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Sincerely,

EJE, Team

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ECONOMIC CONSIDERATIONS FOR THE OUTDOOR RECREATION

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Abstract

The objective of the present paper is analizes important aspects related with the economics of outdoor recreation. Many of these aspects depend on the understanding of the demand for such activity in general and for determined recreational sites. We considered the general issue of the optimal visitation level at a public parks and brought in the issue of congestion cost. Also, given the growth of the population and income, the paper focused on the ration use of public parks from nonfee and fee charge for entry. Then consider the relationship between prices and revenues. Finally, the paper ended syudying the ecotourism, incuding fee options, the possible ecological impacts and the distribution of the generated rent.

Keywords: Ourdoor recreational demand, congestion costs, efficient visitation level, rationing use

Introduction

In this paper, the objective is apply the economic analisis to get an interesting conclusions about the nowadays increasing sector of the outdoor recreational activities. Of course, in wide meaning, the outdoor activities include all leisure´s activities which the people hold outside of their house.[1] Nevertheless, in this paper the focus is those recreational activities where use intensively natural resources, such as forests, lakes, rivers, etc. Now, even there are no clear dividing line between resourse intensive activities and the opposite activties, it is reconizable that activities like picniking in public or national parks are closely linked to the quantity of the natural resources with which the visitors interact, than another activities such as jogging where in

[1] One goodreference about the issue is Jensen, Clayne R.

spite of use resources in certain level, the roads in it´s case, it does not imply direct demand for natural resources.

The interest of this paper in the outdoor recreational activities arise from the fact that, as could be seen in table.1 which treat as example the case of US, during the last decades there were evidently a quick growth of such activities in the most developed countries. Table.1 shows that excepting few activities all the others have been increased. Besides, during the last decades, there were a growing private markets dedicated to the outdoor recreasional activities. Such markets cover the hunting, fishing, skiing resorts, whale watching, etc. For this reason, in this paper arise the interest in the managing of the public reservations, the good roles of the public and private initiatives, and the managing problems posing for the specialized firms.

Table.1. Participating in outdoor recreational activities 1982-2000 (numbers in millions of persons)

Activities	1982	2000	% change (1982-2000)
Walking	93.6	173.7	85
Bird watching	21.2	69	225
Sightseeing	81.3	111.5	137
Hiking	24.7	69.2	180
Swimming (nonpool)	56.5	90.8	61
Picniking	84.8	114.4	35
Motor boating	33.6	50.6	51
Camping (developed área)	30	52.7	76
Boating	49.5	76.1	54
Camping (primitive area)	17.7	31.9	80
Outdoor team sports	42.4	45.4	7
Backpacking	8.8	22.4	155
Downhill sking	10.6	17.2	62
Water skiing	15.9	17	7
Snowmobiling	5.3	9.5	79
Cross-country skiing	5.3	8.1	53
Bicycling	56.5	80.8	43
Sailing	10.6	10.6	0
Horseback riding	15.9	20.3	28
Fishing	60.1	70.9	18
Hunting	21.2	22.8	8

Note: The table incudes the people aged 16 and more.
Source: USDA Forest Service, National Survey on Recreation and the Environment. 1982-2000. www.srs.fs.usda.gov/trends/nsrr/nsre.html. Accessed 3/12/2007.

The demand

Understand the demand for the outdoor recreational activities is necessary for different perspective. One of them, is to know the demand for

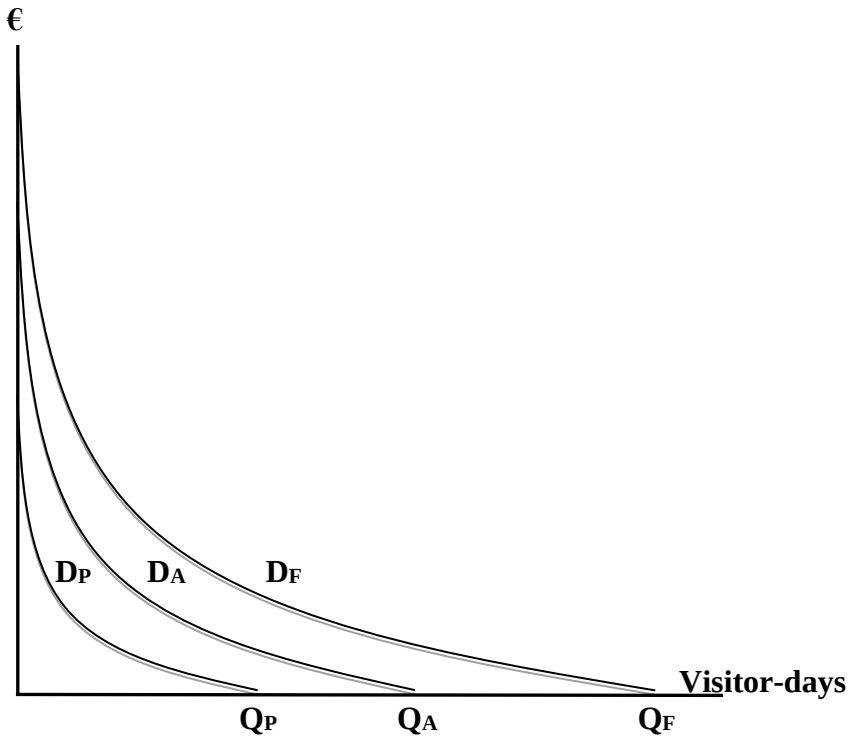
certain type of outdoor recreational activities among one group of people. For example for one company of Granada which is dedicated to the camping equipment it would be important the information about how the demand for backpacking by the residents of Granada (or all Spain, if it sells by mail-order or online) could be grow during the next years. Of course, studying the future growth of the demand could imply the need to estimate the impact of factors such as the growth of the population or the income, and another possible factors which could also determine how many people would engage in the activity. Then, the company might need to determine the implications of this demand growth for the demand growth of certain products it expect to sell. The perspective is interesting also to the public agencies and private individuals who supply parks and areas necessary for the backpackers to pursue their activities of recreation.[2]

One another perspective is what could be denoted as viewpoint of facilities management. For the in charged of, supposing, a particular park, it is necessary to develop a comprehension of the demand for the park facility which is affected by population, incomes, transportation services and the existence of other competing or complementary areas. A demand curve of the park is shown in figure 1. The horizonal axis has an index of visitor-days, defined as the total number of day-long visits (e.g., two half-day visits make one visitor-day). Note that this may be a significant simplification, since, many parks produce a multiplicity of recreational services, Those include day trips, overnight, longer visits, active recreational visits, sightseeing visits, and others. So, to have manageable study, it is better to boil all these down to one single variable, that is, the choice of visitor days. The vertical axis measure in euros the entrance price to visit the park. Now, even in many cases there are no entrance fee charge, but there are still other costs of visiting the park, specifily, the travel costs of getting there.

In the figure 1, each one of the curves represent different time. Each curve is aggregate demand constructed by the summing all the individual demands curves of the visitors of the park. Now, if we suppose D_P represents the past demand, for example of the past decade, and D_A is the actual demand, D_F represent the future expected demand, perhaps one decade in the future. The most important possible factors behind the shift of the demand curve are the growth of the population and the income, decrease of travel costs, build more and better roads, and change in the personal preferences in favor of the outdoor recreation.

[2] For an interesting article about the recreational demand preferences, see Daniel Wolf-Watz, et al. The article explores the linkage between nature-based recreation and preferences of individuals

Figure 1.



Naturally, in the absence of direct market, it is not difficult suggest the existence of these demand curves, nevertheless, in reality it is not equally easy measuring them or estimate how they have shifted along the time. In stead, the only what have been successfuly developed by the resource economists for assessing the recreational demand functions are techniques of indirect market-price, such as the travel costs as proxies for the normal market prices that are used in market demand analisis.[3]

Efficiency consideration

In case of areas operating by the private sector, supposedly the area will accepts a visitation level that maximizes the net income. Such level of visitation, to be socially efficient or maximizing the social net benefit, it should be exempted from externalities (environmental or nonenvironmental) arising from the operation, no free riders and that the public goods have standard conditions.[4] Nontheless, we will focus on the publicly supplied

[3] About indirect market approaches, see Barry C. Field; Paul Cameron Mitchell & Richard T. Carson.

[4] About optimal capacity of resource-based recreation, see Fisher, Anthony C., and John V. Krutilla.

outdoor recreational facilities, since along the history such was the general aspect of their supply, and most of the public facilities have not necessitated significant entrance fee. Following figure 1, if the entrance fee is zero, the past, actual and expected number of visitor-days will be respectively Q_P, Q_A and Q_F. Where Q_P is the historical number of one decade ago, Q_A of the actual year and Q_F represent the expected visiting level of one decade later. Evidently, the result could not be considered efficiently from the social point of view, since, such visitation rates do not cover the operating and maintaining costs of the park. This fact implies a disconnection between the people who pay for the park and those who use it. So, there will be no excuse to accept that the willingness to pay of the marginal user fits the real marginal cost of accomodating that visitor. Then one more possible cost which will not be covered through a zero entrance fee is the cost of the degradation of certain resources especially when the visitors number is big. The another reason for the ineficiente result, is the presence of the congestion externalities, since, if there is not entance fee, the situation will be of open access, which generally leads to use rate above the social efficient level.

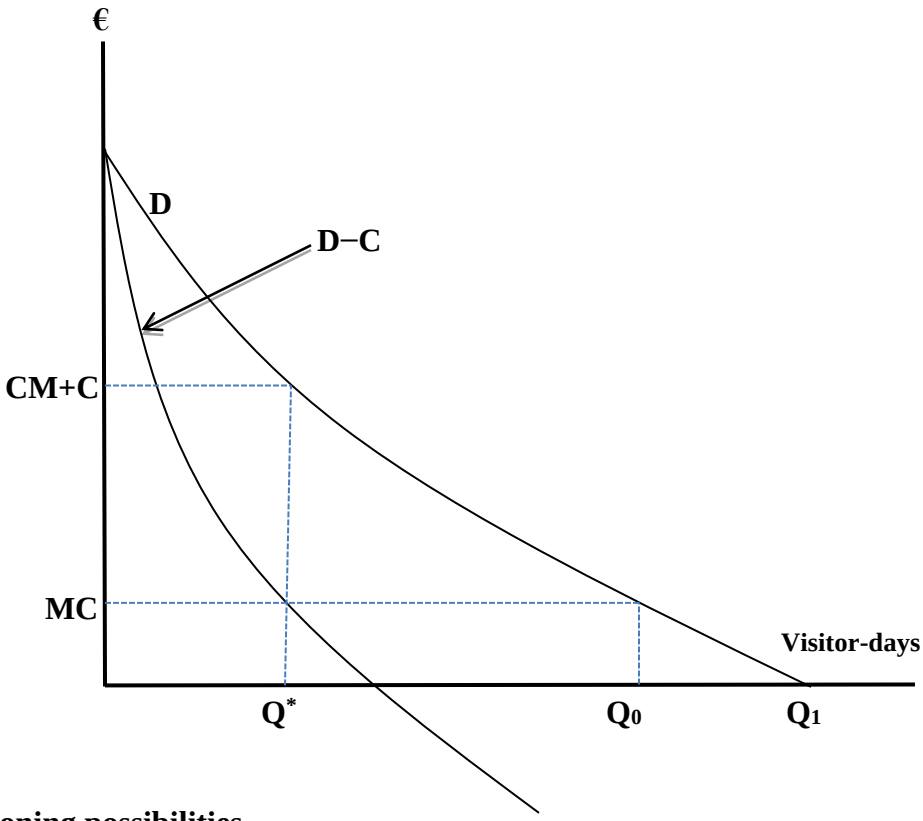
In many of the contingent valuation studies of willingness to pay for backpacking experiences, the possiblility of meeting another backpackers significantly affects the valuations showed by the respondents.[5] The quantities Q_P, Q_A and Q_F of figure 1 show an increase in the open-access use levels of the park and the congestion externalities tend to increase as the demand curve shifts outward, and finally when the visitors number becomes significantly high, might choke off any further increases in visitation despite increases in population and another factors. This situation could has been occurred in certain natural parks, when during the summer time the visitation rates can be so high that physical capacities are reached. Now, in many other parks where the visitation is bellow the maximum supportable level, question has raised about which is the optimal level and how could be achieved. The answer of such question could be met examinig the model presented by figure 2. In the figure we supposed D is the normal market demand curve of the visits to the public park, CM is the marginal cost of operating the park and we supposed constant. D−C is the demand curve minus the externality of the congestion cost. That is, the congestion cost of each level of visitation, as we supposed, is measured by the vertical distance between the curve D and the curve D−C.

Following figure 2, Q_1 would be the open access visiting level, Q_0 is the social optimal visiting level when there are no congestion costs, since it

[5] Regarding the negative relationship between the congestion level and the valuation expressed by the respondents, see Charles J. Cicchetti and V.Kerry Smith.

corresponds to the condition CM=D. And Q^* is the social optimal level of visitation when there are congestion cost. Now, according to D, to achieve Q_0, it would be enough fixing the entrance fee equal to CM and, according to D, to acheive Q^* the entrance fee should be equal to CM+C.[6]

Figure 2.



Rationing possibilities

As could be expected, in many recreation areas and public parks the open access causes overuse, congestion and often to the degradation of the natural resources in the área. So, for the managing agency which wish to limit the access till a level consistent with the social efficiency, or exclude all those who only would have continued the visits if the open access had maintained, it would be possible the consideration of several options. One of them is limit the entry to certain categories of people. For example many communities limit the access to the town beach only to the residents of the town. The second option is the first-come, first served. So, determine the desired level of the visitation on the first-arrival basis; when such level of

[6] In Hanley, Nick, W., et. al., found good economic treatment of the demand and other aspects of outdoor recreation.

visitation reaches, close the points of entry. The third possible option is charge fee for entry sufficiently that the visitation reduce till Q* of figure 2.

The two first options, which are nonprice based are usually accepted in the name of an equity objective, and normally imply certain amount of wealth distribution, since if the coste of operating the park is not covered by the visitors, it should be attained by other means, for example general tax. This involves that some people will participate in the parks cost and not enjoy their services. Of course, it is posible use the two first options in combination, admiting only the residents of the twon up to certain máximum.

The third option absed in entrance charge to ratinoning the use, historically it has not been commonly used given the consideration of the provision of public parks and reservation as an important part of the civic life and cultural identity, so should not be submited to the market force. Nontheless, this idea is changing for some factors. One, is the need of revenues to cover the costs of park areas. Another factor is the increase of the ecotourism. The third factor is the fast increase of the privately produced outdoor recration. And the last factor, beside the increasing interest in protecting the resources, is that entry price and the revenue generated can permit the expantion of the park system and reservations quantitively and qualitatively.[7] But, as can be seen for example in the conference paper presented by Aldo Leopold, this is not means that all the opposition to the entrance price has disappeared. These different positions regarding the entrance fee, in practice, led to the application of entrance fees which are too low for social efficiency if congestion is included and possibily too low to protect ecosystems. Eventhough fees create a revenue, the another justification of the entrance fees is to ration the use of scarce asset and to make sure that people who visit the parks are those who value more the experience than the people who do not visit.

Revenue and prices

In reality a major rationale for the entry fees is to raise revenue, therefore it become importante analize the connection between revenue and the charged fees. Given the demand function, there are certain revenue for each price. Then, given the elasticity of the demand, an increase of the price by one quantity can lead to increase or decrease in the total revenue. The máximum revenue arrives when the demand elasticity is unitary. Above that

[7] In 1995 Congress of USA enacted the Recreation Fee Demonstration Program, which allowed some federal agenceies, such as the National Park Service, to charge entrance fee. In 2004 this was repassed by the Federal Lands Recreation Enhancement Act (REA), which extended for another 10 years the authorization for entrance fees. The types of entrance fees used, for example, included the entrance fee used by the National Park Service (NPS) and Fish and Wildlife service (FWS).

the demand become elastic, so price increses reduce the revenue and bellow that the demand become inelastic so price decreases also reduce the revenue. According to this fact, the prices which lead to maximize the revenue of the visitation of pubic parks are those corresponding to the point where the demand elasticity is unitary. The figures seen in table.2 show the results of a research which undertook to investigate the demand for visitation at three national parks in Costa Rica and the results of fixing different entrance prices.[8]

Table.2. Entrance fees of national parks in Costa Rica (all monetary values are in dolars)

	Parks		
	Volcán irazú	**Volcan Poás**	**Manuel Antonio**
Current fee	12.28	9.85	9.56
Length average of visit (days)	1	1	1.45
Willingness to pay for a visit	21.75	21.60	24.90
Fee that visitors think would be acceptable	6.48	6.77	7.37
Demand elasticity	-1.05	-2.87	-0.96
Current total revenue (1994-1995)	427,307	669,940	431,371
Entry fee of maximizing revenue	7.06	9.28	13.59
Expected total revenue if revenue maximizzing entry fee has been applied	1,372,844	675,447	518,187

One interesting result of the table is that the demand elasticity is not equal for the three parks, and the current fees in the first and third park are quite different comparing with the fees of maximizing revenue.

Source: Lisa C. Chase, David R. Lee, William D. Schulze, and Deborah J. Anderson, "Ecotourism Demandand Differential Pricing of National Park Access in Costa Rica", *Land Economics, 74 (4), November 1998, pp. 466-482.*

It should be emphasized that maximizing total revenue is not necessarily recomanded as a good strategy for national parks, forests and another reservations, since, social efficiency requires the maximization of the net benefit, so the prices which maximize the net benefit may not be those which maximize the total revenue. One important reason of such difference, is that the environmental costs should be included when determining social efficiency. They can or can not affect revenues in a consistent way. Thatis, if willingness to pay of the visitors includes the environmental quality of the sites so the environmental degradation affects the demand, then the environmental costs could be totally deducted from the revenue. Nevertheless, visitors may not necessarily be aware of the ecological

[8] About national parks of Costa Rica see (http://www.gemlab.ukans.edu/cr).

disruption, therefore willingness to pay may not be an accurate reflection of the environmental status of the park or the reservation.

Another important aspect to take into account when fixing the access fees, is that parks and reservations generally exisit as system, since states have numerous parks and they like to manage in coordinated way, as does the central government with its network of national parks, forests and monoments. In simiar situations may be it is not proper to price each one independently in an attempt to maximize its own total revenue. Prices at the different reservations should be fixed in coordinated way, given the interrelationship among their demands.

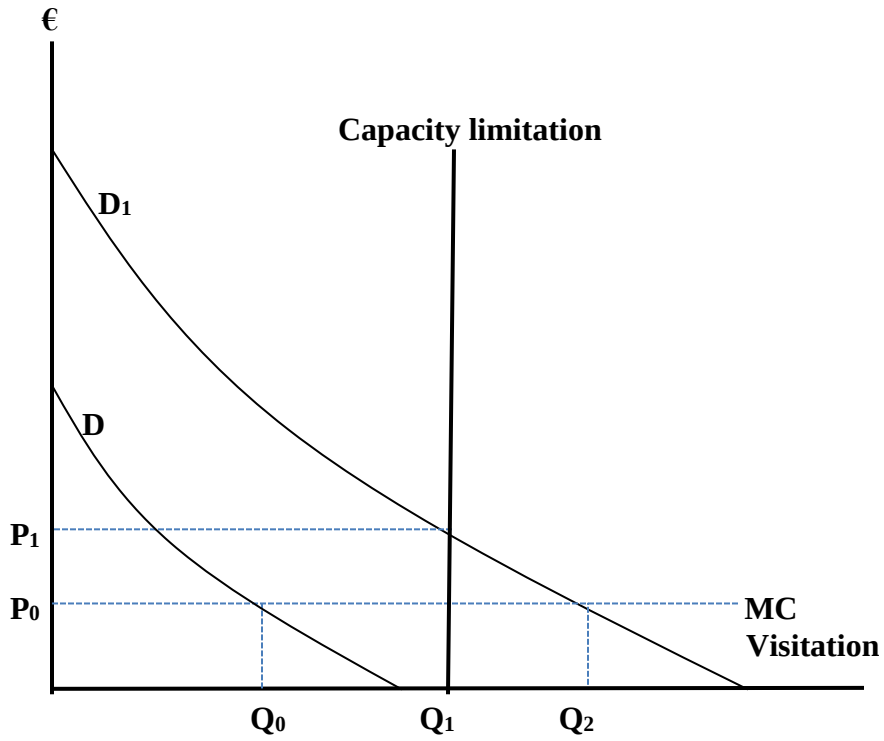
Price selection

It is obvious that the real world is more sophisticated in comparision with the simple models, since not all visitors have equal preferences and consequently their willingness to pay. So, this leads to the question of, for efficiency and/or equity criteria, when is more conveniente the application of equal price and when the different prices. For the answer, first, we should consider the fact that the willingness to pay is higher during the weekend than during the weekdays. Then, different visitors of the same park engage in different actvities, and not all parks are equal en evironmental value or in their closeness to the urban aera. Therefore, to answer the previous question about the preference between equal price and different prices, we can develop some understandable simple principles to help for considering the issue. The first principle is that if the individual demands have different elasticity of demand and the marginal cost, MC, is constant, and there are no congestion, the overall social efficiency requiers simply the achievement of the condition MC=marginal willingness to pay of each visitor. This is obtiened by setting P=MC. In this case the social net benefit and/or the agrregate social surplus is maximized. Now, if the MC of serving the different groups is different, achieve the social efficiency requires different prices for the different groups. That is, P=MC for each subgroup, so, charging higher price for the group of higher MC. An possible example of this case of different MC is that rock climbers need higher costs than picnickers given the necessity for closer supervisión, medical attention, etc.

Certain parks have limited capacity, such as campsites or visitation levels where congestion problems start appear. As seen in figure 3, to expose the case we suppose the simple example of one park with constant MC, a number of camping sites indicated as Q_1 and two demands, D for weekday visitors and D_1 for weekend visitors. D_1 is bigger than D given the more availablity of time on weekends. In this case efficiency needs two prices. P_0=MC for D, which leads to an average of weekday visitation of Q_0, and P_1>MC for D_1, which leads to Q_0 average weekends visitation. For D_1 can

not apply P_0, because it leads to the demand of Q_2 which is higher than the park capacity. Also, P_1 guarantee that the visitors will be those who value most the visit.[9]

Figure 3.



Ecotourisim and natural resources

Here we refer to the ecotourism which in our modern time is growing increasingly. Such tourism is that where the visits are linked in certain manner to the natural or environmental resources. Now, even the ecotourism includes also national component, but possibily it has more reference to international tourism, especially that from the industrial countries to the developing countries whose endowments are uniquely the natural resources. In certain locals the ecotourism is seen by the people as essential factor for pushing the economic progress, since as stimulus it can lead to increase the value of the natural assets which before were out of the markets and in this way encourge people to put more interest on their conservation. Now, if the tourism increase the value of the natural resources there will be less reasons to deforest them and/or converting them to agricaltural land or pasture.

[9] For information about outdoor recreation see (http://www.gorp.com).

Now, regarding the ecotourism, if fees such as that for wildlife tour or park entrance are used to increase the revenue or to protect the resourses from the overuse, then knowing the demand function is also necessary. This need, which faced all along the private firms in the tourism sector and they have supposedly got the necessary knowledege to continue in the market, nevertheless, such obligation is comparatively recent for the public sector, since in the last case, historically the access right has been decided by politicians and who at the same time was the in charged of the pricing. The problema is not simple, because the countries try to reserve many resources which are significantly different in term of types of resources, clientele and objective.[10]

But, besides the positive aspects of converting the resources areas in sources of income through the ecotourism, it is necessary to highlight one possible inconvenient. That is, opening up resources to touristic impact, particularly the resources which are ecologically sensitive, could reduce them quantitatively and/qualitatively in the long run. A great wish to get revenues could lead to excessive visitation comparing with the long run sustainable ecotourism.[11] Nevertheless, most ecotourism activity is conected with the biological resources, so the question which comes up is about the efficient stock of the resource when used as ecotourism resource. In reality all levels of tourism affects the quantity and/or the quality of the resource. The appropriate quantity and quality of a natural resource submitted to ecotourism will be different from what it would be if there were no tourism. The difference will depends on the trade-off between the value of the biological impact and the economic value of the ecotourism. Adding to that, many ecotourism plans have been undertaken as stimulus to economic progress, which if succeed might become less resource dependent. This should raise the possibility that the efficiente stock of the ecotourism resource is not fixed, at least so far. Since, comparatively, economic progress may call for high use in the short run and less in the long run.

