covariance structures for time series cross-section data for our specification (Greene, 1997; Hsiao,1986). The model is

$C_{it} = \beta' X_{it} + \in_{it}, \qquad i=1, \ldots, N, \; t=1, \ldots, T.$

where $V = E[\in \in'] = \sigma^2_{jj} \Omega_{ij}$:

The model allows for different specifications of the disturbance term;

1. Groupwise heteroscedasticity:

   $E[\in^2_{it}] = \sigma^2_{ii} I$

2. Cross-sectional correlation:

   $Cov[\in_{it} \in_{jt}] = \sigma^2_{ij} I$

3. Within group autocorrelation:

   $\in_{it} = \rho_i \in_{it-1} + u_{it}$

These complications were tested for and appropriate corrections made.

C_{it} is the coverage for a particular facility i for time t;

X_{it} is the set of independent variables at facility i at time t (see variable definition in Table 4.1); and

β is the coefficient vector which is assumed to be constant over a period and for all groups.

For the nonautocorrelated models, the estimator may be two step GLS or iterated GLS which produces a maximum likelihood estimator (MLE). For the models with autocorrelation, the estimator may be three step GLS or iterated GLS, which though convergent, does not produce the MLE because of the Jacobian term (Greene, 1996).

The expected signs of the parameters are the following; $\lambda_{period}>0$, $\lambda_{price}<0$, $\lambda_{quality}>0$, $\lambda_{income}>0$, $\lambda_{MCH}=?$. λ_I is the responsiveness of coverage to changes in factor I. While λ_{price} and $\lambda_{quality}$ are the pre-cash and carry elasticities, the post-period elasticities are $\lambda_{price} + \lambda_{period*price}$ and $\lambda_{quality} + \lambda_{period*quality}$ respectively.

To uphold the second hypothesis, the sign of the coefficient of the interaction term between period and price is expected to be significantly positive. That is it should be opposite in sign to the expected negative price effects. It is also expected that due to the concept of diminishing marginal utility, the elasticity of quality in the post-period will be smaller than the pre-period if the supply of drugs rise considerably to higher levels. Thus one will uphold the hypothesis confidently if the change in elasticity of price is greater than that of quality in absolute or percentage terms.

To isolate the behaviour of the market in the health services of the public facilities we assume away the effects of individual characteristics like age and education, severity of illness, other demographic features, and time costs. Though an important effects like cross-price elasticity is ignored, this assumption allows the analysis to be centered on the needed services only (Henderson and Quandt, 1980; pg. 138). This assumption is necessary because it is not possible to measure individual characteristics over time in such aggregate data. The effects of this assumption on the estimates were assessed in the fixed effects model when the long time

period was collapsed into two, cash and carry, and no cash and carry periods. The isolation of the facilities did not change the estimates considerably from the groupwise regression estimates.

Table 4.1: Definition of Variables for Panel Data Analysis.

VARIABLES	DESCRIPTION
Dependent	
Coverage	Total Number of Visits Per Month/Total Population of Catchment Area
Independent	
Drug_All	Monetary value of all drugs supplied at a facility - (Sept. 1997 Values)
Drug_Malaria	Monetary value of anti-malaria drugs** given to patients- (Sept. 1997 Values)
Price	Cost per patient (outpatient cost less drug fees).
MCH	Number of visits to growth monitoring clinics
Period	Time period (Cash and Carry=1, other=0)
Period*Price	Interaction between period and price
Period*Drug	Interaction between period and drug
Period*Income	Interaction between period and income
Income	National real GDP per capita

All variables are in natural logarithm.

** They are Chloroquine (Tablet, Syrup and Injection); Paracetamol (Tablet and Syrup); Multi-vitamins (Tablet and Syrup); Aspirin and Piriton (Tablet).

4.1.4 Discrete Response Analysis of Patients' Willingness to Join and Pay for Drug Insurance Premium

Qualitative response variable analysis using ordered probit model with sample selection was used to study the willingness to join and pay insurance premium for the prescribed drugs (Objective 3). The selection model assesses the likelihood of joining the scheme. By offering

bids, the response of an individual is restricted to one of the bids which represents an ordinal value. Since the multinomial logit or probit models fail to account for the ordinal nature of the response variable and ordinary regression analysis would give the wrong signals and would therefore not be appropriate, an ordered probit model was used to estimate the determinants of willingness to pay for the premium (Asenso-Okyere et al.,1997: Greene,1997). Since the choices are hypothetical rather than real, it is important to interpret the results of contingent valuation studies with some caution. The dependent variable for the sample selection equation is whether the individual will join the scheme or not. That of the ordered probit is a qualitative choice of a premium. The explanatory variables are a selected set of variables denoting demand for insurance and other socio-economic factors some of which appear in both models. The equation of primary interest is

$$y^* = \beta' x + \in$$

y* is not observed. What is observed is given as

$y=0$ if $y^* < 0$,

$y=1$ if $0 \leq y^* \leq \mu_1$,

$y=2$ if $\mu_1 \leq y^* \leq \mu_2$,

....

$y=J$ if $\mu_{J-1} \leq y^*$.

The equation that determines the sample selection is

$$d^* = \alpha' z_i + \eta_i, \qquad \in_i, \eta_i \sim N2[0,0,1,1,\rho]$$

$d=1$ if $d^* > 0$,

$d=0$ if $d^* \leq 0$

The selection mechanism is such that y is observed if and only if d=1. That is we observe the patient's willingness to pay only when he has indicated his willingness to join the scheme. The problem with estimations in which these two models are fit differently is that when ϵ and η are correlated, $\rho \neq 0$, the estimated effects of the parameters especially those variables which appear in the two models, tend to be overestimated in the primary equation (Greene, 1997). In the joint procedure, the ordered probit model first estimates the selection model, hold its results for the second step where α is re-estimated from the probit model along with β and μ, obtaining a FIML set of estimates for the parameters including ρ.

The independent variables used for the estimation are in Table 4.2. Essentially, the demand for insurance is a function of the premium, other available premiums, income of participants, services offered, benefits available, current levels of health expenditures, and socio-cultural factors. In studying the prospects of expanding health insurance in sub-Saharan Africa, Shaw and Ainsworth considered both supply and demand factors as they affect the viability of insurance markets in the region. Among the factors considered were prices of competing alternatives, the income of prospective participants, the ability to organise the groups and the current levels of health expenditures. In this section various factors have been considered as explanatory variables for the ordered probit analysis to study the demand for health insurance and these are presented in Table 4.2.

Table 4.2 Description of Explanatory Variables for Ordered Probit Model

VARIABLES	DESCRIPTION
MALE	Gender (Male=1, Female=0)
AGE[a]	Age in Years
MARRIED	Marital Status (Married=1, Unmarried=0)
YRSCH	Years of Formal Education
FARMER	Occupation (Farming=1, Non-farming=0)
HHSIZE	Household Size
INCOME[b]	Monthly Expenditure
DRUG_PRB[c]	Cost of Prescribed Drugs
DRUG_SM[c]	Cost of Self-Medicated Drugs
MALARIA	Disease of Patient (Malaria=1, Other=0)
MILD	Severity of Disease (Mild=1, Severe=0)
POOL	Membership of a Resource Pooling Scheme (Member=1)
SATISFY	Satisfaction of Current System of Drug Purchase and Payment
LOC	Locality (Rural=1, Non-Rural=0)

a. Divided by 10 for estimation
b. Divided by 100,000 for estimation
c. Divided by 1000 for estimation

4.2 Study areas

The study was tacked on to an on-going related study at the Institute of Statistical, Social and Economic Research (Asenso-Okyere et al., 1998) which collected data from 12 facilities in 4 districts of Ashanti Region. In each district, the district hospital and two other health facilities were selected for the work. The study utilised information from six of these communities that had complete series of the period needed for the work. These comprise two rural health centres, two urban health centres and two district hospitals. They are Obuasi government hospital, and

of inhabitants and it serves as the mainstay for most part of the year. Logging is common but processing of the logs are not done in the community.

4.3 Data Collection

The data collection was in two major parts. It used facility level statistics for different public facilities over time for its principal analysis to assess the effects of quality on demand for health care, and also used cross-sectional data to examine patients willingness to pay for a prepayment scheme for drugs.

Table 4.3: Summary of some Features of the Selected Health Facilities

District	Population (January,1997)	Type of Facility	Personnel (Prescribers and Dispensary staff)
Adansi West			
Obuasi	108,812	District Hospital	2 Doctors, 2 Pharmacists, 1 Disp. Technician
Akrokerri	16,390	Urban Health Centre	1 Doctor, 1 Disp. Technician
Fomena	16,222	Urban Health Centre	1 Medical Assistant, 1 Disp. Technician
Ejisu-Juaben			
Juaben	24,117	District Hospital	2 Doctors, 1 Pharmacist, 1 Disp. Technician
Bomfa	19,874	Rural Health Centre	1 Medical Assistan
Kwaso	29,135	Rural Health Centre	1 Medical Assistant, 1 Disp. Technician.

4.3.1 Data from facility records

This part of data collection picked monthly information on drug supply and demand patterns at the health facilities from January 1990 (two years before the introduction of the cash and carry

in Ghana) to September 1997. Outpatient attendance figures disaggregated by age, gender and morbidity (malaria and non-malaria) were collected from the facilities' record books. Growth monitoring attendance figures at the available MCH departments were also taken. The receipts from both outpatient and inpatient departments over those years were also noted to enable us know the cost borne by patients.

Monthly requisition records in the facilities were consulted for number of drugs requested and obtained. Amount of anti-malaria drugs dispensed to patients as well as the prices at which they were obtained and sold were also collected. An attempt was made to collect information on other quality indicators like number of staff, availability of laboratory, theatres and other equipment over those years but they were not available in almost all the facilities.

4.3.2 Data from contingent valuation method

I used contingent valuation method (Cummings et. al., 1986) to solicit patients' willingness to join and pay for a hypothetical insurance scheme set up for prescribed drugs. Two hundred patients were interviewed at these facilities with structured questionnaires. The interviews were done at exit points of the health facilities, that is, at the dispensaries or soon after consulting with the prescriber.

A contingent valuation technique is an approach that is used to estimate the value of an intangible good or service. It is also used to provide a guideline for setting a price for intangible goods and services. This theory employs a simple but structured bidding procedure that allows predictions about the individual's level of payment based on his/her socio-economic characteristics. In studies that employ the method, respondents are presented with well described but hypothetical situations. The individuals are asked to choose whether or not they

would purchase a non-market, 'intangible' good, at a specified price. In making this decision, they trade off perceived costs and benefits just as they do when purchasing consumer goods (Lee et. al., 1997). Their choices allow insight into the willingness to pay for the 'goods' being valued in the study. In this study, introductory explanations and a scenario description of the services to be offered (advantages and potential disadvantages) along with their costs, the financing mechanisms, and the terms and conditions upon which the services will be offered was provided. Assessment of willingness to participate in the scheme was made by asking the respondents whether they belong to existing risk-pooling schemes and whether they would like to join one for health care.

After the explanation, each respondent was presented with a price or the cost of the benefits from the scheme for an individual and then asked if he or she was prepared to enroll through a bidding game. Guided by the economic subscription (premium) of ¢5000 ($3.03) per month for a family of five suggested by Asenso-Okyere et al. (1997), the individual was asked whether he or she was willing to enroll if he was to pay ¢7000 as a monthly premium. This figure translates to Asenso-Okyere and others figure[2] at the time of the interview. It was used as a ceiling for the bidding game for the individual. If the respondent declined the offer then the subscription was lowered and the respondent was asked to reconsider the new offer. The offer was lowered successively by ¢1000 until a bid or acceptance was obtained or until the lowest offer of ¢1000 was reached.

Follow-up questions were included to determine the reasons for the responses given and to assess how respondent's choice and willingness to pay are likely to change in the future given a change in the initial conditions. Information on current patient's drug

[2] **Exchange rate at the time of the survey was: ¢2300=US$1.00**

acquisition, use, and disposal habits, drug choice as far as cost is concerned were also picked. Cost of self-medication, cost of prescriptions given and bought, type of disease presented and severity were also taken. The questionnaire also sought information on patients' or their caretakers' socio-economic background.

CHAPTER FIVE
RESULTS AND DISCUSSION

5.1 Supply of Essential Drugs in Public Health Institutions

Tables 5.1.1a and 5.1.1b show the ANOVA results of the differences in drug supply before and after cash and carry was introduced. These results are controlled for differences in the facilities' supply of drugs. The summary tables indicate that the supply situation was significantly different in the two periods. The overall F-value for the two measures of quality (proportion of requested drug types obtained and proportion of requested drug quantities obtained) are very high resulting in minimum significance level below 0.01.

The period differences have F-values of 244.99 and 2272.86 respectively for the proportion of drug types obtained and the proportion of drug quantities obtained. The differences in the facilities' supply of drugs are also significant at 99% confidence level meaning that some of the facilities could get more of their requested drugs than others in both periods. The F-values of the period and facility interaction terms were not significant even at 10% significance level. Since the main effects are significant and the interaction terms are not, one can conclude that the order of drug supply for the two periods in all the facilities did not change. This means that the facilities that had higher proportions of supplied drugs in the pre-period continued to have higher proportions in the post-period.

The average proportion of drugs types obtained in every month for all the facilities before 1992 was about 0.49. This increased to about 0.80 after 1992 (Table 5.1.2a). Obuasi district hospital was getting about 61% of the types of drugs requested before 1992 but this

percentage increased to about 89% after the scheme was instituted. That of Juaben district hospital increased from 55% to 88% after the scheme was introduced.

The increase in this percentage is higher in rural health centres than the district hospitals although the hospitals continue to get more of drug types requested. While this increase is about 60% in Juaben Hospital, Bomfa rural health centre in the same district realised almost 97% increase in the supply of the types of requested drugs after the introduction of the scheme (See Table 5.1.2a). The situation in the urban health centre could not be ascertained because of lack of data. They however, receive slightly higher proportions of both types and quantities than the rural health centres in the post period.

Table 5.1.1a: ANOVA Results of Supply of Drugs: Proportions of Requested Drug Types Obtained Before and After January 1992.

Source of Variation	Degree of Freedom	Sum of Squares	Mean Square	F-Value	P-Value
Model	9	8.479	0.942	33.11	0.001
Period	1	6.971	6.971	244.99	0.001
Facility	5	1.415	0.283	9.95	0.001
Period*Facility	3	0.092	0.031	1.08	0.356
Error	397	11.297	0.028		
Corrected Total	407	19.776			

The observations in Table 5.1.2a are quite similar to what pertains in Table 5.1.2b. The district hospitals continued to have more of what they requested than the rural facilities. The size of proportional changes in the quantities is higher than the types. While the overall change in the proportion of the types of drugs obtained was around 60%, the observed change in the

obtained quantities was far over 100%. For instance, the increase in the rural areas' drug types received were more than 170%. The proportions of quantities obtained are rather lower than that of the types obtained in both periods in all the facilities.

Table 5.1.1b: ANOVA Results of Supply of Drugs: Proportions of Requested Drug Quantities Obtained Before and After January 1992.

Source of Variation	Degree of Freedom	Sum of Squares	Mean Square	F-Value	P-Value
Model	9	391.405	43.489	279.93	0.001
Period	1	353.106	353.106	2272.86	0.001
Facility	5	37.917	7.583	48.81	0.001
Period*Facility	3	0.381	0.127	0.82	0.484
Error	10827	1682.054			
Corrected Total	10836	2073.459			

Table 5.1.2a: Average Proportion of Requested Drug Types Obtained Before and After January 1992 by Locality

	No Cash & Carry		Cash & Carry	
Community	Mean	Std	Mean	Std
Juaben	0.55	0.19	0.88	0.10
Bomfa	0.39	0.15	0.77	0.21
Kwaso	0.40	0.19	0.76	0.16
Obuasi	0.61	0.18	0.89	0.09
Akrokerri			0.79	0.19
Fomena			0.78	0.15
All	0.49	0.20	0.80	0.17

These results provide very useful quantitative indications about the performance of the scheme but one should be cautious about the generality of its conclusions especially in other parts of the country. Figures 5.1, 5.2, 5.3 and 5.4 in appendix reveal the occasional stock outs in some (if not all) of the facilities. In particular, Kwaso and Akrokerri for some of the times recorded around 20% for these indicators even after the scheme was introduced.

Table 5.1.2b: Average Proportion of Requested Drug Quantities Obtained Before and After January 1992 by Locality

	No Cash & Carry		Cash & Carry	
Community	Mean	Std	Mean	Std
Juaben	0.38	0.43	0.85	0.34
Bomfa	0.32	0.44	0.75	0.42
Kwaso	0.24	0.34	0.67	0.43
Obuasi	0.38	0.39	0.84	0.34
Akrokerri			0.79	0.39
Fomena			0.74	0.42
All	0.34	0.40	0.77	0.40

The qualitative study by Asenso-Okyere and others (1997) suggests that these stock outs may be due to management issues in the implementation of the concept. The ministry's report in 1993 also highlights this management problem but it is quite difficult to understand why these stock outs still happen after five years of the scheme's running.

The management and other supply factors like delays in drug acquisition discussed by Koeppel and Vian (World Bank, 1992) can clearly help isolate the effects of the policy change if

it becomes possible to account for them in similar analysis in the future. This study assumed that these factors remained unchanged within each period and tried to absorb their effects in the included facility variable.

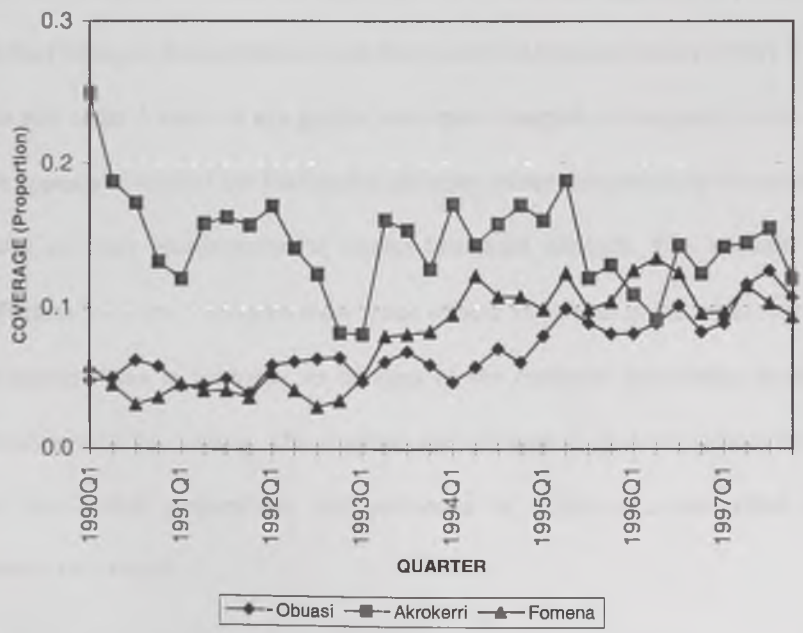
One should also be careful about equating requisitions to needs in this case. It is possible that the requisitions made after the introduction of the scheme come close to the drug needs of the facilities because of the cash and carry nature of the reforms which rules out free or credit purchases from the regional medical stores completely. The observation by Rankin and others in their assessment report to the Ministry of health in 1993 shows that improper drug needs calculations are not peculiar to the before period. This means that one can confirm the improved drug supply situation in the public health facilities with this quantitative evidence.

5.2 Trends in the Coverage of Public Health Facilities

Figures 5.5 and 5.6 show that the quarterly coverage of all the facilities rose immediately after the cash and carry scheme was instituted in January 1992 but apart from Obuasi district hospital all of them experienced a drop after the first and second quarters of the same year had elapsed. Juaben district hospital and Kwaso rural health centre continued to experience this drop, even recording levels below the pre-period minimum values. Bomfa rural health centre experienced a rise again in the first quarter of 1993 and revolved around 5% until the last quarter in 1995 where a sustained downward trend is experienced. Akrokerri urban health centre also experienced another rise in the second quarter of 1993. It served about 15% of its

Fig. 5.5: COVERAGE: EJISU-JUABEN DISTRICT

Fig. 5.6: COVERAGE: ADANSI WEST DISTRICT



catchment area, dropped close to its 1993 minimum level of 6% but rose just after that drop to the sustained level of 15%.

The above observation is quite different from the picture in Fomena urban health centre and Obuasi district hospital. Obuasi district hospital's quarterly coverage revolved around 6% of its catchment area until the third quarter of 1994 where it has experienced an upward trend till recent times. After the drop in its 1992 rise, there has been a continued upward trend in the coverage of Fomena health centre, though it serves lower coverage than the other urban health centre in the same district. The centre now serves about 10% of its catchment area quarterly. It is therefore easy to deduce that apart from Obuasi and Fomena health facilities, coverage of the facilities did not increase significantly with the increase in drug supply. The quarterly attendance figures themselves also depict the same conclusions (see Figures 5.7 and 5.8). The reason for this counter intuitive observation is studied closely in the next section.

The question on how different cohorts of the population react to shocks in the health sector were not assessed in detail but Figures 5.9 to 5.14 in the appendix depict an impression similar to the finding in the qualitative work by Asenso-Okyere and others (1998). The spikes in the female and under 5 years of age graphs were quite damped as compared to the male group. The above appears to support the finding that the most vulnerable groups in the society (children and female) are very unresponsive to shocks like price changes. The mobidity pattern for malaria (Figures 5.15 and 5.16) also show quite volatile variations in the visits especially in the district hospitals. This is probably so because of the common knowledge people have for malaria treatment in the country. The slightest price change is likely to prompt the use of self treatment like herbal preparations and patronage of chemical stores which are almost everywhere in the country.