Apart from the previous aspects, it is important have in consideration the institutional elements involved in the management of the ecotourism. One very important is the balance that is necssary to be established between the private and the public sectors. In Spain, as many another countries central or regional governments are directly intervene in the management of the access to national parks, wildlife refuges, etc. In certain cases, such as wildlife in Africa, private companies have established to manage the

[10] A good exposition of these differences in term of Categories, Objectives and Criteria for Protected Areas can be seen in International Union for the Conservation of Nature (IUCN); J. Mackinnon et al., and Gardner Brown.

[11] About the sustainable ecotourism see Erlet Cater and Gwen Lowman.

ecotourism activities in the market setting. In some cases units of local government function en certain senses as private companies in operating local ecotourism. This is the case of what is known as Campfire (Communal Areas Management Program for Indigenous Resources) in Africa allows local communities, acting collectively, to benefit by selling access to local wildlife resources to the operators of safari.

In any particular case, the preferable institutional arrangment should depends on the characteristics of such case. That is, the resource implicated and the political and economic conditions of the countries. Nontheless, certain general criteria may be possible. When the Ecotourism is based on market principles, the supply should be directed at the demand of the ecotourists. Not all resources that are valuable in cerain biological term are valuable for the tourists. In similar cases, it is important that economically significant resources not be favoured to the detriment of less significant, but ecologically important, resources. When decisions are left to the private sector, this problem is known as negative externality or negative costs. On the contrary, when, decisions are taken in the public sector, that is, by public agencies that are responsible for the ecotourism resources, may be made according to the narrow political interests of those in power, at the expense of other values which could be important for the whole society. From the other side, one more important institutional element is the distribution of the resource rent. In this sense, if the ecotourism is undertaken for the economic progress, it obviously make a difference who recieves the generated rents. If the state recieves them, they are used for objectives that politicians and state planners think to be necessary. If the local individuals recieve them, they may be spent on different products. Besides, in many ecotourism plans the reason is to provide stimulus to conserve the resources in consideration. If this succeeds, the rent should be recieved, at least in large part, by those of the local population who have the power of conserving the specific resource. Therefore, one very effective policy to protect the public ecotourism reservations from the deforestation or poaching by the local people, is possibly giving them one part or another of the generated rent.[12]

Conclusions

Given the quick growth during the last decades of outdoor recreation together with the corresponding private markets and the increasing concern about the environment and the the depletion of the natural resources, the aim

[12] Regarding the information about national parks, visitation, forcasts and impacts on local communities, see National Park Service, Public Use Statistics Office (http://www.aqd.nps.gov./stats). For information about ecotourism see (http://www.ecotourism.org). And about Ecotourism Management, see Lindberg, Kreg.

of this article is to analize the important economic aspects of the outdoor recreation which are resource intensive. The reason of such study is to understand the necessary condition for the efficient management of the outdoor recreation activities.

Now, for the efficient management of the outdoor recreation, it is indispensable the understanding of their demand, since the information about the demand is valuable as much for the private companies of the related market as for the public agencies.

Regarding the efficient level of visitation, such as in the park case, this is not results the same when the resource is managed by private sector instead of public one. So, when the objective of using the resource is satisfying the social efficiency, understand the difference between the private and public management results important for the pricing policies. However, when congestion externality is presented, the socially efficient level requires higher entrance fee and consecuently less quantity of visitors. To limit the access, in addition to the application of a positive entrance fee, there are also nonprice based options available for the managing agencies. Eventhough, recently, the consideration of a new concerns is justfying the more preference of the price based entrance. That is, besides the creation of the revenue, the another justification of the entrance fees is optimizing the use of the scarce asset and to make sure that people who visit the parks are those who appriciate them more than the others.

Even the revenue maximizes when the elasticity of the demand is unitary, however, the entrance fees which maximize the revenue are not necessarly coincide with those which are socially efficient, because, the social efficient fees are only those which maximize the social net benefit. Such distinction is particularly important when the visits involves environmental degradation which, by turn, leads to a difference between the total revenue and the social net benefit.

To fix the recomendable entrance fees when there are different grupos of visitors with a different demands, the application of different prices is prefered above the equal price when the marginal coste is different among the different demandas and also, when certain demandas exceed the maximum visitation capacity of the corresponding area.

When the ecotourism used by the countries to help the economic growth, it could increse the value of corresponding natural resourses and in this way can help to improve their conservation. Now, when the application of fees for ecotourism are aimed to increse the revenue or to improve the conservation of natural resurces, the information about their demand result important. The efficient conservation management, also has to take in consideration various affecting intitutional aspects.

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DOES FOREIGN AID PROMOTE TRADE? EVIDENCE FROM SOME SELECTED AFRICAN COUNTRIES

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Note This Paper is part of my PhD Dissertation deposited on AISBERG repository Bergamo University Italy I also acknowledge the useful incites from members of faculty of Economics and Mathematics. The views expressed in the paper are solely those of the Author.

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Abstract

Will aid given to specific sector promote growth? Will bilateral aid be more effective than multilateral aid in export promotion? This paper fills a gap in the literature by studying the implications of aid channeled specifically to trade and export oriented growth. Many African Countries look towards increase in trade driven growth as a means of improving living standards and boosting growth of their economies. Aid given to trade in desperately poor countries can be of tremendous advantage to such countries. We investigate some peculiar components of temporal self limiting aid (often referred to as development assistance) to sectors that can affect trade in developing countries. Aid to four sectors was found to have significant impact on trade although the presence of natural resources tends to reduce the effectiveness of aid in promoting trade. Institutions and government economic policies were also found to be weak in the African countries in our sample reducing aid overall effect on trade.

Keywords: Foreign Aid, Government Economic Policy, Institutional Quality, Trade
JEL: F13, F16, O24.

1.0 Introduction

The International Trade Centre (ITC) taskforce report 2010/13 states that global markets and export oriented growth are an effective way of alleviating poverty, improving livelihood and supporting entrepreneurship in a sustainable way. The Millennium Development Goals (MDGs) Gap taskforce report 2010 have also confirmed that "trade is a useful mechanism

to realize the MDGs by the 2015 deadline" therefore trade is vital in driving growth. Studying aid-trade dynamics in this paper[13] provides an insight into the possible effects that aid can have on trade with particular emphasis on Africa.

Exports (as a measure of trade) can have a strong effect on the living conditions of people in advanced countries where strong trading capabilities have already been attained and in developing countries that are emerging from economic and political disruptions who wish to establish strong trade ties (see ITC Trade Report 2010/2013 and DFID (Department for international Development) Strategy Report Working Paper on Economic Growth 2008/2013). Exports also has the capability to increase employment, improve earning power, raise government revenue to provide more services to its population, provide economic empowerment for the poor through commerce and deal with environmental and climatic problems, if the gains accruing from exports are used for common good (see International Trade Centre (ITC) Taskforce Report 2010/13 for details).

Africa's per capita GDP is also significantly low and that is why it remains the World poorest continent (see World Bank Statistics 2012). The African economy requires a strong industrial effort to drive it out of its current economic doldrums. The richest countries in Africa based on World Bank 2009 statistics are South Africa and Egypt, (measured by their purchasing power parity) with South Africa's GDP being around $488.6 billion as of 2009, see Economic Watch "An African Economy Overview" (2010), however many African countries remain extremely poor. Foreign aid given to these poor countries can have strong effects on the economy of these countries (particularly in sub Saharan Africa), especially in circumstances where it consist of a significant percentage of their national budget or gross domestic product. If the reason behind giving foreign aid is purely altruistic, then foreign aid can have a positive impact on the recipient country's development, if well utilized.

The aims of this study is to identify what components of foreign aid (channeled to trade) is useful in promoting productivity and increasing trade in developing countries by dividing aid into sectors, and secondly to determine what the impact of government economic policy and institutional quality is on aid effectiveness in Africa? Previous papers have estimated reduced forms equations of trade aid dynamics they find that country specific economic and social variations and its proximity or distance to both local and foreign markets have a significant effect on trade (particularly exports)" see Morrissey, Osei and Lloyd (2004). In this paper it is assumed that aid is

[13] I wish to express my thanks to Bergamo University Italy for funding the course of this research and for the guidance and feedback obtained in writing this paper.

endogenous. The reason for this is that aid is likely to suffer from measurement problems since the data for aid might not capture all aid flows to developing countries for instance.

The econometric approach we use in the study is instrumental variable estimation, this allows us to control for endogenity. Aid to sectors was found to have little or no significant effect on trade using OLS, and it has a somewhat increased effect in sectors using two stage least squares. Lots of literatures have argued that aid is useful, while others have suggested that giving aid does not help developing countries achieve economic growth. Some papers e.g. that of Jempa (1991)[14] examine vast literature on foreign aid and finds that foreign aid has the tendency to overshadow private savings, contribute to consumption spending and has no significant impact on a country's growth. Others like Boone (1994, 1996) find out that aid has no effect on investment.

Burnside and Dollar (1997) also find that aid is only beneficial to countries that have good policies in place. Other authors have found some similar inconclusive results regarding aid and growth (see Bourguignon and Sundberg, 2008; Douclouliagos and Paldam, 2007). There is also, conflicting evidence that aid may have a positive impact on growth (Gormanee et al, 2003; McPherson and Rakowski, 2001). In addition to endogeneity, Svensson (2000) finds that disaggregating aid into sectors is a more promising route in trying to identify the effects that aid can have on a developing country. Clemens et al (2004) uses sectoral aid and finds a positive short-run effect on economic growth and that institutional factors may impact the effectiveness of aid. See Renzio (2006) or Jensen (2008) for a review of aid literature. The rest of this paper is divided into five parts, the theoretical part, data description, some constraints to trade in Africa and index construction, empirical analysis and conclusion.

2.0 Theory and Methodology

The theoretical model we present suggest that some specifically channeled aid can influence exports, the simple export demand model as developed by Fontagne et al (2002)[15], used by Morrissey et al (2004) and Cali and Velde (2009), shows the possible effect that aid can have on trade. If we assume a situation where each country produces one good, differentiated from the others as a result of its place of production (origin), with the supply of each good constant and consumers having identical and

[14] Jempa, C. (1991) suggests that foreign aid in most cases does not contribute in a significant manner to a country's economic growth.

[15] The model first developed by Fontague et al (2002) describes the role of country specific effect particularly infrastructure in determining trade cost. We extend this model to the private sector and show how aid will affect factors of production such as cost of capital, labor and cost of developing a suitable environment for trade.

homothetic choices which is represented by a constant elasticity of substitution (CES) utility function. The overall utility function of individuals in a given country k can be defined as a sum of the utility function of individuals in country i. we represent this in equation 1 below as

$$(\mathbf{1}.) \qquad \boldsymbol{U_k} = (\sum_{\boldsymbol{i=1}}^{\boldsymbol{N}} \ \boldsymbol{\varphi_i}^{\ \frac{\mathbf{1}}{\sigma}} \ \boldsymbol{C_{ik}}^{\ \frac{\sigma-1}{\sigma}} \ )^{\frac{\sigma}{\sigma-1}}$$

Where σ = elasticity of substitution of all goods and services, this can be defined as the share of goods and services from country i expended upon by individuals in country k,

C_{ik} = the value of consumption of the goods produced in country i by individuals in country k, φ_i = share of goods produced by country i, expended on by individuals in country k,

where k ϵ [1, N] this subject to the budget constraint that the value of goods and services consumed by individuals in country k, needs to be equal to the total national income of country k. The income of country K is given as shown in equation 2 below as

$$(\mathbf{2}.) \qquad \boldsymbol{y_k} = \sum_{\boldsymbol{i=1}}^{\boldsymbol{N}} \ \boldsymbol{C_{ik}} \, \boldsymbol{P_{ik}}$$

Where P_{ik} =is the price in importer country k of goods produced in exporting country i

P_i is expressed as the supply price of the exporter i

Then therefore $P_{ik} = P_i \, \tau_{ik}$ where $\tau_{ik} \geq 1$ which is the exporters price times the cost of transaction

This will capture all types of trade related transaction cost for example potential tariffs and import taxes, likely administrative cost of trade, , transportation to ports and other local and international market destinations etc see Cali and Velde (2009) for further discussion. After maximizing eqn.1 subject to the budget constraint in eqn. 2 the real consumption C_{ik} with respect to import of goods from country i by country k is given below as in equation 3 below

$$(\mathbf{3}.) \qquad \mathbf{C_{ik}} = \frac{\boldsymbol{\varphi_i} \, \boldsymbol{Y_i}}{\boldsymbol{\tau_i} \, \boldsymbol{P_i}} \left(\frac{\boldsymbol{\varphi_i} \, \boldsymbol{Y_i}}{\boldsymbol{\tau_i} \, \boldsymbol{P_i}}\right)^{\mathbf{1-\sigma}}$$

The constant elasticity of substitution can be expressed as the likely trade cost in exporting to country k this can be defined as an index of how far in terms of distance, that country k is to country i, given by the distance factor. The distance factor can be defined as how remote goods from country i are from the market of country k. We express it in terms of remoteness in eqn. 4

$$(\mathbf{4}.) \qquad \mathbf{R_i} = (\sum_{\boldsymbol{i=1}}^{\boldsymbol{N}} \ \boldsymbol{\varphi_i} \ \boldsymbol{\tau_i}^{\ \mathbf{1-\sigma}} \ \mathbf{P_i}^{\ \mathbf{1-\sigma}})^{\frac{\mathbf{1}}{\mathbf{1-\sigma}}}$$

country's k income can be expressed as $y_k = P_k \, Q_k$. which is the price multiplied by quantity consumed. The total export from country i to country

k can be given as X_{ik} expressed below in terms of the exporting price and the total consumption in k of country i goods and services.

(5.) $$\mathbf{X_{ik} = C_{ik} P_i = \frac{\varphi_i Y_i}{\tau_{ik}^{\sigma}} \left(\frac{R}{P_i}\right)^{\sigma-1}}$$

The total exports from country i can also be expressed as

(6.) $$\mathbf{X_i = \frac{\varphi_i}{p_i^{\sigma-1}} \sum_{k=1}^{N} \frac{Y_i \; R_k^{\sigma-1}}{\tau_{ik}^{\sigma}}}$$

This indicates that exports from country i will depend significantly on individual country preferences for goods from i. This will depict how competitive, attractive and the degree to which goods from country i are in demand in the international market. Total demand from country i therefore, will be affected in a negative manner by the cost of carrying out trade transaction in i, since this will affect its final selling price. This will therefore be displayed by its constant elasticity of substitution σ (CES). If the σ =1 this will mean that the CES is high therefore increases in price of goods from country i will lead to a significant decrease in exports since buyers will have to look elsewhere for cheaper goods, therefore change in exports with respect to price will reduce which we can express as $\frac{\partial X_i}{\partial p_i} < 0$.

Incorporating foreign aid into our exports model, it is likely that it could influence a whole lot of factors that could lead to increase in exports. Some factors that it could influence are the quality of goods produced by a country which could lead to product competitiveness in the international market this will likely increase the country's share of trade φ_i . Secondly it could reduce transaction cost in carrying out trade since aid is likely to improve infrastructure this will make the final price of country i products to be cheaper. Finally it might also reduce administrative and legal cost since aid might strengthen both financial and civil institutions so as to increase access to capital and reduce the bureaucracy of obtaining business permits and processing exports at ports. We define all these as transaction cost τ_{ik} and express it below in equation 7 as

(7.) $$\mathbf{\tau_{ik} = (1+t_{ik})\, b_i\, b_k \; f\,(I_i\, I_k)\, d_{ik}}$$

Where τ_{ik} is the transaction cost of carrying out trade in i relative to exporting to k. We express b_i and b_k as the cost of processing exports in country i and k respectively. We assume that transaction cost is a linear function of distance between i and k therefore country specific infrastructure should exert a positive effect on transaction cost depending on its state. The factor d_{ik} is the trade distance between i and k and therefore a barrier that should be overcome for trade to take place this could also affect price significantly, I_i and I_k are the quality of infrastructure in country i and k. This shows that aid given towards improving trade capacity is likely to facilitate trade in a positive manner by reducing transaction cost of trade in

general. With this we establish that there might indeed exist, a relationship between trade and aid. This relationship can be expressed as the inverse function between trade transaction cost and infrastructure. We can express trade transaction cost to reflect this by writing it as shown in equation 8. Where I_d is each country's domestic infrastructure and A_{4INFR} is aid channeled towards infrastructure.

(8.) $$\tau_{ik} = \frac{(1+t_{ik})\, b_i \;\; (A_{4T}) \;\; b_k\, d_{ik}}{(A_{4INFR} + I_D)_i \;\; + I_k}$$

Putting equation 8 into 6 the export becomes

(9.) $$X_i = \frac{(\varphi_i (A4_{PC})) \;\; (A_{4INFR} + I_D)_i^{\;\sigma}}{P_i^{\;\sigma-1} \;\; (b_i \;\; (A4_T))^{\sigma}} \sum_{j=1}^{N} \;\; \frac{Y_i \;\; R_k^{\;\sigma-1}}{E_{ik}^{\;\sigma}}$$

Where E_{ik} represents the total cost of trade (in exports) by country i with all other countries. It is assumed therefore that different types of aid depending on the sector it is allocated to will likely have a positive effect on exports. Therefore we express a change in exports with respect to trade as shown in equation 10 below by including different constraints to trade.

(10.) $$\frac{\partial X_i}{\partial (A_{4T})_i} = \frac{\partial X_i}{\partial \, b_k} \;\; \frac{\partial b_i}{\partial (A_{4T})_i} > 0$$

A change in exports with respect to aid will depend on how aid given to boost trade will reduce cost of production within a given country (see Cali and Velde (2009) for further discussion on how aid can influence export oriented growth).

Relating this to the private sector, the approach of our model will depict how aid will affect trade within a country, which will be a straightforward profit-maximization problem where trade within a country leads to a situation where firms in the private sector are attempting to maximize their profits (π_i). We can express profits (π_i) as the difference between total revenue and total cost $\pi_i = TR_i - TC_i$. In constructing the total revenue function we will for simplicity assume that firms' quantity choice does not impact the output price. This will be particularly true for firms in the export sector as they will be selling at the world price. The total revenue function for firms operating in sector i can thus be written as the price of output from sector *i* (P_i) multiplied by the output level (X_i), $TR_i = P_i X_i$. So, the marginal revenue is equal to the price $MR_i = P_i$. In sectors of an economy firm costs are a function of several factors. These include the cost of labor (*w*), the cost of capital (*v*), transportation costs (*t*), and rent seeking (*r*) . The cost of labor is the wage rate per unit of output produced. The cost of capital can be viewed as the typical rental price of capital but also more broadly as to include additional factors impacting the cost of obtaining capital such as access to credit. Transportation costs are a function of both the distance to market and more importantly the level of infrastructure. For example, in many developing countries the distance in kilometers to market

is considerably less important than the state of the roads that lead there. Rent seeking represents the cost of dealing with corrupt government officials imposed on firms. So, the firms total cost function can be written as $TC_i = f_i(w, v, t, r)X_i$.The marginal cost (MC) can be expressed as $f_i(w, v, t, r)$. As firms increase output we can assume that eventually scarcities will occur and the marginal cost of production will rise. This can occur because of the rising cost of labor per unit of output produced and/or because of capital costs per unit is rising. Eventually, there reaches a point at which equilibrium occurs in firms. This profit maximization point (X_i^*) will represent the point at which $MR_i = MC_i$, also expressed as $P_i = f_i(w, v, t, r)$.

One of the goals of foreign aid (a_i) is to improve conditions for private sector businesses in developing countries. There are many ways in which this can occur. Foreign aid can increase education and training of workers, which would lower the firms labor cost per unit produced. So, the wage cost per unit produced can be expressed as a negative function of foreign aid, $w_i(a_i)$. Aid may also be used to subsidize equipment/technology purchases for firms or come in the form of credit extensions which may be used for capital purchases. Therefore, we can write the cost of capital as a negative function of foreign aid, $v_i(a_i)$. It is common for both multilateral and bilateral aid to be used for infrastructure projects (roads, harbors, airports, etc). These would lower the transportation costs for firms resulting in the following function where transportation costs are a negative function of foreign aid, $t_i(a_i)$. The flow of foreign aid into a sector may have a negative side effect; however, by increasing the rent seeking behavior of government officials since more funds flowing into a sector may result in corrupt officials seeking higher payout from firms. Therefore, the costs imposed by rent seeking officials is modeled as a positive function of aid, $r_i(a_i)$. With foreign aid included in the model we can rewrite the equilibrium condition as $P_i = f_i[w_i(a_i), v_i(a_i), t_i(a_i)r_i(a_i)]$.

We can now examine the impact on the equilibrium condition from a change in foreign aid. We will assume that foreign aid does not impact output prices, especially for the export driven sector. Therefore, the differentiation of this condition with respect to foreign aid is only a differentiation of the marginal cost function. This can be expressed as

(11.) $$\frac{\partial f_i}{\partial a_i} = \frac{\partial f_i}{\partial w_i}\frac{\partial w_i}{\partial a_i} + \frac{\partial f_i}{\partial v_i}\frac{\partial v_i}{\partial a_i} + \frac{\partial f_i}{\partial t_i}\frac{\partial t_i}{\partial a_i} + \frac{\partial f_i}{\partial r_i}\frac{\partial r_i}{\partial a_i}$$

first expression on the right hand side ($\frac{\partial \mathrm{f_i}}{\partial \mathrm{w_i}}\frac{\partial \mathrm{w_i}}{\partial \mathrm{a_i}} \leq 0$) represents foreign aid potentially lowering the cost of labor. They potentially lower cost of capital from aid is represented as $\frac{\partial f_i}{\partial v_i}\frac{\partial v_i}{\partial a_i} \leq 0$. The potential reduction in transport

costs is shown as $\frac{\partial f_i}{\partial t_i}\frac{\partial t_i}{\partial a_i} \leq 0$. The possible rise in rent seeking costs is the last term on the right hand side which is $\frac{\partial \mathrm{f_i}}{\partial \mathrm{r_i}}\frac{\partial \mathrm{r_i}}{\partial \mathrm{a_i}} \geq 0$. Therefore, the overall impact of foreign aid is combining three potential cost reduction factors (w, v, and t) with one potential cost increase (r). Whether or not the overall sign of $\frac{\partial f_i}{\partial a_i}$ is greater or less than zero will depend to a large extent on the quality of a country's institutions and on how the foreign aid is directed. If aid is directed towards more productive uses that lower firm' labor, capital and/or transport costs then this will help turn the prediction towards lower marginal costs. If marginal costs of production fall for firms as a result of foreign aid then output in the sector will increase. In other words, if $\frac{\partial \mathrm{f_i}}{\partial \mathrm{a_i}} < 0$ then $\frac{\partial \mathrm{X_i}}{\partial \mathrm{a_i}} > 0$. We do not use the gravity trade model because aid is typically between the rich and least developed nations however we use a partial log equation to depict the effect that aid can have on trade in developing countries. Therefore our model asserts that exports will depend on a set of exogenous variables $X_{i,t}$ and aid. Our set of exogenous variables consists of a set of variables that affect trade. The model we present is the trade model below in equation 12. We extend the model to sectors and relate the effect of aid to sectors to total trade in a country to determine the effect that aid to each sector has on trade.

(12.) $\boldsymbol{Exports_{i,t} = \beta_0 + \beta_1 X_{i,t} + \beta_2 Aid_{i,t} + \varepsilon_{i,t}}$

We expect our above model, to yield the following hypotheses which will be tested in this paper for the export sector

Hypothesis #1.) Aid focused directly on export promotion (extensions of trade credit, etc) will have a positive impact on exports.

Hypothesis #2.) The positive impact of aid on exports will be reduced if the country has lower institutional quality (more corruption).

Hypothesis #3.) Aid focused on infrastructure investments will increase exports.

Hypothesis #4.) Due to conditionality, it is expected that multilateral aid will suffer from less rent seeking and will be directed more towards lowering firms' costs as opposed to bilateral aid. Therefore, the positive impact of aid on exports should be higher for multilateral aid rather than bilateral aid.

Hypothesis #5.) Aid directed towards the agricultural and educational sector may or may not increase exports depending on whether the aid is promoting production for export or for domestic consumption.

3.0 Data and Sources

The descriptive statistics of all data used, is presented below (see Table 1). We use panel data in our study. We obtain data for five African countries, four in sub Saharan Africa and one in North Africa (i.e. Kenya, Botswana, Ghana, Cameroon and Egypt) for a period of 39 years 1970 to 2008 although some data are missing.

Dependent Variable

Our dependent variable is exports, we use exports as our measure of trade, it is the total amount of goods and services exported overseas from a given country in constant US dollars, it however does not capture domestic trade which is a major limitation. Data for exports is obtained from World Bank database. Logarithm of exports is taken because the data on exports is too noisy therefore this helps to resolve scaling issues. Exports overseas depicts the exporting country's capacity to exports and its share of oversea trade which is often its foreign exchange earning capacity, therefore export is a vital measure of a country's international trade.

Description of explanatory variables

Data for aid, gross domestic product (GDP), Population, exchange rate, trade openness, government spending and inflation was also obtained from World Bank database. Two different measure of aid is used in this paper. One is effective aid (pure aid) which consist of grants and grants component of loans, initially constructed by Chang, Fernandez- Arias, and Serven (1999) and the other is official aid which we described as distorted and conditional in nature (distorted because donors often require recipient to use a sizable amount to import goods from donor countries) it also consists of grants and loans whose grants component is at least 25% according to World Bank data. This allows us to determine the difference in their respective impact on trade. Bilateral and multilateral aid is added up to obtain what we call total effective aid and total official aid respectively. Effective aid data was available only for a period of 1975 to 1985 and official aid data for the period of 1970 to 2008. We intend to compare the difference of the impact of effective aid from that of official aid on trade and note the difference between aid without conditionality (effective aid) and aid with conditionality (official aid) on trade since donor often require recipient to purchase goods from donor countries as a condition for giving official aid, this could make official aid to be too stringent thereby limiting its impact on trade.

Table-1 Descriptive Statistics

Variable	Observations	Mean	Std. Dev	Min	Max
Log of exports	195	3.25	0.48	1.21	4.32
Log of GDP/capita	194	13.35	0.84	11.87	15.79
Natural Resources	195	0.6	0.49	0	3
Exchange Rate	195	1.15	1.92	0.0004	7.03
Landlocked Status	195	1.8	0.4	1	2
Economic Policy	190	-1.25	1.09	-1.80	5.22
Institutional Quality	140	-1.67	1.24	-1.83	1.83
Crude price	195	42.72	21.48	15.93	99.11
Life Expectancy	195	55.04	5.11	44.63	68.41
Health Access	140	73.33	22.62	5	99
Inflation	190	15.05	17.4	-3.21	122.88
Openness	195	70.24	30.56	22.25	157.63
Torture	140	0.59	0.61	0	2
Electoral Self Determination	140	0.99	0.73	0	2
Freedom of movement	140	1.01	0.82	0	2
Political Imprisonment	140	0.87	0.83	0	2
Effective Bilateral Aid	105	2.98	2.43	0.42	15
Effective Multilateral Aid	105	1.41	1.37	0.11	6.4
Total Effective Aid	105	4.39	2.98	0.77	16
Official Multilateral Aid	195	1.62	1.64	0.03	8.28
Total Official Aid	195	5.75	3.91	0.17	18.24
Log of Official aid to Education	144	-6.34	1.74	-14.81	-2.99
Log of Official aid to Agriculture	145	-6.1	1.77	-10.68	-3.46
Log of Official Aid to Infrastructure	145	-4.76	1.3	-10.08	-2.19
Log of Official Aid to Trade Policy	130	-6.96	1.89	-13.28	-3.23
Log of Official aid to industry	144	-6.84	1.85	-13.41	-3.04
School enrollment rate	183	88.94	15.64	55.15	120
Life Expectancy in Years	195	55.04	5.11	2	68.4

Source: Authors compilation (from WDI dataset of the World Bank and other sources)

Effective aid to sectors was not available for individual sectors, comparing the difference in total aid allocation allows us to know the difference of the impact of official aid from effective aid on trade, so as draw conclusion of their impact on trade. Official aid to sectors alone was used to determine the impact of aid to sectors on trade this will probably affect our results since we lack data on effective aid to sectors. Data on official aid to sectors was obtained from The College of William and Mary Williamsburg

Virginia aid data base www.aiddata.org , for the period of 1980 to 2008 (29 years) for five the sectors that we wish to consider their effect on trade, although some years of data are missing. The sectors are trade and business support services, infrastructure, education agriculture and industry. Country specific income was represented as GDP per capita which is the average per capita income of individuals in a country, exchange rate is the average dollar local currency exchange rate by country this captures fluctuation in the global economy that are likely to affect trade since the dollar is the global currency used in international trade. Economic liberalization rate was captured using the number of phone lines, since businesses are likely to acquire more phone lines in a liberalized economy than in a highly regulated one. We use indices to capture the effect of economic policy and institutional quality on trade in the presence of aid. This method of construction of the indices is shown in next section. Economic policy is the fluctuations in government regulatory decisions reflected in its monetary and trade policies. We capture this using inflation and trade openness variables and develop a single index for this using principal component analysis (PCA). Investors are likely to consider how sound and consistent government economic policy have been overtime in the cause o their future investment in the private sector of an economy. While institutional quality is reflective of government attitude and behavior towards governance. We capture these using political variables. Institutions will also capture a whole host of factors such as transaction cost involved in running businesses, the cost and time in acquiring business permits and the quality of infrastructure which will affect the cost of transportation to both local and foreign markets, since access roads linking rural agricultural areas to ports will depend on governments ability to create enabling environment for trade. We obtain data on institutions from Brigham University political data, we create an index also for institutions (see next section for index construction). Foreign direct investment is the inflow of foreign investment to the private business sector in a country in constant US dollars, school enrollment was used to capture the level of skill available in the labor market, this was the total school enrollment of boys and girls between the ages of 0 to 15 years of age, therefore we expect that this will affect the overall quality of manpower in countries which could have an effect on output productivity, all variables are for a period of 1970 to 2008 except otherwise stated.

4.0 Some Constraints to Trade in Africa: *Constructing economic and institutional indices*

Business surveys such as World business environment (WBE) report and World development reports (WBR) of the World Bank of 1999/2000 and 1996/1997 respectively have listed some constraints to foreign direct

investment and trade in Africa (See Table 2). They used a sample of 413 and 540 firms respectively in Africa in the two surveys, and respondents were asked to determine on a four point scale (1= no constraint and 4 = severe constraint) for the first survey and six point scale (1= no constraint and 6 = severe constraint) for the second, to depict

Table-2 Constraints on Trade in Africa

WBE(1= no constraint 4= severe constraint)		WBR(1= no constraint 6= severe constraint)	
Corruption	2.80	Taxes and Regulation	4.50
Weak Infrastructure	2.75	Corruption	4.47
Street Crime	2.70	Weak Infrastructure	4.28
Inflation	2.67	Crime	4.25
Financing	2.64	Inflation	4.11
Organized Crime	2.57	Lack of Access to Finance	3.95
Political Instability	2.43	Policy Uncertainty	3.88
Taxes and Regulation	2.24	Cost Uncertainty	3.75
Exchange Rate	2.15	Regulation of Foreign Trade	3.64

Source: World Bank Business Report (2000), also used by Asiedu (2002)
Note: The table above shows the different constraints on trade in Africa using results from two World Bank surveys

the extent to which some factors constrained business operation in African countries for each of the reports. As can be seen above in Table 2, institutional and economic factors rank highest on the list of constraints to business and trade in Africa. Corruption, weak infrastructure and crime are the greatest institutional impediments to trade while inflation and financing are strong economic impediments to trade. Therefore having a good measure for institutional quality and economic policy as they affect trade is vital in determining the dynamics that affect trade in Africa. In this paper we group most of these constraints into institutional and economic factors and reduce the number of variables by creating an index which captures their effect.

Developing a single variable from a list of variables that have been identified to be relevant to our topic under study (trade) makes the discussion of what the effect of institution or policy is on trade to be easier. Most variables used to capture institutional quality are often political indicators, they show the direction of a country's internal governing style and are often used to rate the reputation of its government and its inclination to good governance through its affinity for democratic values. Principal component analysis (PCA) allows us to create a single index for economic policy and institutional quality, this is a statistical technique used, to derive summary measures from a set of variables by capturing their variation. The difficulty most economists face when considering institutions is that they find numerous indicators for institutions and it becomes difficult to analyze

institutions using every single one of them. The variables we use to capture institutional quality are country specific freedom of movement and electoral self determination rate. These variables depict a country's respect for rights to social assembly and right to self electoral determination. The reason for using these two variables is that it allows us to capture country specific freedom of association since this could affect trade if people are prohibited from doing business because of their opposition to government or unnecessary threats to life and property. While electoral self determination rate allows us to capture political stability and the presence of enabling environment that can promote trade.

Governments also find it difficult to control many economic indicators, however some of the economic policies that governments float are captured using indicators that governments try to control, and some examples of such policies are its monetary, trade and fiscal policies. To capture these three policies economist use indicators such as inflation, trade openness and government spending or budget surplus to measure the effect of these policies on growth. The difficulty arising from using such indicators is that if one wants to talk about economic policy as an entity it also becomes virtually impossible or quite cumbersome using more than one indicator to discuss the effect of government economic policy on the issue under focus. Due to this difficulty we use these three indicators (inflation, trade openness and government consumption spending) to develop a single index for economic policy. In this paper we show the index construction below. We create the index for institutional quality using the two variables stated above. They are freedom of movement (freedmove), which is the right to social association and electoral self determination rate (elecsd) which captures political stability as stated earlier. We obtain these variables from Brigham university data set for political indicators developed by international non-governmental organizations.

Freedom of association was developed by assigning a score of 0 in cases where it did not exist, 1 in situations where it was interfered with and 2 in cases where it was present. Electoral self determination rate was measured by assigning a score of 0 in cases where it did not exist, 1 in a case where it existed but there were some limitations and 2 in a case where citizens have ability to exercise full political and voting rights. Principal component analysis uses a weighted average of the underlying variables above to develop an index for institutional quality using the matrix of eigenvectors transformation allowing us to obtain an uncorrelated index from a group of correlated variables. The result of our scatter matrix plot using the two variables used for generating institutional quality is presented below in fig 1. Where the variables 1 and 2 are freedom of movement and electoral self determination rate respectively. The scatter matrix shown below show that

electoral self determination and freedom of movement are identically distributed (see blue dots) and closely correlated. This might not be clear but a case where variables are not correlated will be explained when developing the economic policy index subsequently.

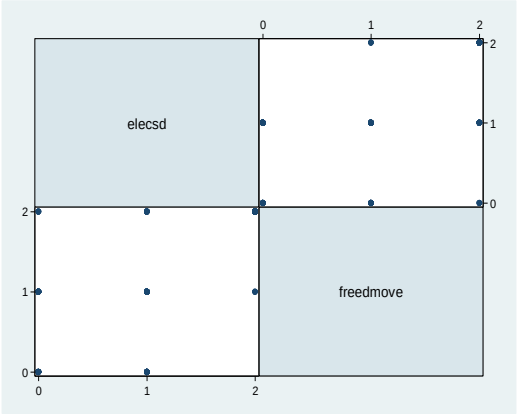


Fig.1 Above shows matrix plot the institutional variable

Table 3 Construction of institutional quality index using eigenvectors

Method of construction Variables	(1) PCA Component 1	(2) PCA Component 2
Electoral self Determination Rate	0.7071	0.7071
Freedom of movement	07071	-0.7071

Note: The above values are generated using eigenvalue transformation. We used the PCA command "pca elecsd freedmove"to construct the institutional quality index in Table 3 above. The index captures the variation in the two variables allowing us to generate a single index by adding the individual principal component of the variables. This index obtained using PCA is uncorrelated with the dependent variable in our regression analysis.

The results of the eigenvectors values is obtained in Table-1 above, (we show by hand below how this is constructed although "Stata" does it automatically) using the PCA command "pca elecsd freedmove". The index is obtained by adding the two principal components obtained from the eigenvalue transformation using the two variables alternately as shown below.

PC1= (0.7071 elecsd) + (0.7071* freedmove) and PC2= (0.7071* elecsd) - (0.7071* freedmove)* where freedmove = freedom of movement and elecsd = electoral self determination rate. Institutional quality index is given by Institutional quality = PC1+PC2 Where PC1 and PC2 are principal components 1 and 2 obtained from our variables.The score plot is shown below in figure 2 for the two components to depict the variation in our new

index, it shows that there exist sufficient variations among our variables to capture the effect of institutions.

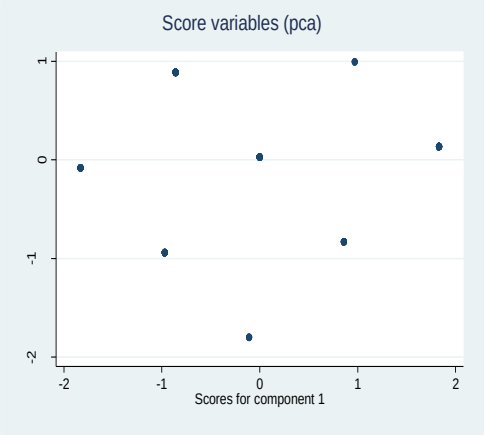


Fig.2 Above show the score plots for the institutional variable

An index for economic policy was also created using the three variables inflation, trade openness and government consumption spending which captures government monetary, trade and fiscal policies respectively. Inflation is the change in price of goods over time in US dollars, trade openness is the ratio of exports to imports by country and government consumption spending is government welfare spending in US dollars, which displays its fiscal discipline. The scatter matrix plot for the variables used in the construction of economic policy is shown below below in figure 3. The results of our scatter plot show that government consumption spending is not correlated with inflation but only openness (see comparison of the narrow blue scatter on the left with openness and inflation). We find that inflation and openness have a stronger correlation with each other. Using a set of uncorrelated variables could affect the quality of our index since it could either reduce the variation of the index or over exaggerate its variation making the index to have a strong negative or strong positive effect leading to poor conclusions as to the effect of the index in our study. Government consumption spending was dropped to avoid such problems and we used only inflation and trade openness in our index construction. Past literature e.g. Burnside and Dollar (2000) and Easterly (2003) also lend credence to our assertion since they state that countries can experience growth or trade increase with poor fiscal conditions (i.e. growing budget deficit) as most developed countries have for decades.

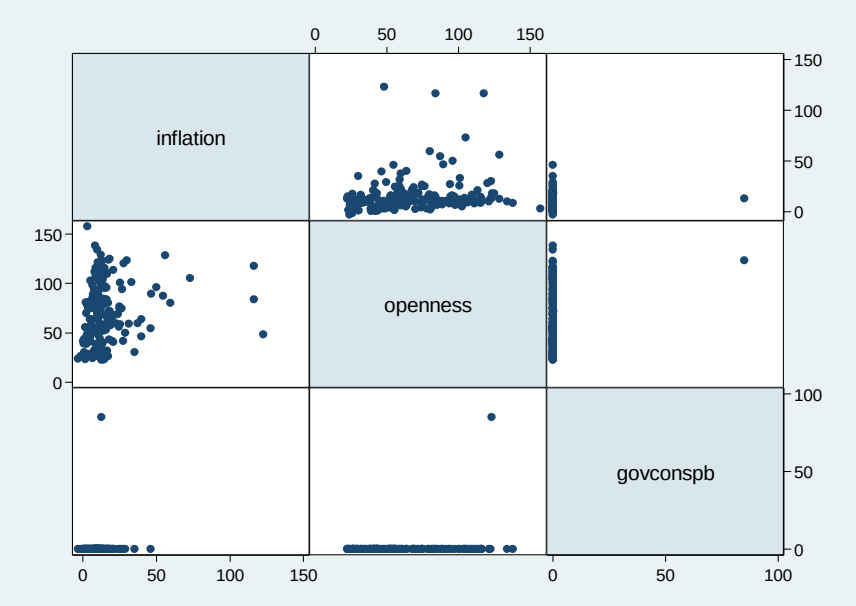


Fig3 Above show the matrix plot for the economic policy variable

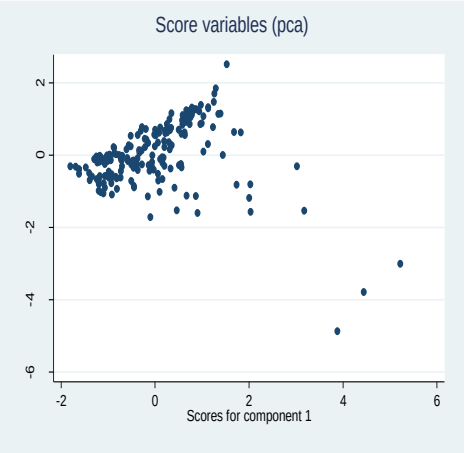
The PCA command used to produce the eigenvectors in Table-4 is "pca openness inflation"

Table 4 Construction of Economic policy index using eigenvectors

Method of construction	(1) PCA	(2) PCA
Variables	Component 1	Component 2
Openness	0.7071	0.7071
Inflation	07071	-0.7071

Note: The above values are generated using eigenvalue transformation. Using the PCA below we also show we construct the economic policy index from our matrix of eigenvectors as follows using the command "pca openness inflation" in the table above.

Economic policy index is generated from our principal component eigenvector table shown in Table-4 above as PC1= *(0.7071*openness)* + *(0.7071*inflation)* and *PC2= (0.7071*openness)-(0.7071*inflation)* Economic policy index is also obtained from summation of the principal components shown below as Economic policy index = PC1+PC2 where PC1 and PC2 are our principal component, 1 and 2 respectively. The results of the score plots also shows the correlation between openness and inflation in figure 4 whereas figure 5 shows all three variables, in figure 5 we observe that government consumption spending affects



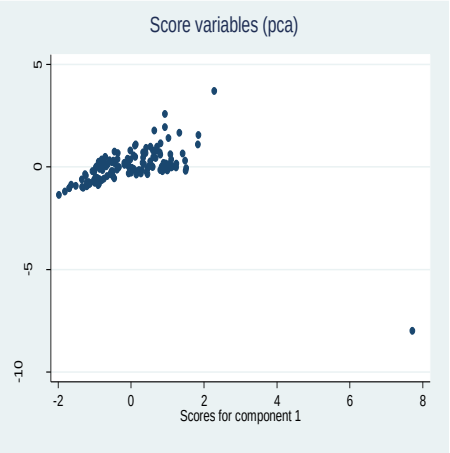


Fig4 Fig5

Note: Fig 4 and 5 show the score plots for the policy variable

the spread of our score plots in such a manner as to skew our spread more in the positive direction (compare the spread on the vertical axis of both figures). This gives some more leverage as to why it was dropped. See Abeyasekera (2004) and Schlens (2009) for further discussion on how PCA produce consistent indices.

5.0 Empirical Analysis

Does Aid Attract Trade?

Our empirical model tries to answer, if aid promotes trade? The argument we present is that many middle income countries receive higher amounts of aid than low income countries (see USAID 2010 fast facts), this can be attributed to the fact that there is a higher volume of trade between middle income countries and developed countries who give aid. Based on this one might be tempted to say absolutely that it is trade alone that attracts aid. When one considers cases like that of Rwanda or Kenya that are particularly poor countries with little or no mineral resources and a low volume of trade but receive aid, we can state otherwise since there exists little or no incentive of giving aid to such countries. One can argue from sound judgment based on reasons for giving aid, that aid is initially altruistic to poor developing countries. Past studies e.g. Easterly (2003) suggest that giving aid to a country can establish a close connection between two countries leading donor country, to search for the presence of minerals and other country specific endowments in recipient country, on finding a sizeable deposit of resource this could lead to trade between both countries giving leverage to the argument that aid could be initially altruistic in nature, causing aid to attract trade.

Model specification

Hausman specification test was run to choose between using fixed and random effects model for estimation. Results accept the null hypothesis that the fixed effects estimator is not biased (p-values are all considerably lower than .01). The use of instrumental variables approach is because of the endogeneity of the aid variables. A Hausman-Wu test rejected the null hypothesis that aid was exogenous, with a p-value of 0.00. Therefore, using aid as an independent variable could lead to biased results. We then used fixed effect method of estimation to estimate our equations. We present the reduced forms of our three versions of aid and trade equations below (for effective, official and aid to sectors).

The EDA versions of these equations are

(13a) $\boldsymbol{EDA_{i,t} = \alpha_0 + \alpha_1 X_{i,t} + \alpha_2 I_{i,t} + \mathbf{c_i} + \mu_{i,t}}$

(13b) $\boldsymbol{Exports_{i,t} = \beta_0 + \beta_1 X_{i,t} + \beta_2 \widehat{EDA}_{i,t} + \mathbf{c_i} + \mu_{i,t}}$

The ODA versions of these equations are

(14a) $\boldsymbol{ODA_{i,t} = \alpha_0 + \alpha_1 X_{i,t} + \alpha_2 I_{i,t} + \mathbf{c_i} + \mu_{i,t}}$

(14b) $\boldsymbol{Exports_{i,t} = \beta_0 + \beta_1 X_{i,t} + \beta_2 \widehat{ODA}_{i,t} + \mathbf{c_i} + \mu_{i,t}}$

The sectoral versions of these equations are

(15a) $\boldsymbol{AID^j_{i,t} = \alpha_0 + \alpha_1 X_{i,t} + \alpha_2 I_{i,t} + \mathbf{c_i} + \mu_{i,t}}$

(15b) $\boldsymbol{Exports_{i,t} = \beta_0 + \beta_1 X_{i,t} + \beta_2 \widehat{AID^j_{i,t}} + c_i + \mu_{i,t}}$

The trade (exports) equations are linear specifications, where i is the index for the countries, t the index for time and trade is the logarithm of per capita export resulting from trade with other countries, aid (be it EDA,ODA and aid to sectors) is expressed as the logarithm of aggregate aid allocated for purposes that can stimulate trade. Our vector of exogenous variables $X_{i,t}$ consists of a group of specific variables that affect trade they consist of government economic policy, average dollar-local currency exchange rates which capture global shocks that affect trade, institutional quality, school enrollment rate and GDP per capita. We excluded natural resources as a variable since we experience negative R-squared with its presence but use it in interacting aid. We assume that aid is endogenous in the trade equations, since aid is likely to suffer from measurement problems. Therefore we employ an instrument $I_{i,t}$ for aid to capture the effect of aid in our aid equation. The dynamics that govern the different types of aid in promoting trade was found to be complex and different from one another. We find that with some types of aid, trade was found to depend on additional factors, since aid was to be used in promotion of trade, for instance with effective

and official aid we found that such aid will likely be given to assist trade in the presence of reasonable foreign direct investment (FDI) and economic liberalization. With aid to sectors which was in fact official aid to sectors, aid will depend on some level of economic liberalization which allows for private ownership and some investment in the private sector but not necessarily foreign direct investment. Where c_i represents time invariant unobserved effects on trade and μ_{it} represents time varying unobserved effects on trade. The fixed effect method will produce consistent estimate of the effect of aid on trade by allowing arbitrary correlation between unobserved time invariant effects (c_i) and explanatory variables in the trade equations. The consistency of the FE estimators will depend on following assumption (a.) The time varying unobserved effects μ_{it} are uncorrelated with the explanatory variables across all time periods. (b.) There is significant variation in aid flow over time and (c.) The assumption of strict exogeneity of explanatory variables is fulfilled. The assumption of strict exogeneity is going rules out feedback effects from aid to trade and country specific effects over time.