The ANOVA results represented in the summary table, Table 5.2.1, also show that monthly coverage of the facilities do not differ between the two periods at both 5% and 1% significance levels. It is only significant at 10% significance level. The significance of the interaction term confirms the picture from the graphs that the period differences in coverage for the two periods differ among the facilities. The observed average monthly coverage for the periods in Table 5.2.2 indicate that Juaben's monthly coverage dropped from 11% to 6%, Kwaso and Akrokerri's figures dropped from 4% to 3% and from 6% to 5% respectively. The average for Bomfa, Obuasi and Fomena however increased from 1% to 2%, 2% to 3% and from 1% to 3% in that order.

Table 5.2.1: ANOVA Results of Monthly Coverage of Public Health Facilities Before and After January 1992.

Source of Variation	Degree of Freedom	Sum of Squares	Mean Square	F-Value	P-Value
Model	11	0.0228	0.0021	11.23	0.001
Period	1	0.0006	0.0006	3.07	0.089
Facility	5	0.0172	0.0034	18.67	0.001
Period*Facility	5	0.005	0.001	5.42	0.008
Error	36	0.0066			
Corrected Total	47	0.0294			

Table 5.2.2: Monthly Coverage of Public Health Facilities Before and After January 1992 by Locality

	No Cash & Carry		Cash & Carry	
Community	Mean	Std	Mean	Std
Juaben	0.11	0.062	0.06	0.020
Bomfa	0.01	0.001	0.02	0.001
Kwaso	0.04	0.001	0.03	0.010
Obuasi	0.02	0.001	0.03	0.011
Akrokerri	0.06	0.010	0.05	0.012
Fomena	0.01	0.001	0.03	0.010
All	0.04	0.043	0.03	0.020

5.3 Simultaneous Effects of Price and Drug Availability on Use of Public Health Facilities

5.3.0 Introduction

Given that the supply situation has improved, can we say that the improvement led to an increase in the use of these facilities? Or did the improvement prevent an eminent drop in their use? What happens when the facilities experience stock outs? These and other issues are studied in this section through groupwise regression analysis, and also through fixed facility and period effects panel data analysis.

5.3.1 Groupwise Regression Results

LIMDEP statistical software (Greene, 1996), version 7, was used to estimate the models in this section. The format of presentation in the programme users' manual has consequently been followed in presenting the results of this study. The results in Table 5.3.1a presents five different specifications of the model starting with the unprecise pooled cross-section time series one. Under this specification, S_0R_0, the covariance structure of the error term is assumed to be non-hetereoscedastic and non-autocorrelated. The approximate test of this assumption starts with a Lagrange Multiplier (LM) test for homoscedasticity. The test yielded an observed value of 31.78. At 5 degrees of freedom, the critical chi-square is 15.09 implying that the error structure is not homoscedastic at 99% confidence level.

The next step in the estimation allowed pooled OLS variance to vary across the facilities. Because the lagged dependent variable was used as a regressor one cannot achieve MLE when the results are iterated (Green, 1997). Hence a two-step FGLS yielding a groupwise heteroscedastic regression assuming no cross-sectional correlation and autocorrelation in the time units was fitted. The estimates under this specification are shown in column S_1R_o. The Wald tests for homoscedasticity confirms the inappropriateness of the homoscedastic assumption. The LM test against the correlation also rejects the assumption on the correlation across facility disturbances. The observed values for the two tests as against the critical value of 15.09 were 50.87 and 33.94 respectively.

Since it is likely that several of the factors that affect the facilities affect all of them, even though to varying degrees and since it was not possible to capture all these factors in the model, it was reasonable to allow contemporaneous correlation across them. This is especially true when one considers a particular district with all the facilities coming under one

administration within the region. Also no district management team has the autonomy to enact specific policies. The extension of the model for this cross-sectional correlation still holding that observations are uncorrelated across time gave the results under column S_2R_o. An approximate LR test was used for testing the hypothesis that the off-diagonal elements of the covariance structure are zeros. At 15 degrees of freedom the critical value of the chi-square distortions was 30.58 at 1% significance level. The observed value of the statistics of 143.40 led to the conclusion that the simple heteroscedastic model is not general enough for the data.

Columns S_2R_1 and S_2R_2 were achieved by relaxing the nonautocorrelation assumption. In the first case a common autocorrelation coefficient was assumed for all the facilities while the last column S_2R_2 allowed for different autocorrelation coefficients. The appropriate LR test against cross-sectional correlation proved again that the non cross-sectional correlation assumption could not be upheld. The observed values for the test statistic were 141.51 and 137.98 respectively rendering the 99% critical value of 30.58 smaller.

According to a discussion in Greene (1997) the presence of the lagged dependent variable introduces serial correlation even if the series do not have it so Hatanaka's instrumental variables technique was used to control for it. In any case, the estimated autocorrelation coefficients are small, apart from those of Kwaso and Fomena, the rest are close to zero. They are -0.106 for Juaben, -0.120 for Bomfa, -0.213 for Kwaso, -0.065 for Obuasi, -0.165 for Akrokerri, -0.243 for Fomena and -0.152 for all of them when a common coefficient is assumed. These results do not go contrary to the theoretical specification of partial adjustment model that implies no serial correlation in the error term. These mean that the theoretical position can be upheld and one can either rely on S_2R_0 or any of the autocorrelation models.

Table 5.3.1a: Summary of Groupwise Regression Estimates: Value of All Drugs as a Measure of Quality of Care

	Model				
Variable	S_0R_0	S_1R_0	S_2R_0	S_2R_1	S_2R_2
Constant	-2.4561	-2.1668	-3.6082	-3.0270	-3.3330
	(2.0769)	(1.9704)	(2.6629)	(2.4760)	(2.4886)
Period	0.5591	-0.6072	1.5442	1.5333	1.8308
	(2.2675)	(2.1636)	(2.8439)	(2.6301)	(2.6475)
Price	-0.1877***	-0.1925***	-0.1860***	-0.1766***	-0.1809***
	(0.0401)	(0.0411)	(0.0332)	(0.0300)	(0.0299)
Period*Price	0.1249***	0.1147***	0.1195***	0.1260***	0.1289***
	(0.0435)	(0.0438)	(0.0344)	(0.0305)	(0.0306)
Quality	0.0673***	0.0656***	0.0589***	0.0539***	0.0570***
	(0.0107)	(0.0098)	(0.0100)	(0.0094)	(0.0068)
Period*	-0.0269***	-0.0305***	-0.0296***	-0.0296***	-0.0303***
Quality	(0.0070)	(0.0065)	(0.0083)	(0.0080)	(0.0080)
MCH	0.0340	0.0298	0.0153	0.0112	0.0133
	(0.0169)	(0.0166)	(0.0134)	(0.0120)	(0.0120)
Income	0.2163	0.2038	0.5314	0.4445	0.4947
	(0.4081)	(0.3873)	(0.5197)	(0.4844)	(0.4863)
Period*	-0.0798	0.1523	-0.2616	-0.2599	-0.3167
Income	(0.4409)	(0.4206)	(0.5524)	(0.5120)	(0.5150)
Lag-One	0.8585***	0.8671***	0.9042***	0.9227***	0.9194***
Coverage	(0.0164)	(0.0156)	(0.0122)	(0.0105)	(0.0107)

*** p<0.01, ** p<0.05, * p<0.10

S_0R_0: Homoscedastic and Nonautocorrelated
S_1R_0: Groupwise Heteroscedastic and Nonautocorrelated
S_2R_0: Groupwise Heteroscedastic, Cross-sectionally Correlated & Nonautocorrelated
S_2R_1: Groupwise Heteroscedastic, Cross-sectionally Correlated & Common Autocorrelation Coefficient
S_2R_2: Groupwise Heteroscedastic, Cross-sectionally Correlated & Different Autocorrelation Coefficients

The results of the five different specifications have been presented here to allow for comparisons with other studies in which these necessary econometric corrections were not made. The summary of the results for the second version of the model is represented in Table 5.3.1b. Here only anti-malaria drugs were used as an indicator of quality of care.

The summary, Table 5.3.1a, therefore shows that coverage of health care facilities is inversely related to price while it is positively related to quality of care. Both factors are highly significant from the three models at 99% confidence level. The measure of income, real per capita GDP is however not significant even at 90% confidence level but it is positively related to the number of consultations at these facilities. The number of visits to the MCH monthly growth monitoring clinics is also positively related to the number of consultations at the facilities but it is insignificant even at 90% confidence level. The lagged dependent variable is very significant for all the models ranging from 0.904 to 0.922. This means that the effect of changes in the above factors is likely to be felt on coverage in about 9 to 12 months at these facilities.

The dummy variable indicating the effect of cash and carry on coverage was not significant. The interaction terms for this dummy and the independent variables were significant at 99% confidence level. This means that the intercepts for the equations that separate the two periods are not different but the significant slope differences show that the independent variables have different impact on coverage in the two periods.

The estimates in the tables are elasticities since the specifications of the models were double log equations. They indicate the short run elasticities while the long run elasticities are calculated by dividing the short run estimates by the coefficient of the lagged dependent variable after it has been subtracted from one.