In some other instance we estimate variants of the trade (exports) equation using GLS including the variable "interact" the interaction between aid and policy, aid and institutional quality and aid and natural resources using interaction variables. The predicted value for the instrumented variable (sectoral aid) was then interacted with the institutional quality, economic policy or natural resources. The second equation (with exports as the dependent variable) then included the predicted aid variable, one of the interaction variables and the other explanatory variables used in all regressions.

The interaction versions of these equations are

(16a) $$\boldsymbol{AID^{j}_{i,t} = \alpha_0 + \alpha_1 X_{i,t} + \alpha_2 I_{i,t} + v_i + \varepsilon_{i,t}}$$

(16b) $$\boldsymbol{Exports_{i,t} = \beta_0 + \beta_1 X_{i,t} + \beta_2 \widehat{AID^{j}_{i,t}} + \beta_3 interact_{i,t} + v_i + \varepsilon_{i,t}}$$

In all government economic policy and income were lagged by one period. We have a total of two right hand side endogenous variables (logarithm of trade and aggregate aid) and at least 6 excluded exogenous variables (logarithm of income, government economic policy, and institutional quality, exchange rates, market access, foreign direct investment, economic liberalization rate and school enrollment rate) with three interaction variables (aid interacts with economic policy, institutional quality and natural resources).

Instrument

Exclusion restriction assumptions are typically theoretical an instrument that is valid should therefore be correlated with aid in our model specification but not with trade (exports). One of the most important aspects of the instrumental variable approach is having a variable (or variables) in the aid equation which is not included in the trade (export) equation; these variables are referred to as the "instruments". We expect that our instruments should fulfill certain conditions in our case which will be particular for exports. First, instruments should have a significant impact on the variable they are predicting, in this case the aid variable. The second condition is that the instrument should not have an impact on the dependent variable, exports in the second equation. While often this is tested empirically, Wooldridge (2010) and others have pointed out that this also needs to be done on the theoretical level as testing the impact of the instrument on the dependent variable in the second equation (exports) with a full model could be biased as the instrumental correction has not been made for the endogenous variable (aid). We use one instrument "life expectancy" for aid (i.e. for bilateral, multilateral and aid to sectors for the three sets of equations), so our model is exactly identified, we expect aid to flow to areas with low life expectancy, making life expectancy to be positively correlated with aid. Our exclusion restriction will hold since it is reasonable to state that on the long run low life expectancy will attract foreign aid but will not promote exports allowing us to solve our first stage and second stage equations simultaneously.

The exclusion restriction we impose on our trade equation is that life expectancy is correlated with aid but not with trade, this will hold econometrically, if the coefficient for aid in our structural equation after imposing the restriction in our trade equation (where we use life expectancy as a proxy for aid) tends to that in our reduced form equation and secondly, if the correlation between the instrument $I_{i,t}$ and the error term $\varepsilon_{i,t}$ is identically equal to zero as shown below in equation 17.

(17) $E|I_{i,t} \,.\, u_i|=0$ *and* $E|I_{i,t} \,.\, \epsilon_i|=0$

This then shows that the only way life expectancy is related with trade is only through aid therefore the instruments $I_{i,t}$ is not correlated with the disturbances (u_i and ϵ_i) in our model specification and finally, if the exogenous component of the instrument, (the fitted value of aid) is uncorrelated with the error term we can therefore identify the variation of the dependent variable trade (exports) as the slope of the aid coefficient. This shows that there is sufficient variation (which is non zero) between aid and our instrument which we represent in the covariance (cov) equation 18 below.

(18) $Cov\,(Aid_{i,t} \,.\, I_{i,t}) \neq 0$

(where Aid can be EDA or ODA, this means that α_2 in not zero). This implies that exports will vary according to changes in aid in flow to countries (see Kraay (2008) for further discussion on exclusion restriction). We argue that our instrument meet the criteria theoretically for our exclusion restriction to hold, since the behavior of the instrument life expectancy (see the first stage results and F-tests in Tables 5 to 7), support previous literature e.g. Heintz (2004) that argue that a good instrument should capture the variation in the dependent variable and be highly correlated with the endogenous variable therefore β_2 (our aid coefficient) will no longer biased in our model specification.

Table 5. First Stage: EDA Regressions

Method of Estimation	OLS Bilateral EDA	OLS Multilateral EDA	OLS Total EDA
Life Expectancy	0.36	0.35	0.71
	(.12)***	(.11)***	(.20)***
Policy Index	-0.06	-0.21	-0.30
	(.12)	(.15)	(.23)
Institution Index	-0.0004	-0.31	-0.04
	(0.35)	(0.17)	(0.34)
Exchange Rate (LCU per $)	0.27	0.23	0.49
	(.26)	(.11)**	(.30)
FDI	-0.06	-0.06	-3.08
	(.89)	(.06)	(.10)**
School Enrollment Rate	0.01	-0.12	-0.11
	(.07)	(.03)	(.08)
Liberation Policy	-0.42	0.97	1.38
	(.88)	(.36)**	(1.03)
GDP per capita	-2.67	-0.47	2.07
	(1.39)*	(.66)***	(1.67)
F-Test	8,23	10.13	12.90
Chi^2 (p-value)	0.00	0.00	0.00
# of observations	73	73	73
R-Squared	22	52	36

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Table 6. First Stage: ODA Regressions

Method of Estimation	OLS Bilateral EDA	OLS Multilateral EDA	OLS Total EDA
Life Expectancy	0.28	0.16	0.44
	(.05)***	(.04)***	(.08)***
Policy Index	-0.24	-0.35	-0.56
	(.15)	(.15)**	(.26)**
Institution Index	0.24	-0.03	0.26
	(0.20)	(0.16)	(0.32)
Exchange Rate (LCU per $)	-0.42	0.22	-0.18
	(.31)	(.13)	(.40)
FDI	-0.08	0.03	3.10
	(.06)	(.04)	(.09)
School Enrollment Rate	0.02	-0.06	-0.04
	(.03)	(.02)***	(.04)
Liberation Policy	-0.63	-0.13	-1.75
	(.12)***	(.07)*	(1.58)
GDP per capita	-3.95	-0.56	4.47
	(.75)***	(.39)	(1.02)***
F-Test	37.28	13.54	29.52
Chi^2 (p-value)	0.00	0.00	0.00
# of observations	131	131	131
R-Squared	0.53	0.34	0.48

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Table 7. First Stage:Sectoral Aid Regressions

	Aid to Trade	Aid to Infrastructure	Aid to Agriculture	Aid to Education
Life Expectancy	0.23	0.16	0.13	0.18
	(.08)***	(.04)***	(.04)***	(.05)***
Policy Index	0.27	-0.02	-0.02	-0.14
	(.24)	(.15)	(.17)	(.32)
Institution Index	0.21	0.04	0.37	0.39
	(.24)	(.13)***	(.14)***	(.20)*
Exchange Rate (LCU per $)	-0.05	-0.01	0.30	-0.23
	(.33)	(.13)	(.33)	(.25)
School enrollment	-0.02	0.01	-0.04	0.04
	(.02)	(.01)***	(.02)	(.02)*
Liberalization policy	-0.11	-0.09	0.12	-0.17
	(.12)	(.08)**	(.08)	(.09)**
GDP per capita	-0.78	-1.25	-0.03	-2.40
	(.52)	(.42)***	(.57)	(.57)***
F-Test	7.95	18.72	10.25	14.24
Chi^2 (p-value)	0.00	0.00	0.00	0.00
# of observation	132	140	140	139
R-Squared	0.21	0.43	0.28	0.25

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Results

We use fixed effect regression as stated earlier, since the result of the Hausman test with p-value 0.000[16] (we included this in our results only for aid to sectors results) suggest that fixed effect estimation is more appropriate for our model, see Baltagi (2005), Baltagi and Wu (2010) and Wooldridge (2010) for further discussion. We find that the factors that affect effective aid are quite different from those of official aid since effective aid is pure aid devoid of conditionality. Time effect "year" is included to control for

[16] This did not hold in some cases with effective and official aid

differences in exports from countries in years. This allows us to control, for production shocks and fluctuations in global demands for exports that is likely to affect volumes of exports. We present our result for effective aid and official aid below in Tables 8 to 11. We compare the results of the OLS estimates with those of the 2SLS. As expected the results of the standard errors of our 2SLS estimates are larger than those of our OLS estimates for aid see standard errors in Table 8 and 9 for our regressions of trade (using log of exports) on effective aid and other factors that affect trade. In Table 8 the OLS estimate for bilateral and multilateral effective aid are 0.06 and 0.10 respectively (see coefficients in table 8 Column 1 and 2) it shows that bilateral aid contributed 6 percentage points towards trade (with p-value 0.037) while multilateral aid contributed 10 percentage points to trade but had a stronger effect (with p-value 0.023) on trade. But the estimate is quite different when we use 2SLS in Table 9 the result of the F-test for excluded instruments for the 2SLS shows that the instrument life expectancy is valid and highly correlated with aid (see first stage regression results for effective aid). The estimated aid effect on trade is now 0.15 and 0.16 (see Table 9 Column 1 and 2) using 2SLS showing that multilateral aid contributed about 1 percentage point more to trade (with p-value 0.03) compared to bilateral trade with only 15 percent (with p-value 0.07) . This showed that controlling for endogeneity helps solve the problem of aid measurement, through the instrumental correction of aid since this could lead to bias in our results.

The results of the regression of trade on official aid are presented in tables 10 and 11. The result of the OLS regression with estimates for bilateral and multilateral official aid respectively of 0.06 and 0.05 in Table 10 Column 1 and 2, shows that bilateral aid contributed 6 percentage points to trade (with p-value of 0.000), while multilateral aid contributed 5 percentage points (with p-value of 0.052) to trade which is 1 percentage points less than bilateral aid contribution to trade. The results of our 2SLS estimates where we control for endogeneity are different from our OLS estimates. The result of the F-test for excluded instruments shows that our instrument life expectancy is valid and highly correlated with aid (see first stage official aid regression). The result in Table 11 Columns 1 and 2 shows that bilateral aid contributes 12 percentage points to trade (with p-value 0.000) while multilateral aid contributes 21 percentage points to trade with (p-value of 0.000) which is 9 percentage points more than bilateral aid contribution t trade. This result suggests once again that using 2SLS to address the issue of endogeneity is important, since aid is likely to suffer from measurement problems making the OLS results to be biased. Table 12 and 13 present the estimates of the regression of trade on aid to sectors and factors that affect trade in sectors. The result of our OLS estimates (see Table 12) show that aid to sectors had no effect on trade except for aid to

infrastructure that contributed 10 percentage points to trade (with p-value 0.000) while aid to trade policy and business support services, agriculture and education contributed 2,1 and 3 percentage points to trade respectively and had no significant effect on trade. The results of our 2SLS are different from that of the OLS estimates for aid to sectors. Aid had a significant effect in four sectors, With aid to trade and business support services, infrastructure, agriculture and education contributing 15, 22, 17 and 16 percentage points respectively to trade using 2SLS (see Table 13 Columns 1, 2, 3 and 4 for aid estimates of 0.15, 0.22, 0.17and 0.16 respectively) therefore controlling for endogeneity using 2SLS was also relevant in this case. Aid to industry had no significant effect on trade so we left that out in our results. The result of our F- test show that our instrument is relevant and valid since it is highly correlated with aid (see first stage results using official aid to sectors). Finally GLS was used in estimating our trade equation with the interactive variables, the three interactive variables aid*economic policy, aid*institutions and aid*natural resources had reduced effect on trade showing that these variables reduce aid effectiveness (we show results in the Appendix-A to C in Tables 14 to 16).Based on the above results we answer the hypothesis that we posed earlier as follows

Hypothesis #1.) Aid focused directly on export promotion (extensions of trade credit, etc) was found to be contributing to exporting in a significant manner. Therefore aid channeled to sectors that could improve output productivity is likely to be useful in promoting trade.

Hypothesis #2.) Institutions were probably contributing negatively to aid effectiveness in promoting exports. The interactive variable aid*institutions had a reduce effect on exporting. It is likely that institutions are weak and not helping in effective utilization of aid to promote trade.

Hypothesis #3.) Aid focused on infrastructure investments was found to be contributing to exports in a positive manner. It is likely that aid used in developing infrastructure will likely create enabling environment that can promote trade by way of cost reduction in the trade facilitation process.

Hypothesis #4.) Multilateral aid was found to be contributing to exporting in a more significant manner than bilateral aid. It is likely that the altruistic nature and good policy requirement conditions associated with multilateral aid made it more effective in promoting trade than bilateral aid.

Hypothesis #5.) Aid directed towards agriculture and education sector contributed to exporting significantly. It is likely that aid used in improving the level of education of the working population as well as modernizing methods used in cultivation was useful to improving trade.

Table 8. Impact of EDA on Exports

Method of Estimation	OLS (1)	OLS (2)	OLS (3)
Bilateral EDA	0.06	-	-
	(.03)**		
Multilateral EDA	-	0.10	-
		(.04)**	
			0.06
Total EDA	-	-	(.02)***
Policy Index	0.08	0.07	0.07
	(.05)	(.05)	(.05)
Institution Index	0.28	0.30	0.28
	(.06)***	(.06)***	(.06)***
School enrollment	0.01	0.02	0.02
	(.004)***	(.004)***	(.004)***
Exchange rate (LCU per $)	0.08	0.09	0.09
	(.04)*	(.04)**	(.04)**
Liberalization policy	0.09	-0.29	0.18
	(.10)	(.12)**	(.10)*
FDI	0.06	0.06	0.06
	(.02)***	(.02)**	(.02)**
GDP per capita	0.15	0.19	0.22
	(.10)	(.10)*	(.10)**
Chi^2 (p-value)	0.00	0.00	0.00
# of observations	73	73	73
R-Squared	0.72	0.73	0.73

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Table 9. Impact of EDA on Exports

Method of Estimation	2SLS (1)	2SLS (2)	2SLS (3)
Bilateral EDA	0.15	-	-
	(.09)*		
Multilateral EDA	-	0.16	-
		(.07)**	
			0.08
Total EDA	-	-	(.04)***
Policy Index	-0.11	-0.09	-0.10
	(.06)**	(.05)*	(.05)*
Institution Index	0.14	0.15	0.15
	(.06)**	(.04)***	(.05)***
School enrollment	-0.001	0.02	0.01
	(.01)	(.01)**	(.01)
Exchange rate (LCU per $)	0.21	0.21	0.21
	(.11)**	(.08)***	(.09)**
Liberalization policy	-0.13	-0.04	-0.09
	(.17)	(.10)**	(.13)*
FDI	0.01	-0.01	0.001
	(.02)***	(.01)**	(.01)**
GDP per capita	0.12	0.61	0.38
	(.45)	(.18)***	(.27)
Chi^2 (p-value)	0.00	0.00	0.00
# of observations	73	73	73
R-Squared	0.28	0.51	0.64

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Table 10. Impact of ODA on Exports

Method of Estimation	OLS (1)	OLS (2)	OLS (3)
Bilateral ODA	0.06	-	-
	(.02)***		
Multilateral ODA	-	0.05	-
		(.02)*	
Total ODA	-	-	0.04
			(.01)***
Policy Index	-0.10	-0.11	-0.10
	(.04)	(.05)	(.04)
Institution Index	0.23	0.25	0.23
	(.04)***	(.04)***	(.04)***
School enrollment	0.01	0.01	0.01
	(.003)***	(.003)***	(.003)***
Exchange rate (LCU per $)	-0.01	-0.01	-0.01
	(.02)	(.02)	(.02)
Liberalization policy	0.02	0.02	0.02
	(.02)	(.02)	(.02)
FDI	0.03	0.03	0.03
	(.02)*	(.02)**	(.02)*
GDP per capita	0.17	0.12	0.19
	(.06)***	(.06)**	(.06)***
Chi^2 (p-value)	0.00	0.00	0.00
# of observations	131	131	131
R-Squared	0.64	0.61	0.64

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Table 11. Impact of ODA on Exports

Method of Estimation	2SLS (1)	2SLS (2)	2SLS (3)
Bilateral ODA	0.12	-	-
	(.03)***		
Multilateral ODA	-	0.21	-
		(.06)***	
Total ODA	-	-	0.07
			(.02)***
Policy Index	-0.05	-0.01	-0.04
	(.07)	(.07)	(.07)
Institution Index	0.14	0.16	0.15
	(.05)***	(.05)***	(.05)***
School enrollment	-0.001	0.01	0.04
	(.001)	(.004)***	(.003)
Exchange rate (LCU per $)	-0.02	-0.12	-0.06
	(.07)	(.06)*	(.06)
Liberalization policy	0.05	-0.0002	0.03
	(.02)**	(.01)	(.01)*
FDI	0.02	0.02	0.02
	(.01)	(.01)*	(.01)*
GDP per capita	0.10	-0.24	-0.02
	(.20)	(.13)*	(.16)
Chi^2 (p-value)	0.00	0.00	0.00
# of observations	131	131	131
R-Squared	0.31	0.36	0.39

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Table 12 Impact of Sectoral Aid on Exports

Method of Estimation	OLS (1)	OLS (2)	OLS (3)	OLS (4)
Aid to trade	0.2 (.02)	-	-	-
Aid to infrastructure	-	0.10 (.03)***	-	-
Aid to agriculture	-	-	0.01 (.02)	-
Aid to Education	-	-	-	0.03 (.02)
School Enrollment	0.01 (.003)***	0.01 (.003)***	0.01 (.003)***	0.01 (.03)***
Exchange rate	-0.02 (.02)***	-0.01 (.02)	0.0002 (.02)	-0.01 (.02)
Economic policy	0.09 (.05)**	0.11 (.04)**	0.10 (.05)**	0.10 (.04)**
Institutional quality	0.25 (.03)***	0.26 (.03)***	0.29 (.04)***	0.27 (.04)***
Liberalization Policy	0.01 (.20)	0.01 (.20)	0.02 (.20)	0.02 (.20)
GDP per capita	0.07 (.05)	0.17 (.06)***	0.07 (.06)	0.08 (.05)
Chi^2 (p-value)	0.00	0.00	0.00	0.00
# of observations	118	131	131	131
R-Squared	0.60	0.53	0.69	0.69

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Table 13 Impact of Sectoral Aid on Exports

Method of Estimation	2SLS (1)	2SLS (2)	2SLS (3)	2SLS (4)
Aid to trade	0.15 (.06)**	-	-	-
Aid to infrastructure	-	0.22 (.07)***	-	-
Aid to agriculture	-	-	0.17 (.10)**	-
Aid to Education	-	-	-	0.16 (.06)**
School Enrollment	0.01 (.004)	0.02 (.004)	-0.001 (.01)**	0.003 (.01)
Exchange rate	-0.12 (.06)*	-0.06 (.06)	-0.13 (.10)	-0.03 (.08)
Economic policy	-0.04 (.06)**	-0.08 (.06)**	-0.07 (.09)**	-0.05 (.09)**
Institutional quality	0.12 (.06)**	0.17 (.05)***	0.10 (.07)	0.12 (.06)**
Liberalization Policy	-0.01 (.02)	0.004 (.01)	0.01 (.02)	0.02 (.02)
GDP per capita	-0.38 (.14)***	-0.20 (.15)	-0.41 (.15)***	-0.04 (.21)
Chi^2 (p-value)	0.00	0.00	0.00	0.00
# of observations	118	131	131	131
R-Squared	0.16	0.43	0.01	0.02

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

6.0 Conclusion

In this paper we investigated some questions raised during the course of this study. They are what component of aid is useful in promoting trade in developing countries? We found that aid to sectors was useful in promoting trade, with aid to trade policy, infrastructure, agriculture and education being significant in promoting trade. This is consistent with past findings by Morrissey et al (2004) and Velde and Cali (2009) who state that channeling aid to productive sectors in an economy could boost export oriented growth. Aid to industry had no impact on trade so we neglected it in our results. It was likely that finished goods from developing countries do not compete favorably with goods from developed countries and technology is often a problem in developing countries making it difficult to produce. Effective aid had contributed less to exports compared to official aid. However multilateral aid proved more useful promoting export than bilateral aid this is attributable to conditions associated with multilateral aid disbursements which make them more effective in promoting exporting.

We also investigated if economic policies and institutional quality improves or decreases aid effectiveness in promoting trade in Africa? We found that economic policy and the quality of institutions in Africa generally weakens the effectiveness of aid in promoting trade. The interactive variables "aid*government economic policy" "aid*institutional quality" and "aid*natural resources" had a reduced effect on trade. This is consistent with past findings such as Burnside and Dollar (2002) and (2004) which state that aid will be effective in the presence of good policies and other findings by Sachs and Warner (1995) and Ross (2001) that suggest the presence of natural resources and weak institutions can affect economic development in developing countries. The inclusion of natural resources in our model caused our model to suffer from misspecification resulting in negative R-squared so we exclude it and used its interaction with aid in our subsequent GLS regression. This interactive variable aid* natural resources exerted a reduced effect on trade across all sectors, reducing aid effectiveness across sectors. Therefore diversifying the economy in many African countries should therefore be a strong concern to governments.

The policy implications of our findings is that economic policy has a significant effect on aid effectiveness in Africa, therefore donors should continue to emphasize the need for African countries to float sound and consistent economic policies. Such policies could be vital in shoring up investor's confidence and ensure the effective use of aid to boost capacities that can improve trade and stimulate export oriented growth on the long run. Secondly channeling aid to sectors that are likely to improve export capacities in developing countries could likely improve the way that aid can be used to drive growth in an effective manner. Aid given to trade capacities

will likely fulfill the short term intention of giving aid to developing countries since it is likely to contribute to export driven growth in many African countries allowing for a discontinuation of aid giving policies to promote growth. Over reliance on natural resources continue to remain an impediment to the growth of other sectors in many African economies, promoting diversification is likely to help prevent shocks (due to price fluctuation in natural resources) in many African countries that rely on specific natural resources for income. The reliance on these natural resources as a source of alternative revenue often prevents governments from implementing sound policies that could improve growth. Alternative revenue sources through for example a creation of effective taxation scheme can help create other sources of financing government activities thereby reducing overdependence on resource derived revenues.