Table 5.3.1b: Summary of Groupwise Regression Estimates: Value of Malaria Drugs as a Measure of Quality of Care

	Model				
Variable	S_0R_0	S_1R_0	S_2R_0	S_2R_1	S_2R_2
Constant	-2.5924	-2.4562	-4.3014	-3.8509	-3.8188
	(2.0903)	(1.9801)	(2.6297)	(2.4410)	(2.4630)
Period	0.5355	-0.3439	2.2976	2.4513	2.4194
	(2.2869)	(2.1788)	(2.8054)	(2.5875)	(2.6133)
Price	-0.1891***	-0.1814***	-0.1681***	-0.1610***	-0.1644***
	(0.0406)	(0.0411)	(0.0329)	(0.0298)	(0.0297)
Period*Price	0.1292***	0.1096***	0.1097***	0.1173***	0.1205***
	(0.0440)	(0.0440)	(0.0344)	(0.0306)	(0.0305)
Quality	0.0658***	0.0633***	0.0540***	0.0502***	0.0506***
	(0.0117)	(0.0106)	(0.0112)	(0.0105)	(0.0106)
Period* Quality	-0.0282***	-0.0317***	-0.0294***	-0.0294***	-0.0292***
	(0.0083)	(0.0077)	(0.0959)	(0.0093)	(0.0093)
MCH	0.0357	0.0300	0.0150	0.0109	0.0121
	(0.0170)	(0.0168)	(0.0137)	(0.0122)	(0.0124)
Income	0.2976	0.2832	0.6919	0.6275	0.6186
	(0.4106)	(0.3889)	(0.5126)	(0.4768)	(0.4809)
Period* Income	-0.0797	0.0979	-0.4129	-0.4434	-0.4377
	(0.4444)	(0.4233)	(0.5445)	(0.5032)	(0.5081)
Lag-One Coverage	0.8689***	0.8765***	0.9140***	0.9322***	0.9307***
	(0.0160)	(0.0155)	(0.0122)	(0.0103)	(0.0105)

*** p<0.01, ** p<0.05, * p<0.10

S_0R_0: Homoscedastic and Nonautocorrelated
S_1R_0: Groupwise Heteroscedastic and Nonautocorrelated
S_2R_0: Groupwise Heteroscedastic, Cross-sectionally Correlated & Nonautocorrelated
S_2R_1: Groupwise Heteroscedastic, Cross-sectionally Correlated & Common Autocorrelation Coefficient
S_2R_2: Groupwise Heteroscedastic, Cross-sectionally Correlated & Different Autocorrelation Coefficients

All the coefficients show that coverage is inelastic to changes in these variables. It is observed that while price increase has negative impact on coverage, quality improvement can offset the adverse impact. These two impacts are however reduced in the post cash and carry period. It is estimated that if the real value of price of non-drug cost of health care (consultations and laboratory) increase by 100%, while the aggregate supply of drugs and other variables like income remain constant, coverage of public health facilities in the pre cash and carry period is expected to drop from about 17.7% to about 18.6% in the short-run. The long-run estimates[3] indicate that the total effects could rise from about 194% to 228% in a year's time. In the post cash and carry period the negative effects are expected to drop by 64% to 71% resulting in a fall of 5% to 7% if all other things are held constant. It is also observed from table 5.3.1a that if all other things, including real value of price, are held constant and an effort is made to raise the supply of drugs by 100%, coverage of the facilities in the pre cash and carry period is expected to rise by 5.4% to about 5.9% in the short run. In the same period the long-run expected rise in coverage is between 61.4% to about 70.4%. After the scheme was introduced these elasticities are expected to be reduced by 50% to 53% yielding a short run increase of 2.4% to 2.9% respectively.

Considering the reduction in the positive quality effect and the comparative high drop in the negative price effect one will uphold the view that when quality is improved patients will be willing to pay higher fees more than the case when quality remains small or unchanged.

When a lesser value of quality (malaria drugs) is used, similar results were observed (see Table 5.3.1b). The estimated short run price elasticities range from -0.161 to -0.168 for no cash and carry period and -0.043 to -0.058 in the cash and carry period. The respective offsetting

[3] See previous paragraph and chapter four for the explanation on the calculation of the short-run and long-run estimates.

quality effects are 0.050 to 0.054 and 0.021 to 0.025. This observation provides an important implication of measurement of quality of care. It is even possible for quality to completely offset the effect of price if other factors like staff attitude, availability of better equipment and qualified staff are factored into the model. It was not possible to do this because of lack of data at these facilities.

5.3.2 Fixed Effects Regression Results

Tables 5.3.2a and 5.3.2b show the summary of the results of the assessment of constant coefficients assumption for all the facilities. The model with constant term only represents an OLS regression of the dependent variable on a single constant. That with only group dummies represents an OLS regression of the dependent variable on the dummy variables created for the facilities. These models are expanded to see whether more explanatory power will be gained if the regressors are added. The F-statistics in the table is based on the sum of squares for testing the restrictions of the second pair on the first pair. For example, the first test of group dummies only versus constant term only has a null hypothesis of no group effects on the mean of the dependent variable. Also the restriction of regressors only on a model of regressors and group dummies implies that there is a fit in regression but there is no group effects.

These tests show that the model with the independent and group effects performs better than those with constant term only and group effects only. The addition of period intercepts to the group dummy variables model does not improve the performance of the model. The improvement in the f-statistics is only 0.002 yielding the test highly insignificant. We therefore presented only the estimated model of the independent and group effects model in the summary table (Table 5.3.2b).

This model fit well with 99% significant F-value of 341.5. The model also upholds the partial adjustment no serial correlation specification, the estimated autocorrelation coefficient is -0.066. As it can be seen from the results, the signs of the coefficients are the same as the previous models but the slopes differ in magnitude. The price elasticities for the groupwise regression are between -0.16 to -0.18 and -0.05 to -0.07 in the two periods for the short run. Also the service quality elasticities for the periods range from 0.054 to 0.059 and 0.024 to 0.029 respectively. The figures for the fixed effects model are -0.22 and -0.03, and 0.050 and 0.024 respectively for price and quality. The relative reduction in elasticities is smaller for quality than price when compared to the previous results. This confirms the conclusion that patients will be more willing to pay higher fees in improved quality periods.

Table 5.3.2a: F-Tests for Classical Model

Models	F- value	P-value
Group Dummies only Vs Constant term only	216.136	0.000
Regressors only Vs Constant term only	504.557	0.000
Regressors and Group Dummies Vs Constant term only	295.971	0.000
Regressors and Group Dummies Vs Group Dummies only	145.638	0.000
Regressors and Group Dummies Vs Regressors only	10.807	0.000
Regressors, Group & Time Dummies Vs Regressors only	7.706	0.000
Regressors, Group & Time Dummies Vs Regressors & Group Dummies	0.002	0.917

It is also important to note the importance of income in the post cash and carry period in the fixed effects model. Should it be possible to increase the real income level of the citizens, the number of consultations of these public institutions can considerably go up. It

also means that for the period considered, if one can say that incomes of the people fall, then one should be careful about how to assess the impact of cash and carry. Though not very significant as price and quality, a 100% change in income will result in coverage change of 11% in the no cash and carry period in the short run. In the post cash and carry period it is about 13%.

Table 5.3.2b: Summary of Fixed Effects Regression Estimates: Value of All Drugs as a Measure of Quality of Care

Variable	Coefficient	SE	P-Value	Mean
Price	-0.2249	0.0422	0.000	1.089
Period*Price	0.1935	0.0433	0.000	0.967
Quality	0.0497	0.0156	0.001	9.390
Period*Quality	-0.0255	0.0067	0.000	7.249
MCH	-0.0129	0.0196	0.511	5.512
Income	0.1056	0.1698	0.533	5.289
Period*Income	0.0226	0.0121	0.062	4.000
Coverage Lag-one	0.7331	0.0234	0.000	-3.534
Fixed Effects				
Juaben	-1.5751	0.8313	-	-
Bomfa	-1.9269	0.8315	-	-
Kwaso	-1.7685	0.8378	-	-
Obuasi	-1.8203	0.8184	-	-
Akrokerri	-1.6291	0.8277	-	-
Fomena	-1.7888	0.8294	-	-

F(13,562)=341.51, (P=0.000); R-squared=0.8876, Adjusted R-squared=0.8850; ρ=-0.066

5.3.3 Comparison of Panel Data Analysis Results with Others Studies

These results are similar to many price and service quality studies on demand for health care in terms of direction of impact (Nolan and Turbat; Shaw and Griffin op cit.) but differ from others in terms of significance of variables and range of the magnitude of the effects. The results are also similar in terms of the isolation of price effects from quality impacts to the more recent works in this area although a different analytical approach has been used here.

For example, Koeppid and Vian's estimated arc price elasticity of demand for health care using Waddington and Enyimayew's data and Vogel's price assumptions ranged from -0.011 in urban area to about 0.050 in a rural area in the Ashanti-Akim district of Ashanti region of Ghana (World Bank, 1992). Yoder (1990) also reported that a 300 to 400 percent price increase resulted in 32 percent drop in utilisation rates in government facilities in Swaziland. Low sensitivity to changes in the price of medical care has also been observed in Ethiopia (0.05 to -0.05) and Sudan (-0.37) (Jimene, 1989) as cited in Shaw and Griffin.

Shaw and Griffin noted that there have been different findings in studies that do not account for facilities characteristics even though they include important variables which try to capture implicit cost to the patient. Also reviewed in their work are cross-sectional studies that have had a critical look at quality of care, and drug availability in particular. For example, the study by Mwabu and others (1995) found aspirin supplies showing the greatest significance but lack of anti-malaria drugs, which has negative influence on quality of care, surprisingly had direct relationship to utilisation rates. The unusual finding on the effect of anti-malaria drugs was attributed to an endogeneity problem in estimation. Among the most important aspects of their work is probably what Shaw termed the distinction between demand reduction effect and demand diversion effect that this study could not do because of non-availability of data. This

lack of data concerning the absorption of the drop from the public facilities to other facilities like the private sector overstate the effect of price when looked at from the societal perspective. This is because with the absorption of the drop to the other sectors, the shift to those sectors would not lead people to use low quality health care like self-medication. However, with the determined goal to increase her coverage, the Ministry needs to know the appropriate instruments to achieve the set targets.

This work also confirms studies done by Mwabu and others (1995), Litvack and Bodart (1993), and Lavy and Germain's (1995) comprehensive conclusion on the effects of income, drugs availability and a whole lot of service features on utilisation. For instance Lavy and Germain showed that when combined with improvement in private facilities the number of people self-medicating dropped by 15%. Shaw also cited a World Bank report in 1991 from Nigeria that states that public facilities can actually raise outpatient prices to private sector levels if the facilities offer the same level of drug availability as the private sector and improve their physical conditions.

The results therefore compare well with contemporary literature and hence provide very useful information tool for the Ministry to work on its target.

5.4 Willingness to Join and Pay for Drug Insurance Scheme

The report by Asenso-Okyere and others (1997) shows that payment for drugs pose the most difficulty for patients in the Eastern Region of Ghana, followed by payment for laboratory services and then admissions costs. It was also noted in an earlier work by Asenso-Okyere and Dzator (1997) on the cost of malaria care that drug cost takes about 60% of total direct cost of health care. Concerns have also been raised about the difference between actuarial estimates of

premiums and the expressed willingness to pay values quoted by Asenso-Okyere and others for the comprehensive package suggested initially by the ministry. Planners of the national health insurance scheme are also planning to present selective package to potential subscribers.

This makes it necessary to find out whether patients will be willing to subscribe to an idea that a drug insurance scheme or a drug package within the National Insurance scheme be made to cater for their needs. Among the people interviewed, most expressed little knowledge about insurance as a form of financing health care, but most of the respondents understood resource-pooling and knew about some organisations involved in such ventures.

Twenty six percent of the respondents expressed their unwillingness to subscribe to such a scheme. Considering the cumulative distribution, 74% of the respondents were willing to pay ¢1000 per individual as a monthly premium, 50% would pay ¢3000 and up to 28% would pay ¢5000. Only 16% of the respondents were willing to pay over ¢6000 as a monthly premium (Table 5.4.1). There were slight differences in the willingness expressed by the rural respondents and those by the urban and district respondents. For example while about 22% of the respondents in the district capital were willing to pay ¢6000 and 49% were willing to pay ¢3000, about 15% and 56% respectively of the rural respondents were willing to pay the same premium figures.

From Table 5.4.2, the median premium level of ¢3000 was about 1.2%, 1.6% and 1.3% of the monthly expenditures of the rural, urban and district capital dwellers respectively. This also represents about 91%, 47% and 46% of monthly expenditures that go into health care of the respective communities. It can therefore be inferred that if the scheme is launched with a monthly premium of ¢3000, about 50% of the households in the surveyed areas will be willing to join the scheme and be able to pay the premium. The Ministry of Health's consultants estimated ¢6,599 as an individual monthly premium for a comprehensive scheme which covers

all services for an informal worker (MOH, 1997). Prescription drugs have a weight of 52.4% in this figure. This translates to about ¢3,460 for an individual drug premium. Comparing this to those in Table 5.4.1 one would expect coverage of 50% to about 36% if premiums in the range of ¢3,000 to about ¢4,000 for an individual is charged.

Table 5.4.1 Willingness to Pay for Prescribed Drug Insurance by Locality

	Percentage of Respondents			
Premium	Rural	Urban	District	All
¢7000	9.84	5.71	13.85	9.69
¢6000	14.76	12.85	21.54	16.32
¢5000	26.24	27.14	30.77	28.05
¢4000	36.08	38.28	40.00	36.72
¢3000	55.75	45.71	49.23	49.99
¢2000	63.95	57.14	63.08	61.21
¢1000	76.06	74.28	70.77	73.97
Nothing	100.00	100.00	100.00	100.00
Sample Size	61	70	65	196

Table 5.4.2a: Premium as a Percentage of Monthly Total Expenditure by Locality

Premium	Rural	Urban	District	All
¢7000	3.79	3.69	3.00	3.45
¢6000	3.25	3.16	2.57	2.96
¢5000	2.70	2.64	2.14	2.47
¢4000	2.16	2.11	1.72	1.97
¢3000	1.16	1.58	1.29	1.48
¢2000	1.08	1.05	0.86	0.99
¢1000	0.54	0.53	0.42	0.49

Table 5.4.2b: Premium as a Percentage of Monthly Health Expenditure by Locality

Premium	Rural	Urban	District	All
¢7000	212.99	108.51	106.47	127.11
¢6000	182.56	93.01	91.26	108.95
¢5000	152.13	77.51	76.05	90.79
¢4000	121.71	62.00	60.84	72.63
¢3000	91.28	46.50	45.63	54.47
¢2000	60.85	31.00	30.42	36.32
¢1000	30.43	15.50	15.21	18.16

5.5 Estimated Ordered Probit Model with Selection

The estimated results from the ordered probit model with selection are presented in Tables 5.5.1a and 5.5.1b. The estimated model had a log likelihood ratio of -359.716 and the restricted model with only the constant term gave a log likelihood of -382.568. Using the likelihood ratio

index (Greene, 1997) to assess the performance of the model, it is noted that the model fits well at 0.01 level of significance. The significance of the estimate for ρ means that the effect on the willingness to pay of some variables like income and drug cost would have been overstated if the equations were estimated separately.

The variables that significantly determine the patient's willingness to join the scheme are income, prescribed drug cost, education and whether the respondent is a member of a resource pooling scheme. Table 5.5.2a shows the impact on the likelihood of people joining as the values or levels of these explanatory variables change in the future. The results confirm that, in general, as people's incomes increase they are more willing to join such schemes. If an individual's income rises by ¢100,000 (50% of sample average) the individual's likelihood of joining the scheme will rise by 4.8%. Also, as his prescribed drug cost increase by ¢1000, his willingness to join the scheme will go up by 1.2%. It is quite interesting to note that those with higher education were not as willing as those with low levels of education to join the scheme. Those who were members of a resource pooling scheme were more willing to join than those without such membership. They were about 90.2% willing to join as compared to 67.4% of those without any resource pooling membership.

Table 5.5.1a: Results of Ordered Probit Model: Willingness to Join

Variable	Coefficient	SE	P-Value	Mean
Selection Equation				
Constant	-0.0084	0.352	0.981	
Yrsch	-0.0427	0.024	0.072	7.485
Hhsize	-0.0533	0.046	0.246	5.459
Income	0.2109	0.103	0.041	2.026
Drug_SM	0.0662	0.059	0.265	1.275
Drug_PB	0.0755	0.028	0.007	5.495
Satisfy	0.3566	0.195	0.067	0.714
Pool	0.5102	0.212	0.016	0.413
ρ	-0.8833	0.143	0.000	

Although the results confirm the influence of income on the willingness to join such schemes, it is clear from Table 5.5.1b that it has less significant influence on the premium levels. This point on income is in contrast to the finding in the work done by Asenso-Okyere and others (1997) where income was one of the strongest factors determining the premium levels. They did not estimate the willingness to join function simultaneously with the willingness to pay estimation because almost everybody in their sample was willing to join. This result shows that when for some reasons people decline to subscribe, their characteristics should not be discarded or estimated separately when the willingness to pay function is estimated.

Education also had negative influence on the willingness to join equation but when it comes to the level to pay, it shows that higher levels of education will raise the level of premium to pay. The variable was however not significant in the latter case. It is also not very surprisingly to see that education has negative impact on willingness to join because most of the well

educated in the survey area may be those who already have employer benefits for health care. It is also possible that the correlation of education and factors like income and whether the respondent is a formal worker resulted to this observation. Notwithstanding these possibilities the estimation technique helped us to isolate the double edge effects of this important variable.

The variables that significantly discriminate among the premiums that individuals would be willing to pay are drug cost, age, type of disease and the severity of the disease. Table 5.5.2b shows that as people's drug cost increase, they are more willing to pay higher premiums up to ¢4000 but this willingness is likely to drop when premiums of ¢5000 or more are charged. For example if drug cost increase by ¢1000 (20% of sample average) the likelihood of paying ¢3000 is expected to increase by 1.1% whilst that of paying ¢7000 will drop by 4.2%.

Table 5.5.1b: Results of Ordered Probit Model: Willingness to Pay

Variable	Coefficient	SE	P-Value	Mean
Index Function for Probability of Ordered Probit Model				
Constant	1.8078	0.379	0.000	-
Male	0.2162	0.204	0.288	0.214
Age	-0.1334	0.071	0.059	3.423
Married	0.1227	0.183	0.503	0.752
Yrsch	0.0308	0.023	0.185	7.228
Hhsize	-0.0117	0.043	0.786	5.455
Income	0.0320	0.084	0.702	2.102
Mild	-0.3043	0.160	0.058	0.593
Drug_SM	0.0488	0.036	0.176	1.496
Malaria	-0.3703	0.170	0.029	0.428
Drug_PB	-0.0379	0.021	0.065	5.836
Threshold parameters for index				
μ_1	0.4795	0.097	0.000	-
μ_2	0.9229	0.124	0.000	-
μ_3	1.2023	0.139	0.000	-
μ_4	1.6229	0.181	0.000	-
μ_5	1.9243	0.218	0.000	-

The organisers of schemes of this nature should also pay much attention to the treatment of the type of disease and severity of disease to cover. The premium levels were responsive to whether the individual or the patient s/he is catering for had malaria or disease s/he is suffering from is mild. In general, those without malaria were more willing to pay higher premiums than those with malaria, and of those who were willing to pay higher premiums, the respondents or

wards of respondents with severe diseases dominate. For instance, whereas there is a 26.5% chance that those with malaria will be willing to pay ¢3000, there is only 18.3% chance for those without malaria to pay the same premium. However, for a premium of ¢7000 there is a 4.8% chance for those with malaria and 6.9% chance for those without malaria to pay (see Table 5.5.2b).

Table 5.5.2a: Marginal Effects of Significant Variables: Willingness to Join

Variable	P(Join)
Continuous	
Income	0.048
Drug_PB	0.012
Education	-0.013
Dummy	
Member of a Resource Pooling Scheme	0.902
Not a member of any Scheme	0.674
Change	**0.228**

Table 5.5.2b: Marginal Effects of Significant Variables: Willingness to Pay

	Probability of Paying						
Variable	¢1000	¢2000	¢3000	¢4000	¢5000	¢6000	¢7000
Continuous							
Drug_PB	0.025	0.015	0.011	0.002	-0.004	-0.006	-0.042
Age	0.007	0.004	0.003	0.001	-0.001	-0.002	-0.002
Dummy Type of Disease							
Malaria	0.185	0.215	0.265	0.125	0.120	0.042	0.048
Other	0.102	0.263	0.183	0.132	0.167	0.085	0.068
Change	**0.083**	**-0.048**	**0.082**	**-0.007**	**-0.047**	**-0.043**	**-0.020**
Severity of Disease							
Mild	0.166	0.231	0.184	0.143	0.182	0.054	0.040
Severe	0.133	0.232	0.256	0.112	0.112	0.088	0.067
Change	**0.033**	**-0.001**	**-0.072**	**0.031**	**0.070**	**-0.034**	**-0.027**

CHAPTER SIX
SUMMARY AND CONCLUSION

6.1 Summary and Implications

The study used facility records to compare the supply of drugs of six public health facilities in the period when there was no "cash and carry" to the period when the facilities were asked to procure drugs from the regional medical stores on cash down basis. The supply situation in both periods was compared to the coverage of the facilities using panel data analysis. These were made with the aim of assessing quantitatively, the effects of improvement of drug availability at these institutions and also test empirically, the evidence that with good value for their money, patients will be willing to pay higher fees for the use of these facilities.

On average the percentage of different types of desired drugs supplied increased from about 49% to 80% after the cash and carry policy was implemented. The percentage of requested drug quantities supplied also increased remarkably by 126%. Although rural health facilities continued to have less of what they asked for, as compared to supplied proportions of the hospitals, they recorded more than the average percentages quoted here.

The findings on coverage trends were mixed. One of each of the two facilities in the rural, urban and district communities had its coverage reduced in the post cash and carry period. The other in the same community type however had the coverage of their catchment populations improved.

Both price and service quality proxied by supply of drugs were significant determinants of coverage. While price effect is negative, that of quality was found to be positive. It was found that coverage was not very responsive to price and quality changes in

the two periods. However the relative negative responsiveness of coverage to price in the pre cash and carry period was greater than the post period. The estimated short run price elasticity ranges from -0.16 to -0.22 in the pre-period and -0.05 to -0.07 in the post-period. That of quality ranges from 0.054 to 0.059 in the pre-period but reduces to 0.024 and 0.029 respectively. The use of only anti-malaria drugs yielded similar results. The offsetting effects in this case are however smaller in magnitude than the case when the aggregate supply of drugs was used.

The results suggest that patients will be more willing to pay higher fees in improved quality periods. This means that in the post cash and carry period the facilities can improve their coverage or prevent a likely drop in coverage if more quality indicators improve.