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Appendix A. Table 14 Trade Regressions With Aid*Economic Policy Interaction

Method of Estimation	GLS (1)	GLS (2)	GLS (3)	GLS (4)
Aid to trade	0.19 (.07)***	-	-	-
Aid to Trade*Policy	0.01 (.01)**	-	-	-
		-	-	-
Aid to infrastructure	-	0.16 (.19)***		
Aid to Infrastruc.*policy	-	0.01 (0.01)**	-	-
Aid to agriculture	-	-	0.37 (.13)***	-
Aid to Agriculture*policy	-	-	0.02 (.01)**	-
Aid to Education	-	-	-	0.64 (.22)***
Aid to Education*policy	-	-	-	0.01 (.01)**
Aid to industry	-	-	-	-
Aid to Industry*policy	-	-	-	-
School Enrollment	0.01 (.003)***	0.01 (.003)***	0.01 (.003)***	0.01 (.003)***
Exchange rate	0.07 (.02)***	0.02 (.02)	0.22 (0.14)	0.01 (0.02)
Institutional quality	0.27 (.04)***	0.26 (.04)***	0.26 (.04)***	0.26 (.04)***
Liberalization rate	-0.03 (.03)***	-0.03 (.03)***	-0.03 (.03)***	-0.03 (.03)***
GDP per capita	0.07 (.05)	0.08 (.05)**	0.07 (.05)	0.08 (.05)
Chi^2 (p-value)	0.00	0.00	0.00	0.00
# of observations	131	131	131	131
R-Squared	0.62	0.62	0.62	0.62

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Appendix B. Table 15 Trade Regressions With Aid*Institutions Interaction

Method of Estimation	GLS (1)	GLS (2)	GLS (3)	GLS (4)
Aid to trade	0.22 (.07)***	-	-	-
Aid to Trade*Institutions	-0.04 (.01)***	-	-	-
			-	-
Aid to infrastructure	-	0.84 (.28)***		
Aid to Infrastr.*Institutions	-	-0.06 (0.01)***	-	-
Aid to agriculture	-	-	0.40 (.13)***	-
Aid to Agric*Institutions	-	-	-0.04 (.01)***	-
Aid to Education	-	-	-	0.67 (.22)***
Aid to Educ*Institutions	-	-	-	-0.04 (.01)**
Aid to industry	-	-	-	-
Aid to Industry*Institutions	-	-	-	-
School Enrollment	0.01 (.003)***	0.01 (.003)***	0.01 (.003)***	0.01 (.003)***
Exchange rate	0.02 (.02)	0.02 (.02)	0.02 (.02)	0.02 (.02)
Liberalization rate	-0.05 (.03)***	-0.04 (.03)***	-0.04 (.03)***	-0.04 (.03)***
GDP per capita	0.07 (.05)	0.08 (.05)**	0.07 (.05)	0.08 (.05)
Chi^2 (p-value)	0.00	0.00	0.00	0.00
# of observations	131	131	131	131
R-Squared	0.62	0.62	0.62	0.62

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

Appendix C. Table 16 Trade Regressions With Aid*Natural Resources Interaction

Method of Estimation	GLS (1)	GLS (2)	GLS (3)	GLS (4)
Aid to trade	0.22 (.10)***	-	-	-
Aid to Trade*Resource	0.0004 (.0004)	-	-	-
Aid to infrastructure	-	0.89 (.40)***	-	-
Aid to Infrastr.* Resource	-	0.0001 (.001)	-	-
Aid to agriculture	-	-	0.42 (.19)***	-
Aid to Agric.* Resource	-	-	0.0004 (.0005)	-
Aid to Education	-	-	-	0.71 (.32)***
Aid to Educ.* Resource	-	-	-	0.0004 (.0005)**
Aid to industry				
Aid to Industry* Resource	-	-	-	-
School Enrollment	0.01 (.004)**	0.01 (.004)**	0.01 (.004)**	0.01 (.004)**
Exchange rate	0.04 (.03)***	0.04 (.03)	0.04 (0.03)	0.04 (0.03)
Institutional quality	0.19 (.04)***	0.19 (.05)***	0.19 (.05)***	0.19 (.05)***
Liberalization rate	-0.04 (.03)***	-0.04 (.03)***	-0.04 (.03)***	-0.04 (.03)***
GDP per capita	0.07 (.07)	0.08 (.07)	0.07 (.07)	0.07 (.07)
Chi^2 (p-value)	0.00	0.00	0.00	0.00
# of observations	131	131	131	131
R-Squared	0.61	0.61	0.61	0.61

Notes: Coefficients listed with standard errors in parentheses. *, ** and *** refers to significance at the 1%, 5% and 10% levels, respectively. First stage results in Appendix.

TECHNOLOGY INSOURCING IN A UNIVERSITY SETTING

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Abstract

Traditional models of university technology transfer focus on transferring faculty-developed technology from within the university to outside corporations. We propose a novel insourcing paradigm whereby universities bring outside companies into a university setting in exchange for research funding, equipment purchases and faculty consulting fees. Universities hold excess capacity in the form of faculty consulting bandwidth. This faculty consulting can be hugely valuable to private technology companies. In return, these companies supply the university with a variety of value in the form of physical and intellectual capital as well as a variety of opportunities for students.

Keywords: Technology insourcing, Technology transfer, University insourcing

1.0 Introduction

Technology commercialization is a lucrative enterprise for many United States universities. According to the University Transfer Managers (AUTM) 2010 survey, US universities licensed 4,284 technologies in 2010, and collected a total of $2.4 billion in royalties, equity exits and other income.

Past inquiry and implementation of University technology commercialization have focused on the transfer of technology from within the University to outside industries. Within the current research, a widespread model of technology transfer has centered on University investment in intellectual property, predominantly patents, that can be licensed out to private companies, returning a sales-based royalty fee to the University. More recently, research (Bray, Lee 2000) has led to increased

awareness of superior returns related to specific arrangements within technology transfer. Accordingly, while total license income increased 3.0 percent in 2010, cashed-in equity increased 160 percent.

As noted by some, (Jenson, Thursby 1998) prior to the Bayh-Dole Act, the vast majority of university inventions did not see commercialization. University faculty simply do not have the time and resources required to bring their inventions to market. However, inventor involvement is necessary for the long term success of such technology commercialization. To ensure ongoing alignment of incentives between the licensee and the inventor, license fees are typically split between the university that sponsored the research and the inventor. By giving individual inventors a stake in future royalty payments, these inventors have a clear reason to maintain involvement with the technology even after it has been transferred out of the university. This motivation is crucial to successful technology transfer. As detailed in previous work (Thursby, Thursby 2004), university technology is unlikely to successfully transfer out of the university without ongoing support from its original inventor.

University research depends heavily on publicly funding programs from the National Science Foundation (NSF), the National Institute of Health (NIH) , and the National Endowment for the Humanities (NEH). These resources are under constant threat from the waxing and waning of the federal budget. It is important that universities develop innovative models of insourcing in order to supplement these public funding sources with private investment. An innovative model of technology transfer may offer a model that smoothes these gaps in funding and adds significant value to the research ecosystem within universities.

In this paper, we propose a novel conceptual model of insourcing intellectual property into a university setting. In this model, rather than transferring technology from the university to outside corporations, we propose bringing outside intellectual property into the university setting. These outside technologies will gain tremendous value from the underutilized faculty consulting resources available at a university.

2.0 Literature Search

The relevant literature on university insourcing is broken into three categories: 1. Insourcing discussions as a response to outsourcing; 2. Technology transfer discussions; 3. Private funding of university research discussions. A brief discussion of these three areas of inquiry will build the broad understanding necessary to discuss novel university insourcing paradigms.

2.1 Insourcing

The challenges of insourcing have been discussed in the literature. While the cost savings of outsourcing are often elusive, management may have trouble swimming against the current of the outsourcing trend among senior executives (Hirschheim, Lacity 2000). Furthermore, there is often significant risk associated with large institutional outsourcing (Schniederjans, Zuckweiler 2004). It is often difficult to identify which practices should be outsourced or insourced. There is evidence that many practices increase firm value when insourced (Qu, Oh, Pinsonneault, 2010). The terms"outsourcing" and "insourcing" have inspired a range of definitions over the years. Given the ambiguity of these terms, a continuum of meaning may be a more appropriate when deriving a definition (Bergstra, van Vlijmen, 2010). It is therefore a primary aim of this paper to delve into the associated meaning of the term "insourcing" from an impartial viewpoint.

3.2 Technology Transfer

Studies such as the Association of University Technology Managers' (AUTM) Licensing Activity Survey have detailed the significant returns generated by some of the United States elite universities. During FY2010, 4,284 technologies were executed, with a $2.4 billion returned to universities in the form of royalties, equity exits and other income. Trune and Goslin took this AUTM data to analyze the profitability of university research in a broad sense — accounting for technology transfer office costs, patent costs, new research grants, and royalties due to licensing agreements (Trune, Goslin, 1998). The study found that only 48.8% of technology transfer offices operated at a profit when all factor were taken into account. While the majority of universities do not turn a profit, some turn rather sizable profits — a few, greater than $21 million. The study also found that these technology transfer offices had an average contribution of $2.37 million to surrounding communities. There has also been significant research on the effects of institutional and organizational variation on the return of Technology Transfer Offices within universities. Siegel et al suggest that faculty reward-mechanisms are a crucial factor in predicting favorable returns for universities (Siegel, Waldman, Link, 2003). This may be due to a moral hazard problem as well as the embryonic state of these early-stage technologies (Jensen, Thursby, 1998). Sponsored research may alleviate these issues but do not solve the issues of moral hazard (Jensen, Thursby, 1998). Others have discussed the effect of private needs and activities on successful university relationships. Thursby and Thursby found that the level of privately sponsored research was related to a firm's basic research activities, while licensing relationships were predicted by a prevalence of personal contacts between the two institutions (Thursby, Thursby, 2008).

2.3 Private Sponsorship

Private sponsorship has had an enormous impact on university research. There is significant benefit to private sponsorship in the form of research, equipment and postdoc funding. There has been a virtuous cycle related to such investment — creating excess benefit that is used across universities. However, this outside influence is considered by many to be a double edged sword (Montaner, O'Shaughnessy, Schechter 2001). The role of private funding in university research can have serious and unforeseen effects. There is concern that the increasing presence of private corporations in clinical trials of pharmaceutical drugs — while reducing costs for private companies and increasing research funding — may be redefining the rules of engagement within these fields (Davidoff et al. 2001). Some have found that private sponsorship of clinical trials may result in biased results, due to selective reporting or publication of low-quality papers that support the wanted results (Djulbegovic, et al 2000).

3.0 Novel Model of Insourcing

Research question:

Will technology insourcing return additional value to research universities?

University insourcing will be defined as follows:

The process by which a university brings outside companies into a university setting in exchange for research funding, equipment purchases and faculty consulting fees.

Private companies are particularly good candidates for insourcing. Private companies require flexible and scalable resources in order to develop technologies and reach markets. Capital efficiency and scalability are both absolutely critical for companies. These two, often contradictory, needs are incredibly difficult for companies to balance. One area of critical importance for companies is in gaining expert knowledge. Companies are often not able to afford leading experts. Furthermore, the appetite for risk of leading scientists may not be a good fit at some private companies. Startup incubators and accelerators such as TechStars and Y Combinator do a great job at lowering the barrier to entry for technology companies by supplying top-quality mentors in the areas of consumer and enterprise information technology.

Universities are in a unique position to supply the specific expertise needed by private companies. Universities have an abundance of expert knowledge in the form of faculty consulting. The ability to supply expert consulting in an affordable and scalable manner would be hugely valuable to companies.

By bringing in outside intellectual and financial capital into the university, companies add to the innovation ecosystem of university research. This is tremendously value-additive and in alignment with most university missions. University insourcing may also bring in further grant financing previously unavailable to university researchers. Many federal grant programs place importance on commercialization — insourcing is a way to address this need.

The following model describes a method for insourcing private companies that will utilize underutilized faculty consulting to add significant value to companies and return financial and intellectual value to the university and its students.

University insourcing provide 3 fundamental elements to private companies.

1. Matching faculty consultants with startup needs
2. I.P. consulting and funding
3. Increased recognition for companies

Universities receive 3 fundamental elements from the insourced companies.

1. Research funding and equipment
2. Consulting revenue
3. Education and professional opportunities for students

4.0 Visual Model

What follows is a brief description of the included visual model depicting the process of value creation within university insourcing.

University resources holds underutilized resources in the form of faculty consulting hours. In this model, insourced companies gain access to faculty consulting, which fuels creative innovation. In many cases, this consulting increases further the innovation within the faculty member's own research, creating a virtuous cycle of increasingly innovative research. In most cases, the faculty will also receive consulting fees. This increased innovation is also likely to attract additional grants to university.

In exchange for faculty consulting, an insourced company may offer its university a stake in its future revenues as well as its current equity. Future revenues will be paid back to the university in the form of royalty payments. Universities must be careful to structure such an agreement in a way that does not strangle a company. Mechanisms such as a grace periods or leveraged royalty scale (whereby the royalty % increases as total revenue increases) should be considered. These royalty payments are then distributed

between both the university and the faculty members who provided consulting. The other form of ROI takes place during a liquidity event. The university may choose to sell its equity stake, returning capital to the university and its stakeholders, or it may choose to retain possession in the acquiring company or public company. The university will also gain tremendous value from the consulting fees, and research funding, equipment purchases and student opportunities provided by private company involvement.

4.1 Fundamental Premises

- Universities carry underutilized faculty consulting bandwidth
- Faculty have interest in working with private companies
- Universities are willing to explore novel insourcing paradigms
- Insourcing will increase ROI for Technology Transfer Offices

5.0 Methodology

Six policy makers in Vermont were engaged in a series of semi-structured interviews.

Open Questions:

a. Is your university open to new types of insourcing?
b. Is there a precedent of insourcing at your university?
c. What new models would you be open to?
d. What obstacles do you see?
e. What are the greatest opportunities related to insourcing?

Rank the following statements from 1 to 5 according to:

1. *Strongly Disagree*
2. *Disagree*
3. *Neutral*
4. *Agree*
5. *Strongly Agree*

Scaled Questions:

a. Our university is considering new models of insourcing.
b. Faculty consulting holds unfilled capacity.
c. Insourcing has potential in increase university ROI.
d. Insourcing is feasible within your university.
e. Insourcing is attractive to your university.
f. Universities should explore novel insourcing paradigms.
g. Outside company activities add value to university research.
h. Insourcing would stress capacity at Tech Transfer Offices.
i. If so, TTOs would be interested in growing to accommodate

extra demand.

j. Universities should be careful not to take on too much insourcing.

6.0 Results

The six interviewees are anonymized and abbreviated with initials: AB, BC, CD, DE, EF, and FG. All interviewees hold, or have recently held influential positions at Vermont colleges and universities.

6.1 Open Questions

The first portion of interviews consisted of open questions in which the interviewees were asked to give an account of current activities and interests at their own universities.

Q1. Is your university open to new types of insourcing?

All interviewees were generally open to new types of insourcing — however, the level and area of interest differed. Some responded that, while they were open to any new model that would increase ROI at the university, they were not actively exploring new models of insourcing. BC said, "We are always willing to look at new models. Especially if it doesn't cost anything. Everyone is looking to tweak methods for improvement." Some respondents remarked that if new models of insourcing were able to bring value to specific areas they would be especially enticing. BC said to this question, "Absolutely. Especially if there is an educational element." CD mentioned that the university was looking into novel ways to fund research — smoothing out the ups and downs related to federally financed programs.

Q2. Is there a precedent of insourcing at your university?

All six respondents identified some precedent of insourcing at their own institutions. Examples included biomedical research funded by pharmaceutical companies, collaborative research, and student consulting projects for outside companies. Privately funded research examples tended to be tied to work of specific individuals — faculty or administrators, while student-related projects tended to be institutional relationships. FG pointed out that student consulting projects provide huge value to students in forming career-driven skills and also to local businesses that have trouble finding, and affording consulting work. DE's institution had a similar program, "Every student usually completes 2-3 group projects during their undergrad years, with their senior one a requirement to graduate. They are across the board and not just hard core engineering (music, business, as well as biomedical, gaming, etc)."

Q3. What new models would you be open to?

Respondents were open to a variety of new models. The strongest interest was in new models of insourcing that would benefit the students directly — adding valuable research experiences and career opportunities. While most individuals were wholly open to exploring new models, it was not as clear that institutions' interests were open to change. DE's institution is exploring models where outside corporations approach the university, who then sets up teams of students and faculty with the right attributes for the proposed project.

Q4. What obstacles do you see?

Respondents identified a variety of obstacles. The most common obstacle was related to institutional inertia. CD was concerned that faculty interest may be an obstacle. University faculty and departments have been optimized over the years to garner federal funding. Privately funded research is foreign to many, and therefore buy in to insourcing may be difficult. For many, insourcing is not a well understood avenue and for others it is simply not attractive. Another obstacle may be related to intellectual property. AB and DE identified IP issues as a major obstacle for university insourcing. BC discussed that obstacle may differ, depending on the needs of companies — for some time and space may be constraints. FG highlighted obstacles caused by asynchronous schedules of private companies and universities; many businesses have specific needs over the summer, when students are no longer available.

Q5. What are the greatest opportunities related to insourcing?

Discussions of opportunities centered around benefits for students and university research. DE mentioned that the interaction of private companies with students creates tremendous job opportunity. Often, students acting as consultants are hired after projects are finished. FG mentioned that student and business interests are closely aligned — both are able to leverage insourcing to gain tremendous learning experiences. BC discussed the benefits related to increased creativity and interdisciplinary connection. CD discussed the benefits of university research that is more closely aligned with private sector needs — creating a more sustainable research enterprise and offering skills to students that are closely fitted to private sector needs.

6.2 Scaled Questions

	AB	BC	CD	DE	EF	FG	AVG
a. Our university is considering new models of insourcing.	5	4	5	4	4	5	**4.5**
b. Faculty consulting holds unfilled capacity.	4	5	3	5	5	5	**4.5**
c. Insourcing has potential to increase ROI.	5	5	5	3	4	4	**4.3**
d. Insourcing is feasible within your university.	5	5	5	4	4	4	**4.5**
e. Insourcing is attractive to your university.	5	2	3	5	4	3	**3.7**
f. Universities should explore novel insourcing paradigms.	5	5	5	5	4	5	**4.8**
g. Outside company activities add value to university research.	5	5	5	5	5	5	**5**
h. Insourcing would stress capacity at Tech Transfer Offices.	2	3	2	2	3	3	**2.5**
i. If so, TTOs would be interested in growing to accommodate extra demand.	3	3	2	3	4	4	**3.2**
j. Universities should be careful not to take on too much insourcing.	2	3	2	2	4	3	**2.7**

7.0 Discussion

The results of both the open ended and scaled questions display a strong interest in university insourcing among participants. While we expected to find interest in university insourcing, the level and scope of interest were remarkable. Some interesting findings worth discussing are: return on investment, variability in participants' definition of terms, student engagement, barriers to insourcing and the role of technology transfer offices.

7.1 ROI

There was agreement among respondents that university insourcing is

likely to increase ROI for university research. ROI was defined by respondents to include financial, physical, and intellectual capital. External opportunities for faculty and students were also considered to be a substantial source of ROI.

7.2 Definitions

The proposed definition of university insourcing — the process by which a university brings outside companies into a university setting in exchange for research funding, equipment purchases and faculty consulting fees — was used to frame the discussions with participants. The definition was purposefully broad in scope in order to allow for individual interpretation. This helped to expose the individual and institutional definitions and usages of the term. Participants tended to define insourcing at their own universities in three specific ways. The first definition that we encountered is related to the insourcing of funds — public or private — to fund university research. Universities are able to "insource" research that would have previously been done elsewhere. This can include anything from specific, privately funded projects to large public funding mechanisms. The second definition covers the process by which universities will insource all or part of a private company — bringing the company onto campus — interacting directly with faculty and student teams. The final definition describes the process by which a private company will hire the university to build a consulting team of faculty and students to delivery a specific project. While all three definitions broadly fit the model of insourcing proposed in this paper, each is unique and requires university resources and attributes.

7.3 Student Engagement

Student participation in insourcing was a common area of interest among respondents. Within all three definitions of insourcing described above, student involvement played an important role. Student engagement in university insourcing is perceived to add value in the form of research opportunities, job-specific skills and job placement. Job opportunities and industry-specific skills are increasingly important to both undergraduate as well as graduate students.

7.4 Barriers to Insourcing

The data show that universities are seriously considering new models of insourcing. Furthermore, insourcing is perceived to be highly feasible and to offer significant ROI to universities. Interestingly, insourcing is not perceived to be a stressor on technology transfer offices. Given these results, we might expect participants to strongly agree with the statement, " insourcing is attractive to your university." However, participants response

was tepid — at 3.7/5.0.

Participant interviews revealed that there are two reasons for this: university flexibility and faculty interest. While novel insourcing paradigms may interest individuals within a university, they may be difficult to implement if they are not aligned with the university's organizational inertia. There are many stakeholders and pivotal players that play a role in such a type of institutional change. Organizational alignment of interests and buy in from these players is crucial to implementing university insourcing. Participants were skeptical of such conditions at their own universities.

The second major barrier is related to faculty acceptance. The prevailing model of publicly funded research is a strong motivator for university faculty. Faculty often feel that they do not have the time or interest to interface with private sources of funding. Furthermore, there is an ongoing concern about the moral hazard related to private funded research. For these reasons, faculty buy in is a serious barrier for some models of university insourcing.

7.5 The Role of Technology Transfer Offices

Technology Transfer Offices (TTOs) will likely play an important role in the implementation of insourcing systems. However, respondents do not expect insourcing to bring significant stress to TTO operations. While there may be many reasons for this, the implication among participants was that insourcing would not be a tightly controlled mechanism for the TTOs, but rather a medium through which faculty, students and private companies can effectively collaborate.

8.0 Conclusions

This exploratory search into novel insourcing paradigms within a university setting is intended to open the discussion and definition of the concept. These initial data have shown that there is significant interest within universities for novel forms of insourcing. Furthermore, we have begun to detail the returns, opportunities, channels, and barriers related to university insourcing. Further study is necessary to refine the scope of definition and broaden the sample of university stakeholders. While this survey has begun to peel back the outside layers, we are left with many more questions about the future of university insourcing.

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REVIEW OF HOUSEHOLD DEBT AND FINANCIAL STABILITY RELATIONSHIP CONCEPT

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Abstract

Concept of relationship between household debt and financial stability is reviewed in this article. First, financial stability concept is briefly introduced. Then relationship between indebtedness level and financial stability is discussed in general. And finally it is concentrated on describing how debt level of household sector is related with financial stability. Household debt has substantial impact on country's financial stability. Excessive borrowing may cause serious systemic problems.

Keywords: Financial stability, household debt, systemic risk

Introduction

Each recession draws additional attention towards analysis of its prevention, causes and rapid recovery. During recent years (before and during the last economic crisis) financial stability was becoming increasingly important question among researchers. Since 1996 until 2005 the number of banks which prepare reviews of financial stability increased from 1 to 40 among members of IMF. Historically microeconomic point of view towards financial stability was dominating, but recently researchers agreed that macroeconomic or systemic approach is required. One of the most important sources of systemic risk is debt or in other words indebtedness of various economic sectors (public sector, enterprises, and households).

In this article it is intended to define household debt and financial stability relationship concept by over viewing recent researches. First, concept of financial stability is briefly described. Then relationship of general indebtedness and financial stability is characterized. And finally it is concentrated on relationship between household debt and financial stability.

Concept of financial stability

Two main approaches toward financial stability exist, these are microeconomic and macroeconomic. The main differences are stated below (see Table 1).

Table 1. Macro-versus micro perspective.

	Macroprudential	**Microprudential**
Immediate objective	To limit instability at system level	To limit problems at institutions' level
Ultimate objective	To avoid macroeconomic costs associated with financial instability	Consumer protection (investor/depositor)
Risk characterization	Endogenous (dependent on collective behavior)	Exogenous (independent from the behavior of individual agents)
Correlation and common exposures across institutions	Important	Irrelevant
Calibration of prudential filters	Targets risks at system level	Targets risks at institutions' level

Source: Borio (2003)

Historically microeconomic approach toward financial stability dominated. But currently most attention attracts macroeconomic approach which is relatively much less researched, but is indispensible in order to avoid economic instabilities which could be noticed during last economic crisis.

By utilizing macroeconomic approach financial stability is analyzed from systemic perspective and on macro level. Problems in individual institutions or financial markets does not create threats for financial stability until it is not expected that these problems damages economy as a whole or triggers spreading of problems across whole financial system. Such troubles of separate institutions can even be positive fact from macroeconomic financial stability perspective (Maliszewski, 2009).

Some authors state that in a broad sense general purpose of macroeconomic policy is to reserve financial stability. As specific goals it is possible to underline aim to decrease systemic risks and losses causes by financial crisis (Chiriacescu, 2013).