As the debate on the design of the national health insurance continues, it was necessary for this work to assess the willingness of patients to consider changing the current out of pocket payment system for drugs. Using contingent valuation techniques, 74% of the respondents expressed their willingness to join a pre-paid prescribed drugs scheme. Up to 50% of them were willing to pay ¢3000 ($1.3) as an individual monthly premium to join the scheme. This figure was on average about 54% of their monthly expenditure on health care and 1.48% of their monthly total expenditure.

It is estimated that their willingness to join such a scheme depends on their income levels, current drug expenses, educational level and whether an individual is a member of a resource pooling scheme. The willingness to join the scheme was positively related to Income, prescribed drug expenses and membership of a resource pooling scheme but it was found out that the less educated were more willing to join the scheme than the better educated. However it is noted that the premium levels increase with educational level. Income also raises the premium level but it is not as important as with the decision to join the scheme.

For example, when income increases by 50% there is a 4.8% increase in the chance for an individual to join the scheme. While there is 90.2% chance for an individual with a resource pooling scheme membership to join, there is about 67% chance for the others without such membership to join the scheme.

Concerning the level of premium, one has to look at the prescribed drug cost again, and also look at age, type and severity of diseases. For instance, the chances for people to pay premium up to ¢4000 increases but decreases afterwards as drug cost goes up. While there is 1.1% expected increase in the likelihood for people to pay ¢3000, there is an expected 4.8% likelihood decrease of paying ¢7000 when people's prescribed drug cost goes up by 20%. Also the people without malaria or with severe diseases are expected to pay higher premiums than those with malaria or mild cases of diseases.

6.2 Conclusion

The study re-emphasises the importance of drugs in the delivery of health care in the public health institutions in Ghana. The improved supply of drugs improved the trade-off between price and service quality on the utilisation of health services and there is high acceptance of pre-payment scheme for drugs in these communities. Policy makers and handlers of public health care institutions should therefore try to, at least maintain their coverage by removing the noticeable bottlenecks in the improvement of quality of care.

Since the idea of paying for these services by users has come to stay, the improvement in quality of care like drug availability has a big role to play in the delivery of health care in Ghana. There is also the need to minimise the effects of the noticeable bottlenecks in the

improvement of quality of care like management inefficiencies, under staffing in remote areas and the unfunctional credit facilities set up for the needy in society.

The designers of the National Health Insurance Scheme should make headway in implementing the programme by considering a simple and selective, but affordable package for drugs. This can at least serve as a start for the implementation of the policy that has remained a dream for more than a decade.

6.3 Study Limitations

How sensitive these results are to issues relating to management, equity and other demand and supply factors could not be assessed in this study. It is possible that these factors might affect the conclusions drawn here. Future research in this area should try to look at staff consumption of drugs, government re-imbursement fund for exemptions to the revolving drug fund, time lags for supplies to be delivered and how credit to deprived and other exempted patients are handled. Future research should also try to incorporate other quality indicators like the number of staff in the analysis to see whether quality can completely offset the effects of price on coverage.

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APPENDIX

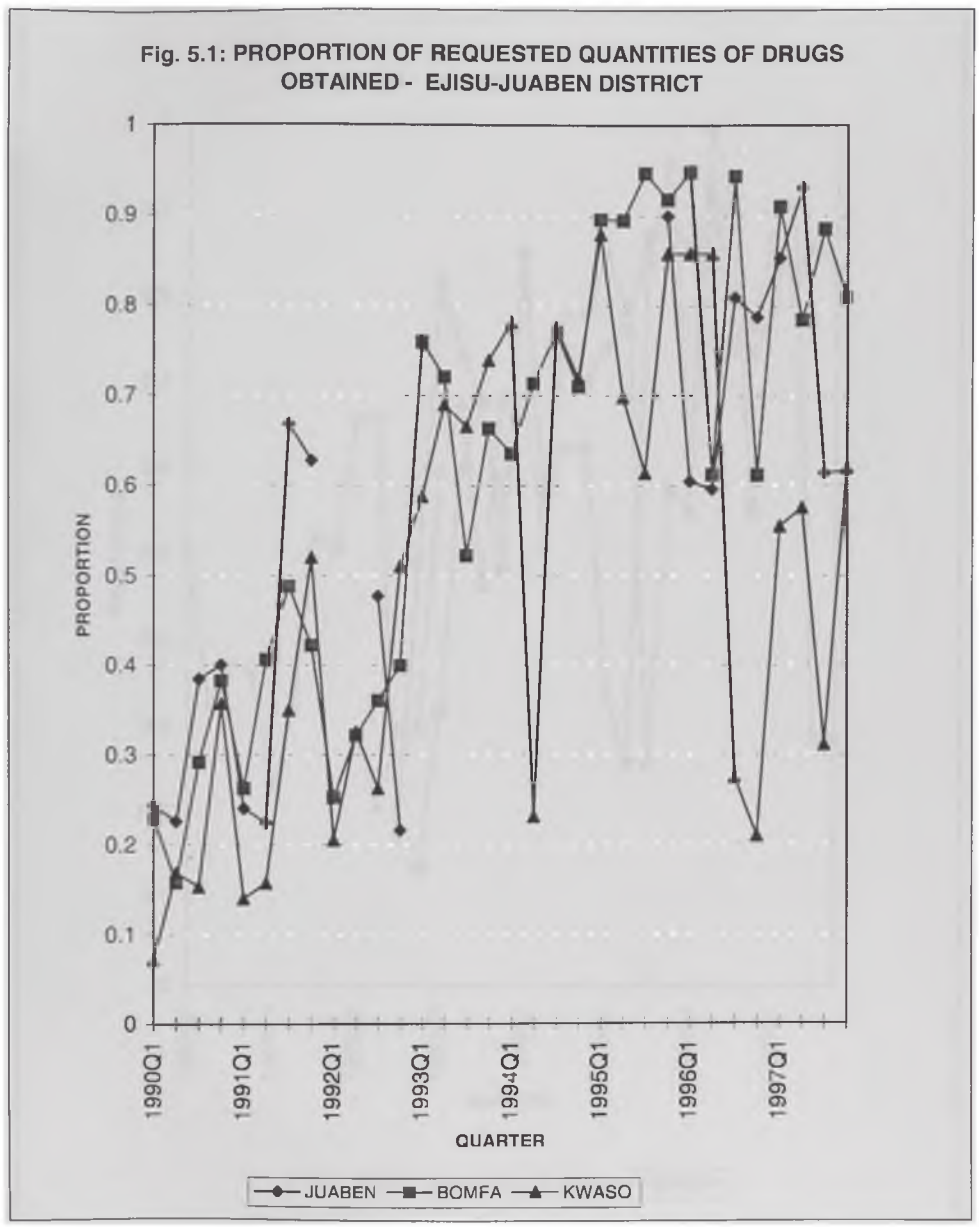

Fig. 5.2: PROPORTION OF REQUESTED QUANTITIES OF DRUGS OBTAINED - ADANSI WEST DISTRICT

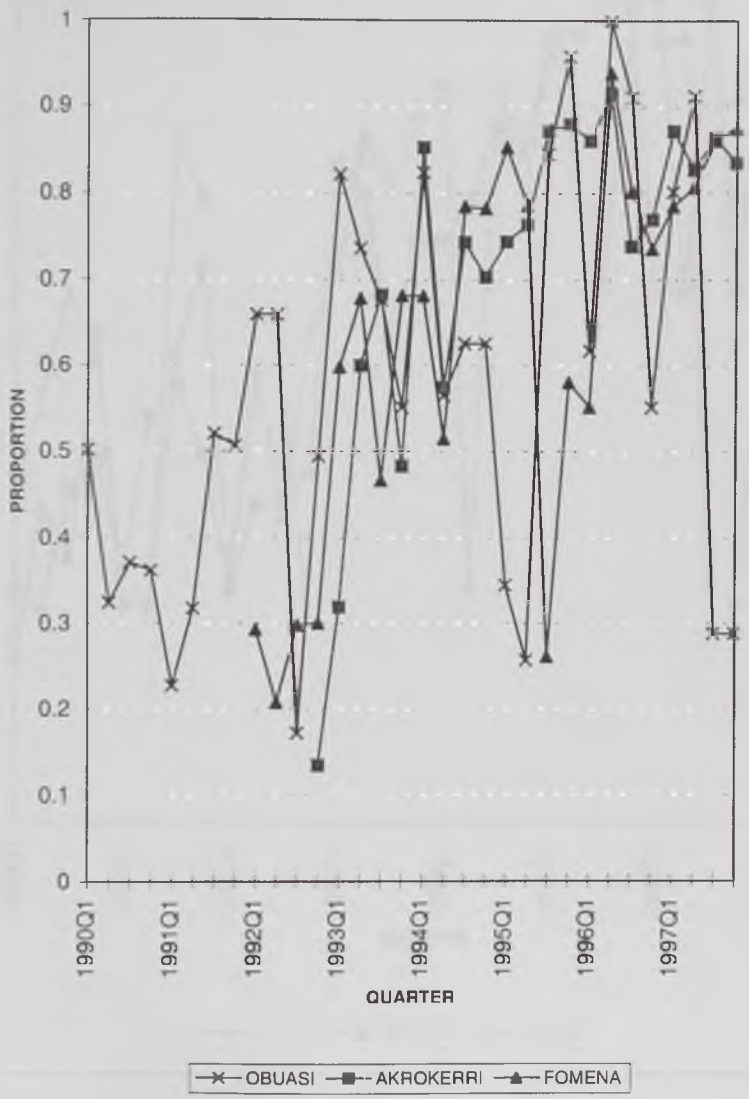

Fig. 5.3: PROPORTION OF REQUESTED TYPES OF DRUGS OBTAINED - EJISU-JUABEN DISTRICT

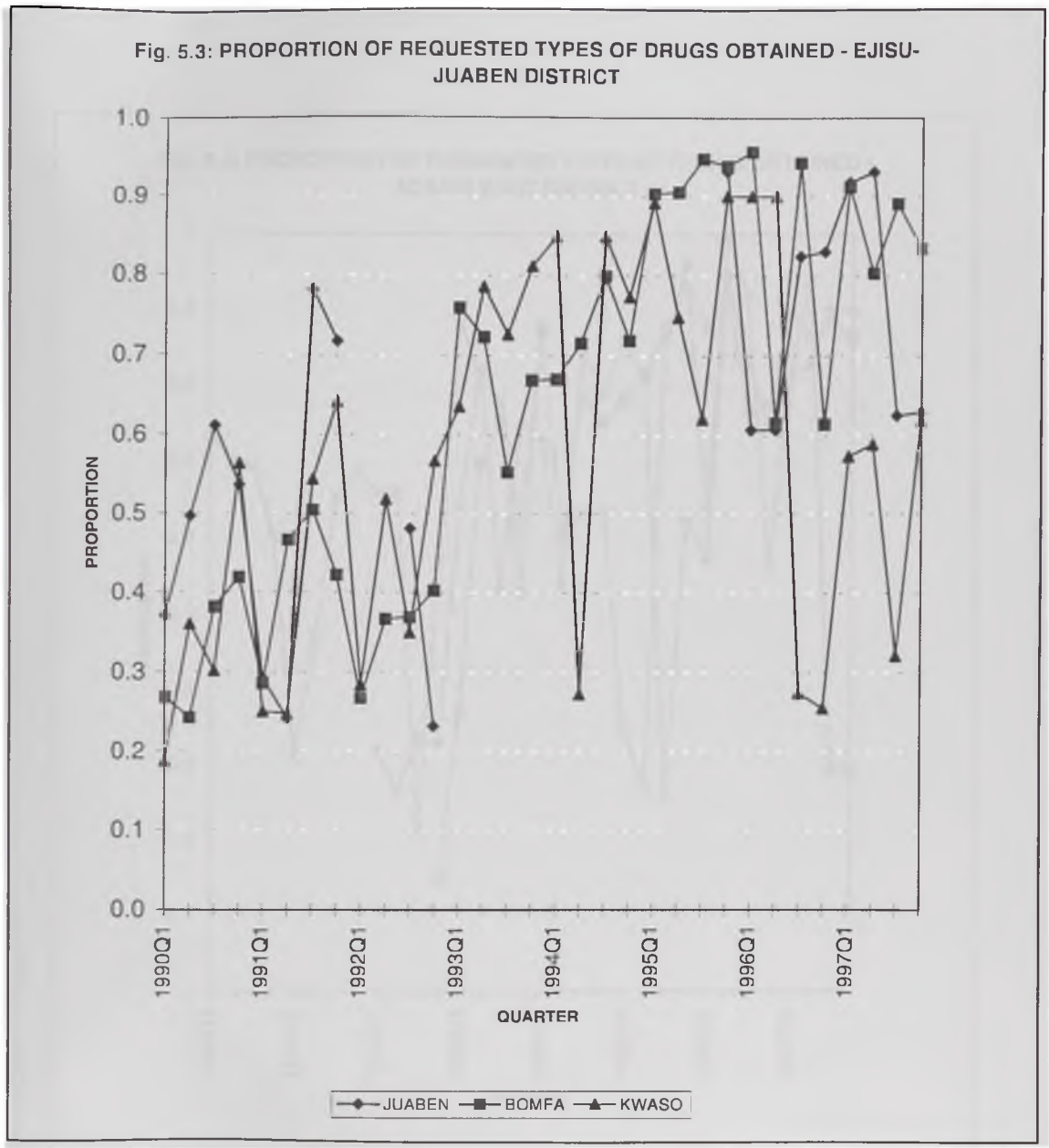

Fig. 5.4: PROPORTION OF REQUESTED TYPES OF DRUGS OBTAINED - ADANSI WEST DISTRICT

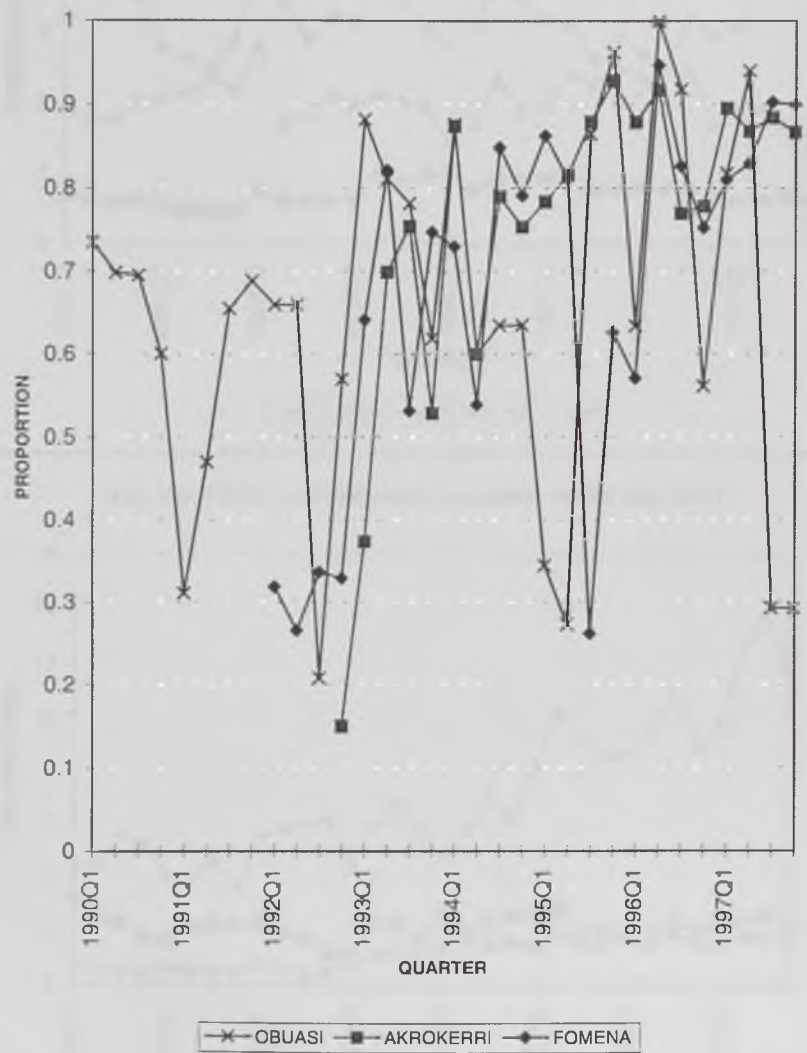

Fig. 5.7: TOTAL ATTENDANCE: EJISU-JUABEN DISTRICT

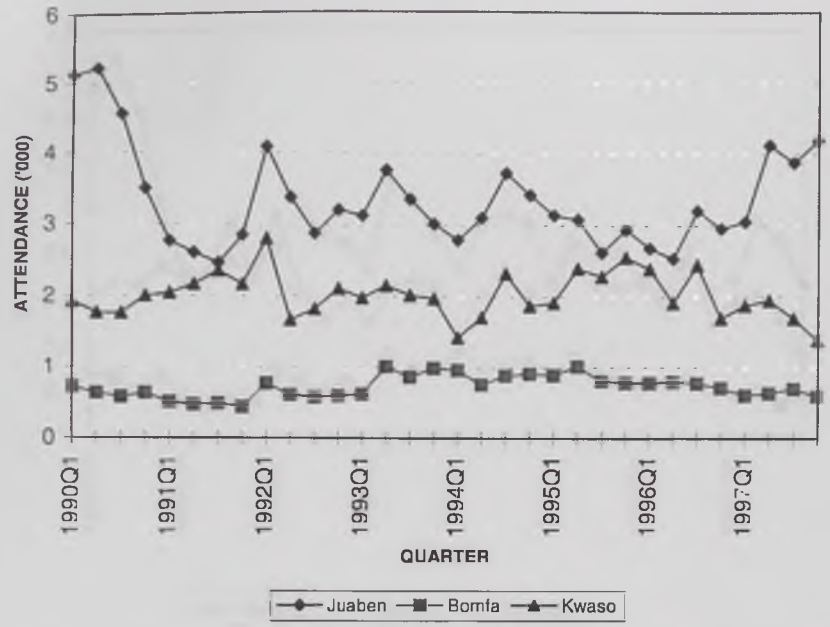

Fig. 5.8: TOTAL ATTENDANCE: ADANSI-WEST DISTRICT

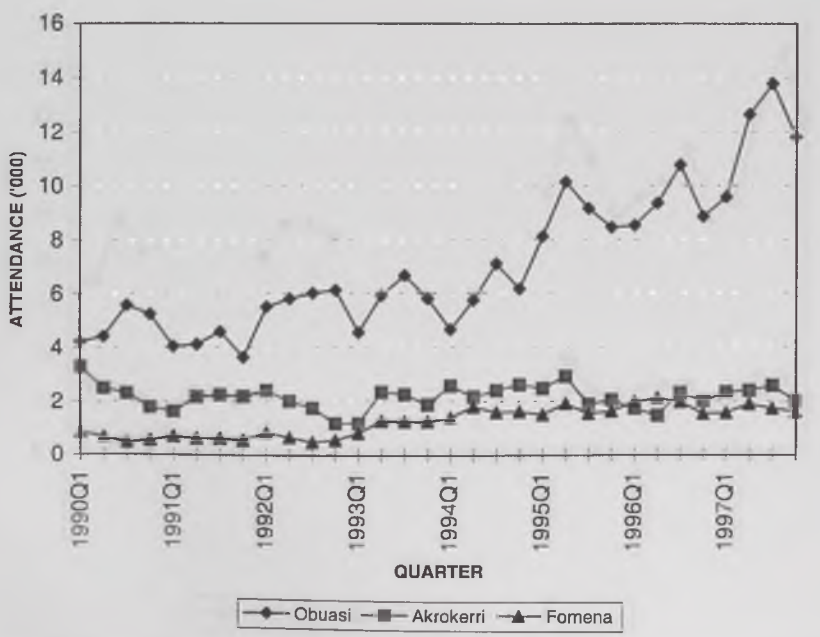

Fig. 5.9: UNDER 5 ATTENDANCE: EJISU-JUABEN DISTRICT