Debt and financial stability

Indebtedness level is one of the most important factor which influences financial stability. During last two decades debts increased substantially in OECD countries (Sutherland, D. et al., 2012). High

indebtedness level transfers economic shocks. Moreover it prevents enterprises and households from reaching optimal consumption and investments, governments cannot properly manage economic downturns.

Weak balance sheet can even prohibit from coping with minor economic fluctuations, which can considerably decreases cash flow towards consumption and investments. Moreover changes of liquidity constrains can increase negative impacts of disorder and influence supply of credit (Barrell et al., 2006).

Pro-cyclic government's borrowing policy dominates. Debt level usually increases during economic downturn which substantially limits actions of a government and triggers threats to financial stability (Egert, 2010; Corsetti et al., 2011).

During last few years OECD intensively researched relationship between debt and macroeconomic stability. In their researches OECD Economic department split analyzed debt into government's debt, enterprises' debt and household debt (Sutherland, D. et al., 2012). Further on in this paper it is concentrated on relationship between household debt and financial stability.

Household debt and financial stability

Sutherland and Hoeller (2012) describe impacts of different forms of debt to macroeconomic stability. Borrowing by households was increasing rapidly during recent years. The main reasons of debt increase are liberalization of financial markets and financial innovations which created more opportunities for investments. Due to changes in the market credits became available for individuals with low income and number of restrictions applied for borrowing for the first home decreased (Girouard et al., 2006). Macroeconomic environment and other factors also influence increase of borrowing, for example, current and forecasted interest rate, expectations and demographic changes. In the light of liberalization of financial system individuals became more sensible to the changes of asset values (Barrell and Davis, 2007). Increase of real estate prices let the people to increase their debts (Dynan and Kohn, 2007), therefore loan and asset value ratio increased in majority of countries. Decreasing regulations in accommodation financing market and financial innovations are related to housing crediting bubble (Campbell and Hercowitz, 2005).

After review of academic papers it can be stated that analysis of relationship between household debt and financial stability is in relatively early stage. Sutherland, D. et al., (2012) state that increase of household debt indicates upcoming economic and financial system troubles. Moreover relationship between debt level and changes of asset value is present.

Therefore relationship between household debt and financial stability clearly exists, but it is not sufficiently researched.

During last economic crisis it could be clearly noticed that economic sector of households had crucial impact for development and burst of real estate bubble in USA and in that way triggering of financial instability (Acharya et al., 2009). Debelle (2004) underlined that distribution of the debt has to be analyzed in order to understand the impact of debt to economy. Aggregated debt data does not supply enough information about risk for financial stability arising from changes of indebtedness level. During research of the influence of household debt to financial stability Austria's central bank at the same time analyzes indebtedness level and asset value, in that way defining impact of debt to financial stability (Albacete and Lindner, 2013). International monetary fund (2012) analyzed how financial sector of households influence Spain's financial stability. It was analyzed what part of household debt can be written off (loss in case of default) and if that sum can affect financial stability.

Another research was carried out in Austria in order to find out what influence household debt has on financial stability (Beer and Schurz, 2007). During the research it was concluded that indebtedness level is not a big threat for Austria's financial stability. Debt level is low comparing to other counties and credits are concentrated among wealthy and high income individuals. Another factor diminishing negative influence of debt level is that relatively big proportion of debt are housing credits which are usually backed by pledge of assets. One risk factor exists, big part of credits are taken in foreign currency which exposes households to foreign exchange risk. The riskiest individuals are these who take loans for consumption and have smaller income and fewer assets.

Important lesson which could be learned from recent financial crisis is that economic and financial system stability depends not only on consumption prices and wage inflation. Other important factors are asset price inflation, enterprise and household indebtedness level. Central banks paid too little attention towards these issues and concentrated on historically set goals, therefore they could not manage financial turbulences (Hui, 2011). Hui (2011) analyzes household indebtedness level in Malaysia. For the research he proposes such variables: debt and GDP ratio, debt and income ratio, debt-service ratio, debt and real estate prices ratio. During year 1997 crisis in Asia banks suffered heavy losses due to corporate bankruptcies which was the reason for decrease of corporate financing, but this lead to increase of household financing. Since 2000 to 2010 credits to individuals increased from 34% to 56% and therefore exceeded corporate financing.

OECD (2010) in its report about Hungary's financial system's stability states that high household sectors indebtedness in foreign currency

is a serious problem. When local currency lost its value, citizens faced problem in servicing their liabilities. Moreover prior crisis the financial liabilities were taken not according to abilities to service them. Excessive risk taking and governments' disability to control thoughtless borrowing led to serious problems for financial stability.

In Estonia household debts also grew before the last crisis. This was lead mainly by low interest rates and minor constrains applied by banks. Moreover increasing incomes encourage individuals to borrow. Kask (2003) analyses the impact of household debt to Estonia's financial stability. On macroeconomic level household insolvency risk which influences stability of banks does not varies only because of aggregated debt or income, but also because of other assets in borrower's balance sheet and macroeconomic factors (interest rate and phase of economic cycle). Analysis on macroeconomic level is also burdened by the fact that household sector is not homogenous; it consists of various groups with different income, wealth and age.

If debt level increases because of demographic reasons, growth of income and wealth or economic cycle, then insolvency risk is low and withdrawal of additional credits cannot be treated as excessive. But if banks mitigate crediting constrains, then individuals can exceed optimal indebtedness level during particular economic cycle. The risk for the individual increases then increase of the loan is not tuned to increase of asset value. In such situation paid interests and capital gearing increase, therefore borrower becomes more sensitive towards changes of interest rate and income. Insolvency risk for the creditor depends on ratio of unsecured loans in the whole household portfolio.

If debt servicing problems for households occur on the large scale, then increasing losses due to bad loans weakens solvency of financial intermediaries. In such case banks can restrict crediting or in worst case scenario systemic crisis can be triggered. Negative influence of insolvency depends on ability of individuals to assess undertaken potential risks and intensity of crediting policy.

Increasing burden of loans amplifies sensitivity of household consumption for changes of economic environment. Decreasing consumption is one of the most significant factors negatively impacting financial stability.

Increasing indebtedness level may decrease influence of household sector to economic upturn, because consumption of household sector determines scale and duration of the crisis. High debt level also decreases ability to boost economy through monetary policy (lower interest rate).

Financial stability of household sector makes direct (credit repayment) and indirect (changes of consumption level) impact on banks' and whole economy's financial stability.

Kaufman (1986) in his research carried out almost thirty years ago tries to attract attention toward increasing indebtedness of USA. The author elaborate that debt increases in all sectors of the economy: household, corporate and government. Household debt and income ratio decreased by 25%, household debt and asset value ratio decreased by 15% during ten years period. Increasing debt diminishes flexibility of households during changes of economic cycle. The author recommends undertaking proper fiscal and monetary policy in order to keep optimal indebtedness level. Among the list of researcher's recommendations one of the most important is to proceed to systemic risk consideration. In other words monitor and manage financial stability on macroeconomic level. This outlook is currently rapidly developing.

Houben et al. (2004) describes main sources of risks for keeping financial stability. If it is wanted to assess main risks, then it is needed to systemically analyze different parts of financial system (financial market, institutions and infrastructure) and real economy (households, enterprises and government). During analysis it is important to take a look at cross sector and cross country relationships, because the disorders start due to problems in different parts of economy. Interconnection of economy members is very important, so problems in household sector may spread across whole economy and threaten system's financial stability.

Research by Crockett (1996) again backs the same arguments; it is stated that financial situation of enterprises and households is potential source of systemic problems. This goes along with "debt-deflation" outlook developed in 1930s (Fisher, 1993; King, 1994). Number of authors stated that excessive borrowing of individuals during economic boom can trigger recession during economic downturn (Kaufman, 1986; Friedman, 1991). During economic slowdown individuals face debt servicing problems and their net capital decreases, therefore further crediting is restricted which leads to systemic problems.

Conclusion

Indebtedness level of households can have serious impact on country's financial stability. Household debt is an important source of risk. Due to close interconnection between economy members problems in household sector can cause systemic problems.

Over last two decades household debts were constantly increasing, thus putting more pressure on financial stability. Negative influence of increased debt can be minimal if the debt is in line with larger income, asset price, economic cycle or demographic changes. One more factor which decreases risk is the substantial part of credits withdrawn for accommodation

financing. On the other hand factor which increases risk is large part of credits issued in foreign currency.

Excessive and not properly controlled borrowing can lead to serious financial stability problems. Individuals can become more sensitive to interest rate and income changes. They can lose flexibility during change of economic cycle. Exceeding optimal debt level during economic upturn may cause serious problems after the economy starts to slow down. Household debts can have direct impact on financial system when banks suffer losses due to clients' insolvency and indirect effects through decrease in consumption.

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SECURITIES: THE USAGE TO A LENDING BANKER

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Abstract

This paper researched into why provision of collateral security by a bank customer is not a 100% guarantee that facilities sought for would be granted. The prerequisite for granting facilities includes: Good Character-integrity, strong financial Capacity, repayment proposal, the purpose of the loan, the Ratio/Proportion of the loan/facilities sought-for to that of the security offered. The lending banker should also consider: relevant accounting ratios. The real security is the integrity of the borrower; lending proposition must be so good that the question of security becomes secondary

Keywords: Bank customer, Securities, Lending Banker and Facilities

INTRODUCTION

The development of commercial activities in any economy depends largely on the financial sector that operates in that system. Banking sector constitutes one of the bodies in financial sector. Best (1989) defined a banker as a dealer in capital, or more properly, a dealer in money. He is an intermediate party between the borrower and the lender. He borrows off one party and lends to another.

The above definition places a lot of emphasis on the two traditional functions of banks i.e. mobilization of deposits and granting of loans and advances. Skye bank Plc was set up like other commercial banks in Nigeria to grant short term loans to customers and keep their customers' deposits in save custody. Skye bank Plc extends its facilities (loans and advances) to sole proprietors, partnership, Limited Liability Companies and expatriate groups. During the process of lending to customers, the lending banker is expected to obtain satisfactory answers to some basic questions which are described as canons of lending. Some of these canons are: How much does the customer want to borrow?, why does the customer want bank finance?

and how long does the customer want it for?. Others are: how does he intend to repay?, is the customers' business financially strong enough to keep going if customers' business plans suffer a setback?, what security can the customer offer? and what is your assessment of the customer?

Over the years, the bank had maintained that security is secondary in the process of lending. The past transactions of the prospective borrowers and his accounts with the bank as well as its financial statements are well scrutinized before facilities are approved for the customers.

Some borrowers have the wrong notion that security is the primary pre-requisite for securing loan/facilities from a lending banker. Many propositions had suffered rejections from lending banker even after customers had struggled to provide adequate securities! It is therefore necessary to delve into:

1. Why Banks ask customers to bring securities before loan facilities are granted (if at all the loan would be granted).
2. The prerequisites for granting loans/facilities by a lending banker.

With this research, it is believed that both individuals and corporate bodies alike would be able to know the pre- requisites for approving loan/facility to customers. Hence, they would be able to appraise themselves even before getting to the banks to seek for facilities.

I. LITERATURE REVIEW

Layi and Afolabi (1990) were of the opinion that lending is to identify, measure and manage risk and that a critical analysis of the above factors should provide sufficient basis for lending decision-making. Several studies have been carried out on *securities and the lending banker*. Layi and Afolabi (1990) in their work on Law and Practice of Banking were of the opinion that 'Security is an insurance against unforeseen developments and the last source through which the bank can get its money recouped should things turn sour'. It is a general opinion in the banking parlance that security should not be the primary thing to consider when facilities are requested by a customer from the lending banker. Preferential creditors rank before other creditors in respects of the security pledge; security (CAMA; 2004: Section 498) can even be set aside if created within three months of commencement of winding - up proceeding of a company. David (1981) maintained that- Every lending proposition 'should be up by itself.' – i.e. it should be so good enough not to need any security. Perry (1979) in his work supported David (1981) when he wrote that security is taken as a kind of insurance. The real security is the character - integrity of the borrower. Adekanye (1986) crowned the aforementioned writers' view since he was of the opinion that every lending proposition must be so good that the question of security becomes secondary. It was his opinion that the primary things to consider by

a lending banker are safety, suitability and profitability of the loans and that securities are secondary. Hence, of what use are securities to the lending banker?

Femi Adekanye (1986) provides answer to the above question in his work. He maintained that bankers only asks for security or support in case the business plans suffer a setback and the loan goes bad or becomes doubtful of repayment. Layi and Afolabi (1990) in their 'Law and Practice of Banking' were of the opinion that: 'The general consensus is that, the best form of bank security is the ability and integrity of the borrower; such that the bank can expect to be repaid as and when due and in the ordinary course of business'.

After the integrity of customers has been known and what the loan is meant for is okay, the next step is the interpretation of the customers' accounts. The emphasis is usually on a critical evaluation of the proposal using the lending cannons mnemonically referred to as the "C"s of lending, which are: capital, capability, character, condition and connection (Layi & Afolabi. 1990; 232). This will reveal the customers' business profitability and efficiency, short term solvency/ liquidity ratio and the long term solvency/ stability ratio.

II. RESEARCH METHODOLOGY

For effective and efficient data collection procedures, two main instruments were used namely: questionnaire and personal interview. All members of Loans & Advances department and some staff who have worked in the department before were given questionnaire each for completion. The entire questionnaires were personally administered. Some members of staff who were fully involved in the appraisal of customers' applications by means of financial analysis were interviewed. The research concerns itself with a case study of Skye Bank PLC, Owo Branch. So the population of study comprises the entire staff of Skye Bank PLC, Owo Branch. The entire population was then divided into strata. The strata were made up of: Loans/Advances, Foreign Accounts, Current Accounts and Savings Accounts Department.

Each questionnaire was divided into three sections – A, B and C. Section A inquires about personal data of the respondents. Section B dealt with the canons of lending. Finally, section C concerns itself with the assessment of customers, the importance of accounting ratios in lending procedure and the Demerits of securities to the lending banker. Closed and multiple choice type of questions were used.

III.i HYPOTHESES

In this research work, two hypotheses were employed. These hypotheses are:

Hypothesis 1. Ho: The customer has no wiliness to repay loan
H1: The customer has the wiliness to repay loan

Hypothesis 2. H0: The customer has no capacity to repay loan
H1: The customer has the capacity to repay loan

III.ii ANALYTICAL TECHNIQUE

Chi-square statistical tool was used in testing the hypotheses raised in this research; whereby 'the observed frequency' was compared with the 'expected frequency' so as to bring out the acceptability of the hypotheses raised or otherwise. The following mnemonics would be used: O = Observed frequency; E = Expected frequency; Chi-square $(X^2) = \frac{(O - E)^2}{E}$

The observed frequency was the direct response from the respondents, while 'expected frequency' was the theoretical frequency/result which shows how the observed frequency would have been. The expected frequency is calculated directly from the observed frequency using the following formula:

Expected = $\frac{\text{Row Total x Column Total}}{\text{Grand Total}}$;

X^2 t = Critical value from the Statistical Table and X^2 c = the value computed from the table of data collected.

In analyzing the data, simple Mathematical methods of comparison and Percentages were used. The data collected were analyzed in tabular form.

III. DATA ANALYSIS AND INTERPRETATION OF RESULT

Best and Kahn (1989; 141) advised that a researcher should use the problems generated from the study and generate convenient hypotheses; and that a data summary table should be obtained to justify the result. Hence, this section is devoted to data summary table, justification of result and testing of the hypotheses raised.

A – Canon of Lending

Please rank the following statements – canon of lending by assigning values from 0 to 5 to indicate their relative importance to the lending banker**.**

TABLE I: ANALYZING THE CANONS OF LENDING

S/N	STATEMENTS	VALUES						TOTAL
		0	**1**	**2**	**3**	**4**	**5**	
1.	The amount which the customer want	-	-	-	-	5	15	20
2.	The capital of the customer	-	-	-	-	2	18	20

3.	The capability of the customer	-	-	-	2	2	16	20
4.	The character of the customer	-	-	-	-	-	20	20
5.	Condition of the customer	-	-	-	1	2	17	20
6.	Connection at the reach of borrower	-	-	-	-	2	18	20
7.	The security the borrower has		-	15	-	-	5	20
8.	Period of repayment	-	-	-	-	2	18	20
9.	The purpose of the loan	-	-	-	-	4	16	20

Sources: Researcher's field work

Table I shows the relative importance of using canon of lending in granting loan to customer. From the above table 75% of the respondents were of the opinion that the amount of loan which the customers want is of importance to the lending banker while 90% believed that the capital worth of the borrower's business is of importance to the banker. Considering capacity and character of the customer, 80% and 100% respectively subscribed to the fact that they are of importance to a lending banker. During the course of analyzing the data collected 85% and 90% is of the opinion that condition (state of the economy) and connection respectively are of importance to the banker. Analyzing the table further, the result revealed that only 25% of the respondents believed that security is of importance to a banker. Finally, 90% and 80% believed that the period of repayment and the purpose of the facility respectively are of importance to the banker.

B. - Accounting Ratios

Please rank the following Accounting Ratios by assigning values from 0 to 5 to indicate their relative importance to the lending banker to evaluate the customers' statement of comprehensive income and financial position so as to determine their financial strength**.**

TABLE II: **Accounting Ratio Analysis**

S/N	**RATIOS**	**VALUES**						**TOTAL**
		0	**1**	**2**	**3**	**4**	**5**	
1.	Current ratio	-	-	-	-	2	18	20
2.	Liquidity ratio	-	-	-	-	2	18	20
3.	Stock Turnover ratio	-	-	-	2	2	16	20
4.	Gross Profit ratio	-	-	-	-	4	16	20
5.	Net Profit ratio	-	-	-		3	17	20
6.	Return on capital employed – ROCE	-	-	-	-	2	18	20
7.	Earnings Per share – EPS		-	-	-	5	15	20
8.	Earning yield	-	-	-	4	2	14	20
9.	Gearing ratio	-	-	-	-	4	16	20

Sources: Researcher's field work

Table II shows the relative importance of using accounting ratios in evaluating customers' financial strength. From the above table 90% of the respondents were of the opinion that current ratio is of importance to the banker in evaluating customers' financial position. Considering liquidity ratio and stock ratio of the customer, 90% and 80% respectively subscribed to the fact that they are of importance to a lending banker. During the course of analyzing the data collected 80% and 85% were of the opinion that gross profit ratio and net profit ratio respectively were of importance to the banker. Analyzing the table further, the result revealed 80% and 75% were of the opinion that returns on capital employed and earnings per share respectively were of importance to the banker. Finally, 90% and 80% believed that earning yield and gearing ratio of the customers' business respectively were of importance to the banker.

C. - The Hypotheses

TABLE III: Chi-Square Contingency Table used

HYPOTHESIS NO. 1

HYPOTHESIS NO. 2

O *OBSERVED*	**E** *EXPECTED*	**O – E**	**$(O – E)^2$**	**$\frac{(O – E)^2}{E}$**		**O** *OBSERVED*	**E** *EXPECTED*	**O - E**	**$(O – E)^2$**	**$\frac{(O – E)^2}{E}$**
4	6	(2)	4	0.67		3	3	0	0	0.00
7	5	2	4	0.80		5	5	0	0	0.00
6	4	2	4	1.00		3	4	(1)	1	O.25
2	4	(2)	4	1.00		4	7	(3)	9	1.29
1	0.6	0.4	0.16	0.27		2	2	0	0	0.00
0	0.5	(0.5)	0.25	0.50		3	3	0	0	0.00
0	0	0	0	0.00		0	0	0	0	0.00
0	0	0	0	0.00		0	0	0	0	0.00
X^2c TOTAL =				**3.74**		**X^2c TOTAL =**				**1.54**

TABLE IV: TESTING THE HYPOTHESES

(Summary of the Hypotheses)

S/N	**HYPOTHESIS**	**X^2c** Computed	**X^2t** Table	**D.F**	**LEVEL OF SIG.**
1.	Hypothesis 1 H0: The customer has no willingness to repay loan H1: The customer has willingness to repay loan	**3.74**	**7.81**	**3**	**0.05**
2.	Hypothesis 2 H0: The customer has no capacity to repay loan H1: The customer has capacity to repay loan	**1.54**	**7.81**	**3**	**0.05**

Sources: Fromm Researcher's Chi-Square Contingency Table

INTERPRETATION OF RESULT: The tables above ((Tables III & IV) showed the Chi –square contingency tables to test the two hypotheses raised for the study. Namely

Hypothesis 1. Ho: The customer has no willingness to repay loan
H1: The customer has the willingness to repay loan

Hypothesis 2. H0: The customer has no capacity to repay loan
H1: The customer has the capacity to repay loan

- On Hypothesis 1

The Chi – square computed (X^2c) from the respondents to the questionnaire in the above Chi-Square Contingency Table was **3.74** for hypothesis 1; while the Chi – square from the Statistical table (X^2t) using 3 Degree of Freedom at 0.05 level of significance was **7.81.** Since the X^2c (3.74) is less than the X^2t (7.81) the null hypothesis is within acceptable region; we should not reject the null hypothesis (HO): That the customer has no wiliness to repay loan.

- On Hypothesis 2

The Chi – square computed (X^2c) from the respondents to the questionnaire in the above Chi-Square Contingency Table was **1.54** for hypothesis 2; while the Chi – square from the Statistical table (X^2t) using 3 Degree of Freedom at 0.05 level of significance was **7.81.** Since the X^2c (1.54) is less than the X^2t (7.81) the null hypothesis is within acceptable region; we should not reject the null hypothesis (HO): That the customer has no capacity to repay loan).

D. – ON SECURITY

Please tick the following: SA- Strongly agreed, A – Agreed, DA – Disagreed; to bring out disadvantages of security on lending**.**

Table V: Disadvantages of security on lending

S/N	STATEMENT	SA	A	DA
1	Security is required just for the banker to play save	18	2	-
2	Value of security offered may fall bellow facility required	16	2	2
3	It is often times difficult to perfect legal mortgage	18	2	-
4	Accurate valuation of security is always a challenge	16	3	1
5	Security offered often run down - depreciated	15	3	2
6	There is danger in executing the security	18	2	-

Sources: Researcher's field work

From Table V, the respondents were of the opinion that some of the defects of security to a lending banker are: The value of security offered may fall bellow facility required, that it is often times difficult to perfect legal mortgage, accurate valuation of security is always a challenge to the lending banker, Security offered often run down – i. e depreciation comes to play and there is danger in executing the security.

IV. SUMMARY, CONCLUSION AND RECOMMENDATION

In summary, the study examined the use of securities by the lending banker using Skye Bank Plc, Owo as the case study. The prerequisites for granting loans/facilities by the lending bankers were also examined.

The general conclusion that emerged from the above analysis of the respondents to the questionnaire administered were that:

- Despite the fact that bank customers have no ability to repay the loan approved to them, often times bank customers are not willing to repay the facility. Hence, the study deduced that before facilities are approved to customers the canon of lending ('C's of lending): capital, capacity, character, condition and connection of potential borrowers must be critically evaluated by the banker who had been specially trained in lending procedures.
- The best form of bank security is the ability and willingness to repay the loan/facility and integrity of the customers. These qualities would spore bank debtors to repay the facilities granted to them as and when due.
- From the research it was evidently clear that the banker needs to evaluate the customers' accounts with the bank, as this would reveal the Turnover of the account and eventually helps in lending decision.
- The work revealed that bankers only ask for Security as an insurance against unforeseen developments and that security is only the last source through which the bank can get its money recouped should things turn sour.
- That the lending banker should never rely upon security as the primary source of loan repayment. Any facility granted to customer must be granted on the strength of the feasibility of the purpose for which facility is required – ability to repay vis-s-vis self liquidating. All lending applications must be so good that the question of security becomes secondary.

The empirical findings from this study revealed that the borrowers' Statement of Income and Statement of Financial Position should be analyzed and evaluated by the lending banker using these accounting ratios: Gearing ratio, Current ratio, Liquidity ratio, Stock Turnover ratio, Gross Profit ratio, Return on capital employed –ROCE, Earnings Per share – EPS and Earning yield. The study revealed that a careful analysis of these accounting ratios would be of good bases upon which the lending banker may use during the process of lending.

The empirical findings from this study also revealed that: Security to a banker is something to fall back on and to play safe should a bank customer default. Reasons why collateral securities are not reliable and dependable **(Some Defects of Security)** to a Banker are enumerated below:

- The value of the security offered by a customer may be below the amount of the facility requested for.
- The security offered by the customer may be substandard e. g. Building constructed with inferior building materials.
- Perfection of security especially legal Mortgage always take very long time, expensive, laborious and cumbersome to conclude legal mortgage of any security offered any bank hence, it makes security pledged by the bank customers not to be effective when banks seek court action and foreclosure when customer defaults.
- Often times, accurate valuation of security is difficult.
- Running down of Asset and Asset depreciation is often witnessed by the banker.
- There are Dangers of execution or realization of the security by the lending banker.
- Preferential Creditors rank before other creditors in respects of the security pledged in the borrower's entity is to be liquidated.
- Finally, security can be set aside if created within three months of commencement of winding- up proceeding of a company.

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DETERMINANTS OF EMPLOYEE RETENTION IN GHANA COMMERCIAL BANK, KUMASI

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Abstract

The study investigated the determinants of employee retention in Ghana Commercial Bank (GCB), Kumasi. Various factors that contribute to employee retention such as organizational factors, human resource factors, organizational benefits, commitment, employees' retention and job satisfaction were examined. Quantitative research design, specifically a correlational design was used. Primary data were collected from 98 employees comprising senior and junior staff, through questionnaire administration. The data were analyzed by using Spearman correlation and step-wise regression tools in Statistical Product and Service Solutions (version 17). The findings of the study revealed significant relationships among policies, job satisfaction and employee retention. Some of the specific determinants of retention were job satisfaction, training and development, communication, justice and fairness. This implies that any policy initiative that is aimed at employee retention should focus on these determinants. It is therefore recommended that employees and branch managers should co-operate and review the existing benefits by paying more attention to policies that will influence job satisfaction, training and development, communication and justice and fairness.

Keywords: Organization, goals, benefits, job, satisfaction, employee, retention, bank, Ghana

Introduction

Employee retention, from its inception, has been well emphasized in Price and Mueller's (1986) model on retention (Bruce, 2003). This theory seems to suggest that retention efforts by management must take into consideration employees' higher needs in addition to their job context needs. This is also in line with Herzberg's (1959) two factor motivational theory which classified employee's needs as intrinsic and extrinsic needs (Mullins, 2010).

Employee retention became very important in the 1970s, when there was a rise in the formation of small and medium-size businesses as competitive employers which provided viable employment opportunities in those times (Coff, 1997). This led to the ascendancy in job mobility and voluntary job changes, and organizations began to feel the impact of the rise of voluntary employee turnover. Additionally, the power in the paternalistic "status quo" employer-employee relationship was also shifting from the employer to the employee, so a matching management tool began to be developed which was employee retention (Connel & Philip, 2002).

In this earliest, simplest form, employee retention was a straightforward response to how employers can stem the flow. The first steps in employee retention were simply just some attempts to make the existing relationship better and more pleasant for the employee by dealing primarily with compensation, benefits, and the physical aspects of the working environment (Allan & Sienko, 1997). Allan and Sienko also stated that by the late 1980s and early 1990s, there was a growing realisation on the part of both employers and employees that there was more to employee retention than hygiene factors. Since then, employers have been paying attention to other needs of employees such as organizational factors, human resource factors, benefit factors, job satisfaction and commitment as a way of ensuring high employee retention in their organizations (Woodruffe, 1999).

Organizations recruit human resources and train them to fit into their set-ups. They therefore go to great lengths to ensure that recruited employees are retained, by considering organizational factors, job satisfaction factors, human resource factors and employees' benefits to meet the needs of their employees (Cheng, 2004). This approach is necessitated by the fact that organizations that are unable to retain their employees have to spend lots of money and other resources to attract, recruit and train new employees which makes recruiting new employees more expensive than retaining the existing ones (Jackson & Mathis, 2006). Such instability can lead to loss of market share and profit for these organizations, including those in the financial sector of any economy.

The key players in a financial system include banks, non-bank financial institutions, brokerage houses, insurance companies, and regulatory institutions. Borrowers, lenders, intermediaries and regulatory institutions like the Bank of Ghana depend on the smooth running of the system, and the effectiveness of this system largely depends on recruitment and retention of competent employees (Dovlo, 2003). According to Dovlo, employee retention is an important issue in both the public and the private sectors in Ghana (Dovlo, 2003). In Ghana, the introduction of the Banking Act, 2007 (Act 673) has brought about stiff competition among the commercial banks, including Ghana Commercial Bank (GCB), which is one of the largest, if not the largest bank, in the country (Amidu, Hinson & Mensah, 2006).

GCB offers important services such as maintenance of individual and corporate savings and current accounts, commercial and corporate lending, corporate advisory services and international trade financing. Therefore, failure of GCB as part of the system can have severe ramifications on the Ghanaian economy and the financial sector as well as on other employers.

Despite, several attempts made by the GCB to retain its workers through provision of training, development and rewards among others, the bank still lost 4.3 percent of its market share in the year 2010 (PricewaterhouseCoopers, 2010). However, there was no empirical study on whether the cause could be due to employee retention issues.

Several studies have been carried out on employee retention in developing countries. In Ghana, such studies have tended to focus on health workers and teaching staff (Dovlo, 2003). The various studies on employee retention in the developed countries dwell on organizational factors, job satisfaction and human resource factors (Cheng, 2004). Thus, there is inadequate empirical evidence on how organizational factors, human resource factors, job satisfaction and organizational benefits can influence employee retention. This paper therefore sought to examine how these factors contribute to employee retention in Ghana Commercial Bank, Kumasi.

The rest of the paper comprises theoretical and conceptual discussions on employee retention and the methodology of the study. These are followed by discussion of the results. The final section of the paper provides conclusion and policy implications or options.

Theoretical and conceptual discussions on factors that affect employee retention

Several factors, notably organizational, human resource, job satisfaction and commitment have been identified as explanatory variables for employee retention. These were captured in Price and Mueller's (1986) revised turnover model which encompassed many of the earlier retention

factors while introducing several new ones. The model comprised determinants such as job satisfaction, distributive justice and perceived alternatives, considered as immediate causes of decisions to stay, whereas pay, promotional opportunities, constituent attachments, kinship, and organizational commitment were included as not having direct influences. Griffeth and Hom (2000) affirmed that Price and Mueller's model was based on a thorough methodology, hence its acceptance in explaining turnover processes.

According to Mitchell (2002), recruitment and development of employees costs organizations a lot of resources in terms of training and development that are aimed at equipping employees with the necessary skills, knowledge and competence to perform their current and future work assignment and challenges. Consequently, Jackson and Mathis (2006) propose that employers should strategically direct their efforts at understanding factors that influence retention and take measures to ensure that employees remain with their organizations. This view is corroborated by Hausknecht, Julianne and Vance (2008) who suggested that concerted effort is required to retain talented employees. Hausknecht et al. however, caution that there is a limit to what any organization can because retention is a complex matter that is affected by internal and external factors, and that these external factors may be beyond the organization's control. They advise that organizations can try to manage the company's climate, culture, and quality of work life to enable employees stay with the organisation.

Organizational factors and employee retention

Organizational factors are leadership style, company policies, company culture, communication and organizational justice. While Bryman (1992) showed that managers in high turnover organizations believe that employees are not to be trusted, several research findings indicate that transformational and charismatic leadership styles result in a high level of follower motivation and commitment as well as well-above-average organizational performance and attainment of organizational goals (Nanus, 1992; Steyrer, 1998). According to Olorunjuwon (2008), people often seek employment in a particular company because of its culture. However, when the culture changes, some employees become uncomfortable and leave, especially when such changes are not communicated effectively.

Communication as a component of organizational factors is important to employee retention and employers need to communicate the organizational goals, policies, visions, strategies and the job requirements to employees (Becker & Gopinath, 2000). Becker and Gopinath emphasized that communication helps to increase employees' level of consent,

participation, motivation, identification and building of trust, which in essence introduces elements of justice within the organization.

Greenberg (1987) argues that the major dimensions of organizational justice are distributive, interpersonal, informational and procedural and employees' perceptions of justice or injustice within the organization can result in a myriad of outcomes both positive and negative. Outcomes are affected by perceptions of organizational justice as a whole or by different factors of organizational justice (Kreik, Muchinsky & Schreuder, 2002).

Human resource factors and employee retention

The human resource department's effort to retain the best personnel begins with recruitment. Taylor and Cosenza (1997) suggest that employers must be candid about the prevailing extrinsic factors and other details during recruitment to reduce the chances of making hiring mistakes and minimize turnover. Armstrong and Murlis (2007) also stated that an organisation's extrinsic reward system can significantly affect the performance of the employees and their desire to remain employed though money alone is not a retention factor.

For instance, Thomas and Eaglen (2000) reported that low levels of training give rise to high levels of employee turnover and that the provision of good training has a positive effect on employee retention. Hunt, Osborn and Schermerhorn (2003) also argued that a good strategy for organizations to improve workforce productivity radically, increase job satisfaction and commitment, and enhance retention is to seek to optimise their workforce through comprehensive training and development programs to ensure acquisition of requisite skills and competencies (Cheng, 2004; Cordero, 2011).

Job satisfaction, organizational benefits, commitment and employee retention

According to Bruce (2003), the theory of organizational equilibrium supports the view that job satisfaction plays a mediating role between self image, job relationship, and retention. Employee satisfaction is therefore a function of a comparison between the outcomes or rewards received and the contributions put toward the job. Intrinsic factors such as employees' opportunity for personal achievement, recognition from supervisors and growth are related to job satisfaction, while extrinsic factors such as company policy, administration, supervision, and working conditions are associated with job dissatisfaction (Robbins, 2001).

Beech and Tompkins (2002) explain that benefits are indirect rewards given to an employee or group of employees for organizational membership, and these can be categorized into two broad areas such as mandated and

voluntary benefits. According to them, the relative importance of benefits will vary according to the specific needs of each individual, and this, in Cordero's (2011) view, can influence commitment and consequently retention.

Organizational commitment, according to Allen and Meyer (1990), is the extent to which people accept and internalize the goals of an organization and view their organizational role in terms of its contribution to those goals. Hitherto this, Mowday, Porter and Steers (1979) had explained that organizational commitment focuses on attachment to the organisation, while job satisfaction emphasised the specific task environment where duties are performed. Price and Mueller (1981) subsequently built upon these ideas and proposed a two-factor model of commitment and stated that employee commitment acts to mediate the influence of job satisfaction on employee retention.

Methodology

This study adopted the quantitative research design, specifically a correlational design to explain the relationship between factors that influence retention and employee retention, based on a sample comprising 98 senior and junior staff of GCB, Kumasi. Questionnaires which were designed with items that were measured on a scale of 1 to 5, with 1 representing low agreement while 5 represented strong agreement were used for primary data collection.

Spearman correlation analysis was used to determine the relationships between employee retention and the factors that contribute to employee retention such as human resource factors, organizational factors, organizational benefits, job satisfaction and commitment. Additionally, step-wise regression analysis was used to determine the most significant contributing factor toward employee retention.

Results and discussion

The relationships between human resource factors, organizational factors, organizational benefits, job satisfaction and commitment and employee retention were determined first. Table 1 contains the results. The means of six out of the 10 items used in the analysis were higher than the theoretical mean of three. This showed that in general the employees agreed that organizational benefits through to job satisfaction relate with employee retention. On the other hand, the employees had lower levels of agreement that leadership, justice and fairness, recruitment and selection, and reward related to employee retention, as shown by their respective means which were all lower than the theoretical mean.

Table 1
Correlation between employees' perceptions on the factors and employee retention

Factors	Mean	SD	Correlation with employee retention	Sig.
Organizational benefits	3.46	0.76	0.23*	0.043
Training and development	3.32	0.95	0.35**	0.004
Policies	3.31	0.92	0.55**	0.001
Communication	3.30	0.95	0.40**	0.000
Commitment	3.26	0.56	0.25*	0.045
Job satisfaction	3.05	0.52	0.44**	0.000
Leadership	2.96	0.99	0.12	0.088
Justice and fairness	2.92	0.76	0.33**	0.000
Recruitment and selection	2.56	0.85	0.20*	0.034
Reward	2.52	0.56	0.22*	0.045

**$p<0.01$ *$p<0.05$
Source: Field survey, 2012

But as seen in Table 1, all the factors, except leadership had significantly positive relationships with employee retention at either 0.01 or 0.05 alpha levels. There was a significantly strong positive relationship between policies and employee retention ($r = 0.55$, p -value = 0.001), similar to Cordero's (2011) finding ($r = 0.53$, p -value = 0.001) of a strong positive and significant relationship between these factors and employee retention in the lodging industry.

Positive correlations were observed between employee retention and training and development ($r = 0.35$, p-value = 0.004); communication ($r = 0.40$, p-value = 0.000); job satisfaction ($r = 0.44$, p -value = 0.000); and justice and fairness ($r = 0.33$, p-value = 0.000). All these are consistent with the findings of Cheng (2004) who had values from $r = 0.41$ to $r = 43$ as significant positive relationship between justice and fairness; training and development; communication and employee retention.

Statistically significant but relatively weak positive relationships were found between employee retention and organizational benefits ($r = 0.23$, p-value = 0.043); commitment ($r = 0.25$, p-value = 0.045); recruitment and selection ($r = 0.20$, p-value = 0.034); and reward ($r = 0.22$, p-value = 0.045). These results are less convincing than those of Cheng (2004) who had values from ($r = 0.42$) to ($r = 0.66$) for these relationships.

Out of the eight variables, which according to literature, had significantly positive relationship with employee retention through employees' satisfaction and commitment, only four variables were confirmed by the study to have had that significant positive relationship. These were policies, communication, justice and fairness and training and development.

The findings mean that employees who perceived better policies, training and development, communication, job satisfaction, justice and fairness, organizational benefits, commitment, recruitment and selection and reward exhibited more positive reactions in favour of employee retention. This corroborates the findings of Cordero (2011) who concluded that how employees perceived factors in an organization would greatly influence their decision to stay or not.

An aspect of the objective of the study was to find out the most significant contributing factors to employee retention in GCB, Kumasi. This was done through step-wise multiple regression analysis, with employee retention as the dependent variable, and with reward, training and development, recruitment and selection, justice and fairness, leadership, policies, communication, organizational benefits, job satisfaction and commitment as the independent variables.

Table 2 presents the results for the step wise regression analysis.

Table 2
Contributions of the most significant factors to employee retention

Model	Factors	Beta	Std Error	R	R^2	Adjusted R^2	R^2 Change	Sig.
1	(Constant)	1.54						
	Policies	.546**	.052	.547	.298	.288		.000
2	(Constant)	1.084						
	Policies Job	.433**	.061					.007
	satisfaction	.207*	.109	.613	.328	.314	.030	.019

Dependent Variable: Employee Retention **p<0.01 *p<0.05
Source: Field survey, 2012

Table 2 indicates two models. In the first model, all the independent variables were excluded from the model except policies ($\propto$= 0.01, p–value = .000). The unique contribution of policies to employee retention was .298 with an adjusted R^2 of .288. In the second model, policies ($\propto$= 0.01, p – value = .007) and job satisfaction ($\propto$= 0.05, p–value = .019) were considered as the most statistically significant factors that contributed more to employee retention and were not excluded from the model.

The unique contribution of the job satisfaction factor when it was considered in the second model was 0.030 with an adjusted R^2 of .314. On the whole, policies emerged as the most statistically significant factor in explaining the variance in employee retention with the other noteworthy variable being job satisfaction. Only these two factors emerged as the most statistically significant predictors of employee retention. Thus, the most

predictive factor out of the variables in the theoretical and conceptual discussions that had significantly positive relationship with employee retention is policy. The predictive potency of policy was high when mediated by job satisfaction.

The examination of how organizational benefits, job satisfaction, commitment, human resource factors and organizational factors contribute to employee retention resulted in the following key findings. Policies of GCB, Kumasi, had a positive and significant relationship with employee retention. Only job satisfaction, training and development, communication and justice and fairness out of the eight variables had significantly positive but moderate to weak relationships with employee retention. Organizational benefits, training and development, and policy were however, perceived more strongly or positive among the eight variables of the study. Policies of GCB and job satisfaction of employees emerged as the most significant factors that influenced employee retention respectively.

The specific aspects of the policies of the bank that contributed to employee retention significantly were that the bank has a defined vision to meet its goals, an organizational structure which facilitated employees' job, periodical review of progress towards goals or targets and helpful procedures for doing things in the bank. Employees were more satisfied with the chance to know other people while on the job and the working relationship in the bank.

Conclusion and policy implications

Policies contributed strongly to employee retention, while job satisfaction, training and development, communication and justice and fairness also contributed to employee retention, but at a moderate rate. However, organizational benefits, commitment, leadership, recruitment and selection and rewards weakly contributed to employee retention. Policies of the bank and job satisfaction made the most contribution to employee retention as compared to the rest of the variables of the study. This means that GCB had appealing policies which contribute to employee retention.

The above conclusion indicates a need for certain action to occur so that employee retention would continue to be high and play its important role in the attainment of organizational goals of the Ghana Commercial Bank, Kumasi. It is suggested that with respect to policy making, management of GCB, Kumasi should focus on a review of the existing benefits available and introduce more voluntary ones like gain sharing and employee recognition schemes. This will make the bank more attractive to work with. It is also advisable for management to pay more attention to retaining the employees of the bank by focusing on policies relating to job satisfaction, training and development, communication and justice and fairness.

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ARTICLE`s TITLE STRENGTH AND WEAKNESS OF CHINESE ENGINEERING KNOWLEDGE BASE ECONOMY.

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Abstract

The main aim of this research paper is to analyze and observe the progress and its factors of Chinese economical growth in the field of engineering manufacturing industries. This article is point out of strength and weakness of engineering knowledge base economy. What are the secrets of Chinese success in the field of engineering?

The Chinese products are big thread to other nation and very big producer of world level. Weakness and strength of Chinese economy is analyzed after practical experience with Chinese goods and services. The article will be helpful for china, user and international partner to promote its goods in every field of life. The rapid growth of Chinese products is a painful to Europe, Japan and USA.

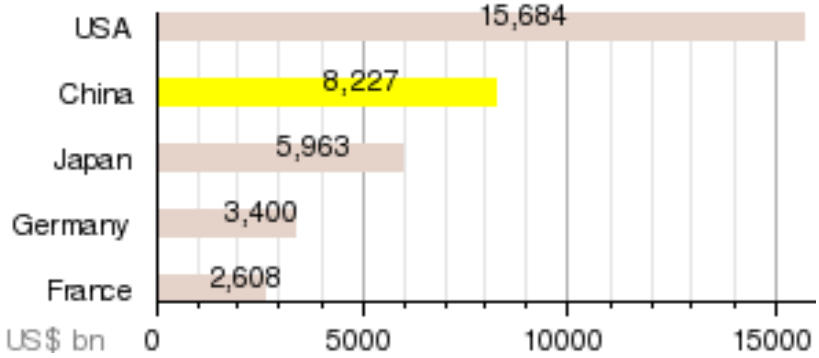
Keywords: Failure and success of chinese economy

Introduction

The **People's Republic of China**, is a sovereign state located in East Asia. It is the world's most populous country, with a population of over 1.35 billion. Since 1949 the government, under socialist political and economic system, has been responsible for planning and managing the national economy.

Since the introduction of economic reforms in 1978, China has become one of the world's fastest-growing major economies. As of 2013, it is the world's second-largest economy by both nominal total GDP and purchasing power parity (PPP), and is also the world's largest exporter and importer of goods. China is a recognized nuclear weapons state and has the world's largest standing army, with the second-largest defense budget.[18] The PRC has been a United Nations member since 1971, when it replaced the ROC as a permanent member of the U.N. Security

Council. China is also a member of numerous formal and informal multilateral organizations, including the WTO, APEC, BRICS, the Shanghai Cooperation Organisation, theBCIM and the G-20. China is a regional power within Asia and has been characterized as a potential superpower by a number of commentators**.**



STRENGHTH OF CHINA

1. National Economy

The Chinese is based on national economy with sincere and dedicated nation under a wise leadership. This is very strength. A world Private company cannot compete with any national company of china with help of huge financial support. The Chinese international firms have won many projects on base of financial support from country. The Chinese firms have completed many projects with own finance but the payment after completion of project due to only national economy. Any international private company cannot fulfill a complete project with own finance with zero advance and payment recover after completion of project. It is only possible due to national economy and country owns your back. The state has too many resources as compeer to a private company. The Hawaii telecom company has won many projects on base national economy as compare to Ericsson, Nortel, Siemens, and Nokia etc. The Chinese bank gave to much financial support to all firms in bulk and unlimited with very low interest. The national economy is best strength of china to win any type of project and business at international level which cannot compete any other country in the world.

2. STRONG MANUFACTURING BASE

A giant Chinese manufacturing strength is very important and unbelievable as compare to other country.

The manufacturing firm can manufacture any type of product within define production cost and quality depend of the order to complete in any country. The Chinese firms are very liberal in their brand and customers can

use their own brand in their native country for marketing. The china is biggest import and export in this time for manufacturing goods and purchased whole scrap from whole world for re-engineering. The Chinese manufacturing firms can manufacture the products on the demand of customers' limitations according to market with help of technical expert.

The manufacturing Industry and construction account for about 48% of China's GDP. China ranks second worldwide in industrial output. Major industries include mining and ore processing; iron and steel; aluminum;coal; machinery; armaments; textiles and apparel; petroleum; cement; chemical; fertilizers; food processing; automobiles and other transportation equipment including rail cars and locomotives,ships,andaircraft; consumerproducts including footwear, toys, and electronics; telecommunications & information technology.

3. STATE SINCERE ECONOMICAL STRATEGY & POLICY

China has become a preferred destination for the relocation of global manufacturing facilities. Its strength as an export platform has contributed to incomes and employment in China. The state-owned sector still accounts for about 40% of GDP. In recent years, authorities have been giving greater attention to the management of state assets — both in the financial market as well as among state-owned-enterprises — and progress has been noteworthy. China, therefore, still imports significant quantities of specialized steels. Overall industrial output has grown at an average rate of more than 10 percent per year, having surpassed all other sectors in economic growth and degree of modernization. Industrial output growth 1978-2006 Some heavy industries and products deemed to be of national strategic importance remain state-owned, but an increasing proportion of lighter and consumer-oriented manufacturing firms are privately held or are private-state joint ventures.

Since the 1950s, the trend away from the agricultural sector toward industrialization has been dramatic, and is a result of both policy changes and free market mechanisms. During the 1950s and 1960s, heavy industry received most attention and consequently grew twice as rapidly as agriculture. After the reforms of 1978, more attention to the agricultural sector as well as a move away from heavy industry toward light resulted in agricultural output almost doubling with only marginal increases for industry.

Before 1978, state-owned and collectively owned enterprises represented 77.6 percent and 22.4 percent respectively of China's exclusively public-ownership economy. The policy of reform and opening-up has given extensive scope to the common development of various economic sectors. Individual and private industrial enterprises and enterprises have mushroomed with investment from outside mainland China.

4. DECISION ON TECHNICAL GROUND BY PROFESSIONAL PERSON

The china is giving too much value, respect and important technical person engineers, scientists and economist on base of action depend upon thinking by Islamic theory. Rest of world, they are not giving proper value, benefits and important in national economical policy and strategy. Many under developing and developed are making their policy according to nationalism.

The nation and state have too much resources and wealth as compare to a private company which cannot compete in front of public limited company. The technical, professional, engineers, scientists and technician are people to develop the nation and its economy under the engineering base economy and engineering manufacturing goods. The technical decision should taking on pure technical base without interference of political pressure.