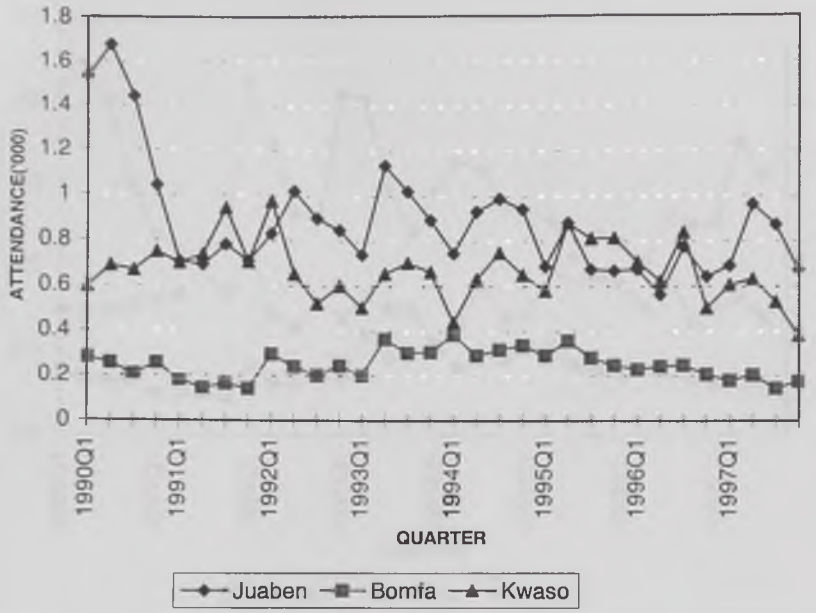

Fig. 5.10: UNDER 5 ATTENDANCE: ADANSI-WEST DISTRICT

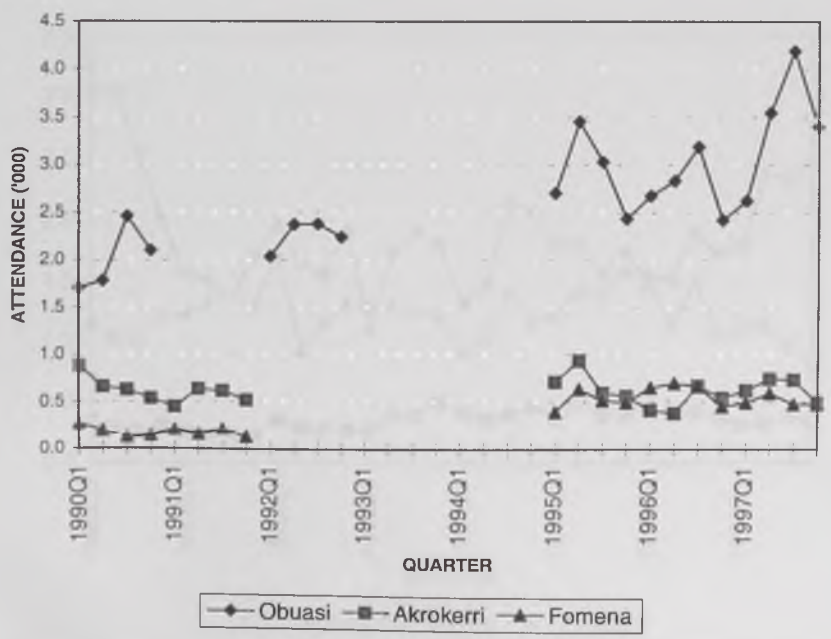

Fig. 5.11: MALE ATTENDANCE: EJISU-JUABEN DISTRICT

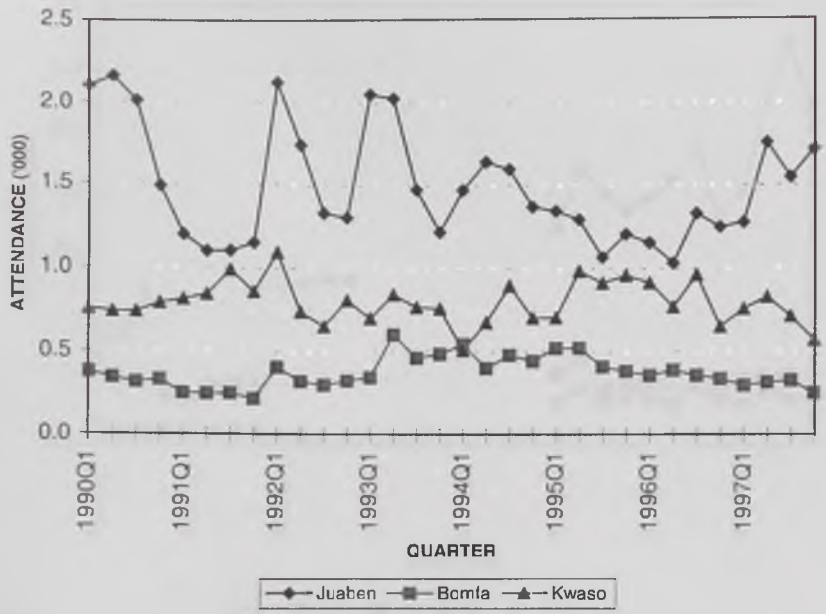

Fig. 5.12: FEMALE ATTENDANCE: EJISU-JUABEN DISTRICT

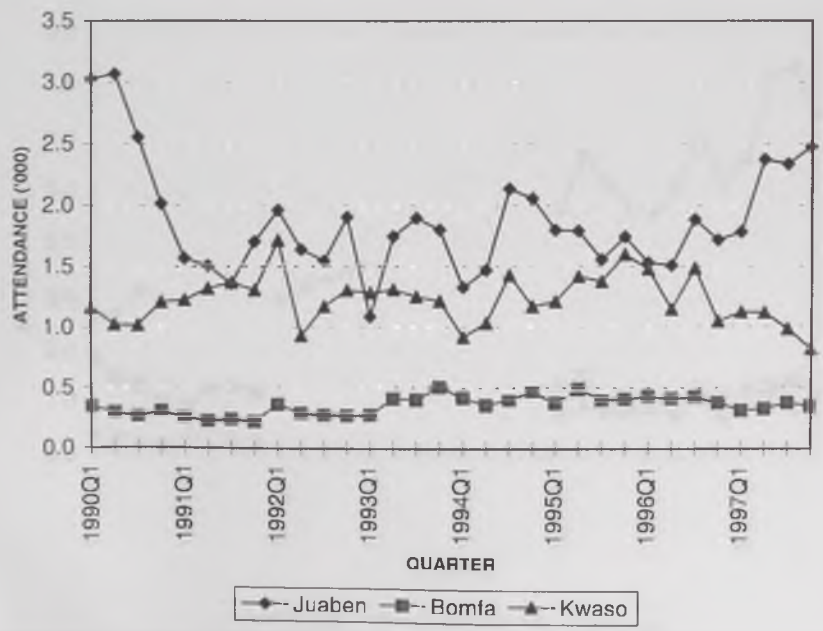

Fig. 5.13: MALE ATTENDANCE: ADANSI-WEST DISTRICT

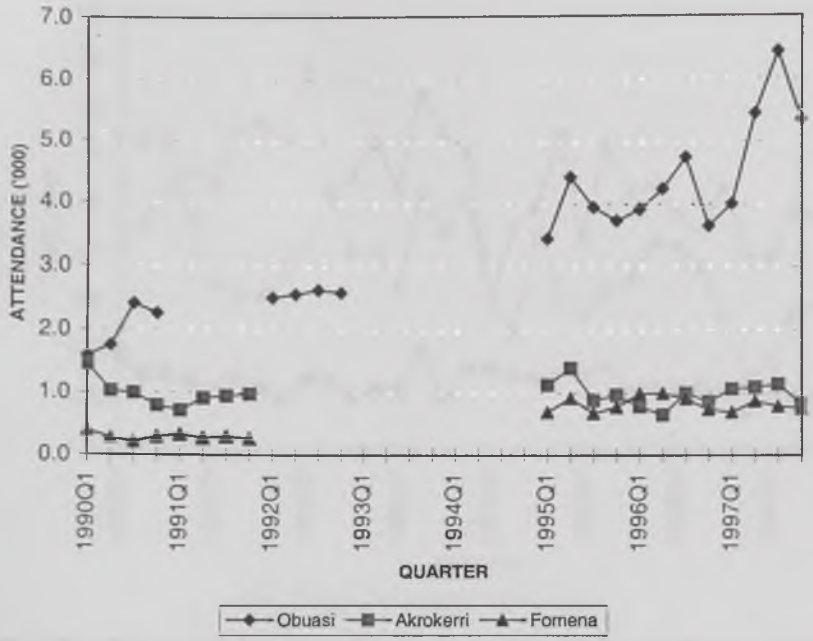

Fig. 5.14: FEMALE ATTENDANCE: ADANSI-WEST DISTRICT

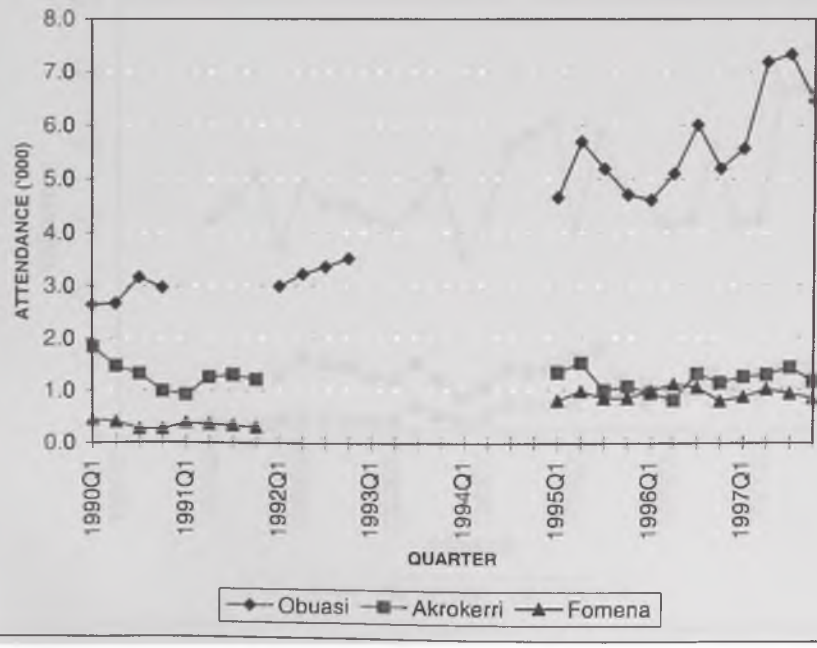

Fig. 5.15: MALARIA MORBIDITY PATTERN: EJISU-JUABEN DISTRICT

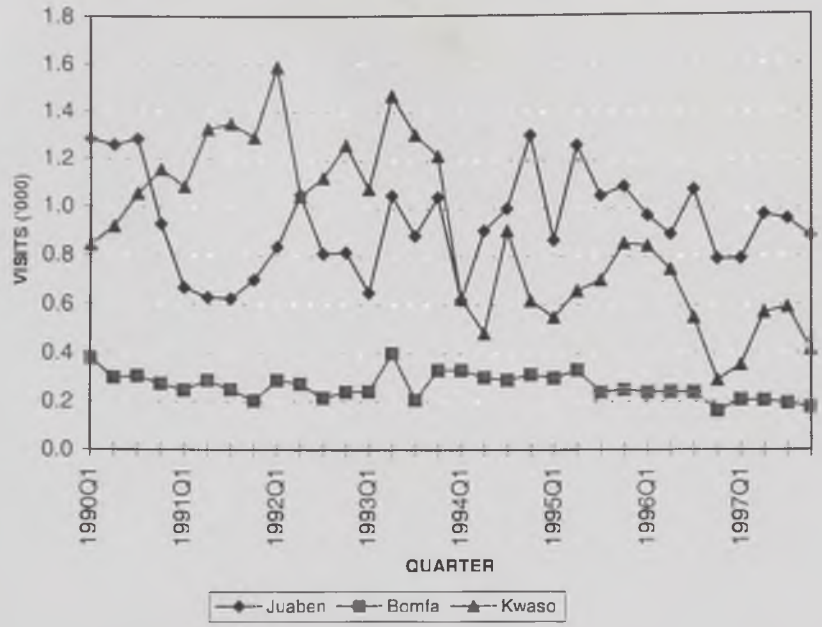

Fig. 5.16: MALRIA MORBIDITY PATTERN: ADANSI-WEST DISTRICT