Domestically, modernization and economic growth has been the focus of the reformist policies introduced by Deng Xiaoping, and in attempting to achieve this, the leadership has implemented the Four Modernizations Program that lays special emphasis on the fields of agriculture, industry, education, science and technology, and defense.

5. PHILOSOPHY OF CHINA UNBELIEVABLE GROWTH

The Chinese forefather implemented a saving and efficient utilization of nation resources for achieving huge goals and objectives at national level. The leaders adopted a simple living standard like, house, running the bicycle whole nation and passing life within the limitation of resources. They did not took the load and enjoy the life on the money others like Pakistan. The whole nation and its leaders decided to do something outstanding after saving the money and best utilization of national resources in field of science and technology under sincere, honesty and dedication like Japanese.

They made the plan, policy and strategy to compete and manufacture at world level though very cheap product as compare to Europe and USA. They are started manufacturing small items like lock three cycles at very cheap in internal level. They have manufacturing the cheapest lock and said close all world companies with also our china lock. The world industries will be closed in future due to very cheap Chinese product and closing lock will also make in china. This is level of thinking and wisdom of whole Chinese united nation for achieving unbelievable goals and objective by MBO techniques at national level.

6. PHILOSOPHY OF CHEAP GOODS AND SERVICES AT INTERNATIONAL LEVEL

Philosophy of cheap goods and service at intentional level means to defeat and compete the quality, expensive goods and service with the help of forefather's philosophy and wisdom.

They have introduced the new philosophy of disposal items and through it after used in small items. The countries and companies cannot compete in low price, service and manufacturing facilities running under very cheap utilities. They have made the world largest Hydro-Dam three Gorges which can produce 22,500 MW electricity.

They government gave too much benefits and service for local and international companies to manufacturing the goods in china with best available best service and cheap utilities. Now the maximum world products are manufactured and came through china due to best manufacturing environment. The price of goods and service is two to three time less as compare to other international world brand from every small item to heavy machinery and equipment.

7. CHINESE EMBASSY ROLE IN WHOLE WORLD

The Chinese embassy and its official played vital role for industrial and manufacturing revolution in china which is threat of whole developed countries. They got the information for industrial development and manufacturing revolution after study the business opportunity in every country of the world. They provided the very important information and guidelines to government about planning, policy and strategy for business development. They also played very active role in every level of meeting to get business from every countries.

8. WHOLE NATION EFFORT AND DEDICATION

This tremendous and unbelievable success story of china is due to only whole nation & authority collect effort for development of rapid growth economy. This is second nation success story after Japanese nation. If someone decided to achieve outstanding goals and objectives but condition is whole nation collective efforts and sincerity for single goals and targets.

The Chinese nation achieved this level of engineering in two stage policy and strategy

1. First saving the national resources and income as whole nation.
2. Secondly best utilization of saving and national income for industrial revolution.

9. CHEAP INDUSTRIAL & MANUFACTURING REVOLUTION & STRATEGY

The Chinese nation introduced a new concept of cheap industrial and manufacturing goods as compare to very expensive in cheap industrial revolution, whenever are already available in the market like Japanese, USA and Europe products. The Chinese engineers and planner decided to produce too much cheap product as compare to high quality from small and consumer able items after studying the purchasing of power of the customers country to country and its economy. This strategy is succeed only due to whole nation direction and government planning on one page and facilitate to each others for achieving the major goals and objective of national level. They designed and developed the industrial economics zone, city and industries on technical ground for achieving productivity and cost reduction with help of engineer and designers on non-agricultural land along all required facilities and cheap utilizes for good industrial environment due to great infrastructure.

10. RAPID INDUSTIAL OUTPUT

China has achieved a rapid increase in the gross value of industrial output (used before China switched to GNP accounting in 1986), which, according to official Chinese statistics, rose by 13.3% annually between 1950 and 1979.

The coastal provinces of Jiangsu, Guangdong, Shandong,Shanghai and Zhejiang provinces together account for close to 33% of the country's total industrial output and most of its merchandise exports. One key factor in this industrial geography has been the government's establishment of several Special Economic Zones in Guangdong, Fujian and Hainan provinces, and its designation of over 14 "open coastal cities" where foreign investment in export-oriented industries was actively encouraged during the 1980s.

China's cotton textile industry is the largest in the world, producing yarn, cloth, woolen piece goods, knitting wool, silk, jute bags, and synthetic fibers. Labor-intensive light industries played a prominent role in the industrial boom of the late 1980s and early 1990s, accounting for 49% of total industrial output, but heavy industry and high technology took over in the late 1990s. In addition to garments and textiles, output from light industry includes footwear, toys, food processing, and consumer electronics. Heavy industries include iron and steel, coal, machine building, armaments, petroleum, cement, chemical fertilizers, and autos. High technology industries produce high-speed computers, 600 types of semiconductors, specialized electronic measuring instruments, and telecommunications equipment.

- **MACHINERY MANUFACTURING**

China's machinery manufacturing industry can provide complete sets of large advanced equipment, including large gas turbines, large pump storage groups, and nuclear power sets, ultra-high voltage direct-current transmission and transformer equipment, complete sets of large metallurgical, fertilizer and petro-chemical equipment, urban light rail transport equipment, and new papermaking and textile machinery.

- **THE ENERGY PRODUCTION**

Thermal, hydro and nuclear power industries are the fastest growing of all industrial sectors. At the end of 2009, the installed capacity of generators totaled 874 million kW, and the total generated electricity came to 3.2 trillion KWH, ranking second in the world. Three gorges world largest hydro-dam which can produce 22,500 MW power.

- **AUTOMOBILE**

An example of an emerging heavy industry is automobile manufacture, which has soared during the reform period. In 1975 only 139,800 automobiles were produced annually, but by 1985 production had reached 443,377, then jumped to nearly 1.1 million by 1992 and increased fairly evenly each year up until 2001, when it reached 2.3 million. In 2002 production rose to nearly 3.3 million and then jumped again the next year to 4.4 million. Domestic sales have kept pace with production.

- **STEEL PRODUCTION**

Concomitant with automotive production and other steel-consuming industries, China has been rapidly increasing its steel production. Iron ore production kept pace with steel production in the early 1990s but was soon outpaced by imported iron ore and other metals in the early 2000s. Steel production, an estimated 140 million tons in 2000, rose to more than 420 million tons by 2007.

- **TRADE RELATIONS**

In recent decades, China has played an increasing role in calling for free trade areas and security pacts amongst its Asia-Pacific neighbors. In 2004, it proposed an entirely new East Asia Summit (EAS) framework as a forum for regional security issues. The EAS, which includes ASEAN Plus Three, India, Australia and New Zealand, held its inaugural summit in 2005. China is also a founding member of the Shanghai Cooperation Organization (SCO), along with Russia and the Central Asian republics. China became a member of the World Trade Organization (WTO) on 11 December 2001 and also with USA, Africa etc.

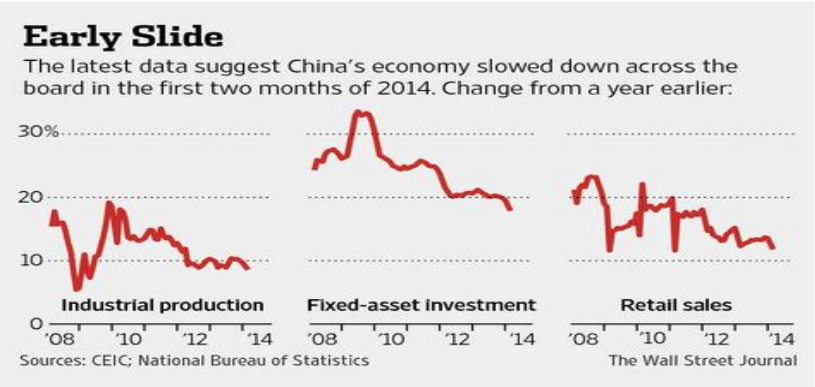
- **ECONOMY**

As of 2013, China has the world's second-largest economy in terms of nominal GDP, totaling approximately US$9.3253 trillion according to the

National Bureau of Statistics of the People's Republic of China.[12] If purchasing power parity (PPP) is taken into account (US$12.405 trillion in 2012, US$14.9614 trillion in 2013), China's economy is again second only to the United States.

WEAKNESS OF CHINESE ENGINEERING BASE ECONOMY

China's economy weakened sharply during the first two months of the year, deepening concerns that growth in the world's second-largest economy would decelerate further. The country's top leaders now have tough decisions about whether to set aside economic overhaul measures that could pinch growth in the short-term. The slowdown was across the board, including retail, manufacturing, housing and investment, as the National Bureau of Statistics released a raft of data on Thursday for January and February, which was combined to adjust for distortions from the Chinese Lunar New Year holiday. Some of the results were the weakest since the global financial crisis of 2009. "This is terrible," said Liu Li-Gang, a Hong Kong-based economist at ANZ Bank. ANZ.AU +0.33% "I wasn't expecting high figures. The main weakness and failure are Chinese production and its product due to following reasons and negligence.



1. MAIN FOCUSES ON SALES BUT NEGLECTED ALL MATTERS.

The china is doing main focus on sales activities on base of cheap price & cost at every sector consumer and industrial production like job production, batch production and job production categories. They have major advantages of cheap product due to cheap labor, material, government strategy and policy, financial support and huge cheap infrastructure utilizes. The china has implemented only policy and strategy to produce cheap product and sell it all over the world but they neglected and left the customers in all others area engineering product. This will be short term

techniques to sell in market but not long term. This strategy and policy will be successful in area of very small and consumer's items like toys, lock, pencil, garments and torch like mass production. This is very wrong and weak planning and strategy for 4S products, industrial machinery and equipment, like batch and job production. They were doing to work and policy like Japanese style in 1970 level but still too much weak in many area.

2. POOR INDUSTRIAL MANAGEMENT

The management of Chinese industries is very weak and poor to retain and sustain customers and this cheap product bubble long time. This is only possible in area of mass production. The management is going to failure in job production and batch production products due to poor and weakness management implementation. All foreign industries are doing very good work and taking full advantage of cheap labor and infrastructure utilizes in china for producing cheap and little quality product as compare to Chinese product. The manager's should review their planning and strategy about production, TQM, TQC, distributer network and after sales etc. Dr. Edward Deming is father of quality in japans with help of its 14-points which adopt Toyota and all others Japanese companies.

3. POOR DOCUMENTATION

The china companies and industries are very weak and poor in documentation at international level. Many companies are producing customers catalog in Chinese languages. There are many weakness areas in poor information about product. They do not know about last production model and its parts due to weak and poor documentation. They did not know about what they were produced last years. There is no standardization which they are producing last many years. They are using something's in one year production and next year new different parts but customers confused due to change in product every year. They are changing very rapidly in product design and parts, and even engine. There are many mistakes in parts and product due to no standardization in product long term.

- Poor customers manual information
- Documentation, catalogue, parts list and specification of product
- Many firm are giving in only Chinese language but not in English
- Poor information about product.
- Poor information in parts catalogue.
- Still working on picture feedback.
- Poor in parts number and identification etc.

4. POOR COMMUNICATION AT INTERNATIONAL LEVEL

Poor communication is another weakness of Chinese firm and companies at international level. There are few people which are speaking English language. There is only one non technical coordinator which communicates between customers and Chinese professional in the industries. But they are not properly communicated with each others about problems of customers many days. The customers are suffering due to this weak area of Chinese industries many days. The technical communication is very import for international business management.

5. HEAVY MACHINERY DESIGN & WEAK MANUFACTURING.

The small and consumers product are very simple and easy to product in bulk but less feature. The heavy machinery and industrial equipment is very specialized and technical product in job production. There are many example of batch and job production like Engine, locomotive, submarine, ship , aircraft, industrial equipment heavy machinery , plant, construction machinery, industrial plant and automotive. They are very still too much weak in area of design, metallurgy, manufacturing and mechanical engineering. The china is successful of first step of copy and manufacturing with bad quality on heavy machinery but with cheap price. They have to make expert in many areas of engineering after reach the first of step of engineering to produce something but still remaining to go beyond the excellence in engineering products.

6. HIGH MAINTENANCE COST

The Chinese heavy product are manufacturing on base of Russian technology, which have very high maintenance cost as compare to others international brand. The quality of industrial equipment and product is not very good but outlook very nice like makeup a lady. The maintenance is also very huge cost in future planning and disturb of work and customers. Japanese, USA and Europe product need to maintenance after 5 years but Chinese start problem within warranty period and one year. The capital cost is very cheap as compare to Japanese, Europe and USA product but maintenance problems started within one year, which is very painful to the customers.

7. QUALITY ,TQM & TQC FAILURE

The quality, total quality management and total quality control are main failure and weak area of heavy machinery and equipment in china. They are still neglected this area in job production. The many countries and customers purchased heavy machinery and equipment due to cheap capital cost with bad experience in within few years due to low quality, breakdown, and high maintenance cost at initial stage. Pakistan purchased locomotive for

Pakistan railways due to very cheap and low capital cost. But they have faced too much problem within few years due to low quality, high maintenance cost and every time breakdown. Still Pakistan is facing problems due to low quality locomotive engine and maintenance problem routine. They should be required an others Dr. Edward Deming Japan for continuous improvement in every area of industries like, quality, production and material etc.

8. POOR FEEDBACK & RESPONSE

The poor feedback and response is an others very big weakness at international level. The many Chinese firms are not giving proper response and feedback during any warranty and spare parts problems. They are not interested to get feedback and work on it for improving the product. The feedback is very important to any company for achieving the beyond excellence. The many company are ignored and neglected the feedback from customers which is very weak and failure of improvement in future. The many firms have focused only philosophy of sales and lost their position in future due to neglect and ignore point of view regarding customers.

9. POOR SERVICE AND AFTER SALES SUPPORT

This area is very important for any company which wants to retain and restore their customers. The Chinese business philosophy is to sell the product at any cost without consider service and sales support. The heavy machinery and industrial equipment cannot survive in the market without service and after service support. The batch and job production cannot furnish and survive in the market long term.

The china has too much strong in the field of sales with help of cheap cost and manufacturing of product. But they are very weak in others area which is very import and essential to develop and enhance in the international market.

10. POOR RETAIN, SUSTAIN & RESTORE CUSTOMERS

The china firm is very weak to retain and restore the customers in heavy machinery and industrial equipment long term. They are using same strategy in heavy product like consumer and small items strategy which is total wrong and just for short benefits. The customers are using the heavy machinery and equipment facing too much problem like Sales (Very Strong due to cheap capital cost but low quality), Service (very weak), Spare parts (very Weak), and Customers support (Very Weak)

The customers purchased the heavy machinery and equipment due to low capital investment at initial stage. They are facing too much problems within one years of performance like engine, gears and converter etc. The customers have faced these problems after purchase of heavy products like

slow response, bad performance, Major breakdown of product and its parts, Weak service, Wrong and delay in spare parts, Bad customer support

- Less distributors and dealers network as compare to Japanese and European companies at international level.

ECONOMIC HISTORY AND GROWTH (*Economic history of China (1949–present)*

From its founding in 1949 until late 1978, the People's Republic of China was a Soviet-style centrally planned economy. Following Mao's death in 1976 and the consequent end of the Cultural Revolution, Deng Xiaoping and the new Chinese leadership began to reform the economy and move towards a more market-oriented mixed economy under one-party rule. Agricultural collectivization was dismantled and farmlands privatized, while foreign trade became a major new focus, leading to the creation of Special Economic Zones (SEZs). Inefficient state-owned enterprises (SOEs) were restructured and unprofitable ones were closed outright, resulting in massive job losses. Modern-day China is mainly characterized as having a market economy based on private property ownership and is one of the leading examples of state capitalism. The state still dominates in strategic "pillar" sectors such as energy production and heavy industries, but private enterprise has expanded enormously, with around 30 million private businesses recorded in 2008.

RECOMMENDATIONS AND CONCLUSION

The china has many strength and weakness in the field engineering base economy. The china has rapidly progress and growth at international level. This position will be maintained and retained in long term or not. They have adopted the philosophy and strategy of low cost and less investment due to cheap product with help of government facilities and cheap infrastructure utilizes for small items and consumers product. There are many suggestion and guidelines as below.

1. The success and failure is due to top management decision making.
2. Top management is responsible of success and failure and accepts it with open heart.
3. The individual and company level, believing management to be responsible for 99% of all problems.
4. The company & Government should be a completed and implemented, policy, plan, strategy and philosophy of management to small or large organizations in the public, private or service sectors.
5. They should be adopted towards continuous improvement of product and service after getting regular customer's feedback.

6. They should be reduced the high maintenance cost after one or two years like.
7. They should be adopted same strategy free of maintenance cost of world leader in the field of automobile and electronic.
8. The china and companies should be improved and transferred the selling concept into marketing concept.
9. They should be adopted and implemented product with 4-S strategy for achieving and competing the world brand.
10. They should be adopted to improve of delay, mistakes, quality, documentation and defective workmanship.
11. They should be adopted and improved mass inspection, statistical evidence that quality, activities, technical meeting, concurrent engineering, brainstorming and end the practice of awarding business on the basis of price.
12. The government and companies should review all industrial development, policy, planning and strategy at national external and internal element.
13. They should be adopted and found the problems and then to work continually on the system.
14. They should be focused to improve the quality of product and service inside the industries activities and outside at international.
15. They should be adopted and promoted to modern methods of training on the job before joining and after joining time to time.
16. They should be worked for welfare of worker at any cost, which real heroes of nation to return the money in the country from other countries.
17. They should be adopted modern methods of supervision of production workers, service worker and the responsibility of all must be changed from numbers to quality and productivity.
18. They should be analyzed and removed the fear, so that everyone may work effectively for the company.
19. All employees, workers and management should be participated in decision making at all level.
20. They should be used the concurrent engineering and brainstorming between departments with positive attitude to resolve the problems.
21. The companies should be published healthy material, technical material, goals, quality policy, posters and slogans for promotion, motivation and enhance workforce.
22. They should be removed all non productivity activities and non standard style of product and work.
23. They have should be improved and promoted the documentation and communication in both way of commercial and technical area

24. They should be helped and trained the employees, worker and management from proper program of education and retraining time to time for achieving the beyond the excellence.
25. The government and companies' level should be insisted to create a structure in top management that will push on the above points every day. Then, you can retain and sustain your customers with help of good quality product, service, spare parts, customer support with best and excellent style of professionalism.

The china and its companies' policy and strategy should rectify to work and improve the above weakness for competition with all international brands. They have achieved the first step of engineering to develop the very cheap product and main focus on selling concept after neglected all area of marketing and4S business strategy. The customers have purchased all Chinese products due to only low price without considering other area of business. Now the customers have practical experience with Chinese product and faced bad behavior and response about above area of weakness.

If the china and its companies want to retain and sustain the customers long term, when they have to improved the weak area on urgent basis. They should be shifted their policy from selling concept to marketing concept along improvement of all neglect area to satisfy the customers as king. Then,

"CLOSE THE ALL INTERNATIONAL INDUSTRIES WITH ALSO CHEAP LOCK OF CHINA"

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IMPACT OF INDUSTRIAL SECTOR ON GDP (PAKISTAN CASE)

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Abstract

This study is an attempt to investigate the relationship between economic growth and different components of industrial sector of the economy of Pakistan. For this purpose the secondary data for 61 years from 1950 to 2010 is used. The first step in the empirical analysis involves testing the time series characteristics of the data series using ADF tests. Simple linear regression and time series techniques are applied to estimate the relationships. All the variables used in this study are stationary in their first differences. Regarding the hypotheses of the study it is concluded that the entire hypothesis, has a positive impact on GDP, partially accepted. Because in simple linear regression all the components of industrial sector show a positive relationship with GDP except mining and quarrying sector that not only shows the negative relationship but also gives an insignificant result. All other results are statistically significant and consistent in simple linear regression.

JEL Classification A-10

Keywords: GDP, Industrial sector

1-Introduction

1.1-Background

The economy of Pakistan is 47th largest in the world in nominal terms and 25th in the world in term of purchasing power parity (PPP). The economy of Pakistan can broadly be described into three sectors agricultural, industrial and services sectors. The agricultural sector contributes around 21 percent, industrial 19 percent, and services sector 53 percent in GDP. Pakistan has a semi- industrialized economy which encompasses textiles, chemical, food processing, agriculture and other industries. In 1947 when Pakistan came into existence its industrial sector was very limited at that

time but as time passed this sector of economy flourished. Today Pakistan ranks 41 in the World and 55 Worldwide in factory output and industrial sector accounts for about 26 percent of GDP. The share of industrial sector in the country's GDP has increased by 0.40 percentage point in the outgoing fiscal and that of agriculture and services sector has slightly declined according to latest official survey report. (Wikipedia, Economy of Pakistan 2010).

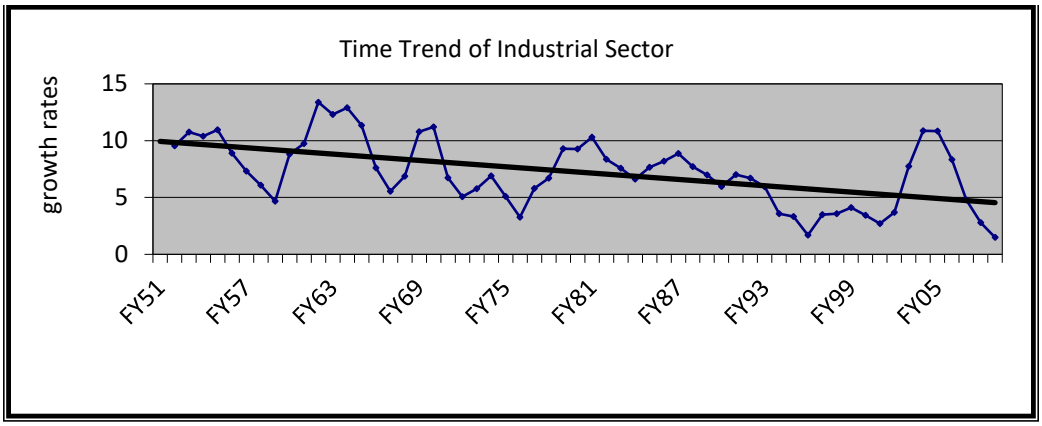
Pakistan's major industries included cement, fertilizer, edible oil, sugar, steel, tobacco, chemicals, machinery, food processing, textile and apparel manufacturing. Cotton textile production and manufacturing are Pakistan's largest industries accounting for about 64 percent of total export and account for 40 percent of employed labor force. The contribution of traditional product such as textile and fibers, leather, food and tobacco, are the major industries in terms of their contribution to value addition 43.2 percent in 1998 and 38.8 percent in 2007. The shares of these industries dominate whole industrial sector.

At the ground level the SMEs and the large firms are equally ignorant and careless about their role in environmental degradation in Pakistan. This is essentially due to poor institutional capacity and little emphasis on environment in fiscal policy and insufficient allocation of funds for environmental protection of forestry, biodiversity, water and sanitation. The Mid Term Development Framework (MTDF: 2005-10) has laid down the long term objective of sustainable economic growth without environmental degradation (GOP, 2005). Its real success would depend on how effectively the environmental laws cover the National Environmental Quality Standards (NEQS) and whether or not the violators of the laws are made to pay for damaging the environment.

While the government of Pakistan needs to promote the industry in the country, and simultaneously is a custodian to environmental protection, there is a need for national environmental legislation on the leather industry; local laws could be introduced to curb the growing tannery effluent problem. In fact, certain industrial areas are suffering greater environmental damage and would benefit from local legislation. For example, in Karachi, the Korangi Industrial Area has the largest number of tanneries working in the leather sector and is the most polluted area with "open drains and effluent being discharge without treatment.

In recent years the country has seen rapid growth in industries such as apparel, textile and cement and services (such as telecommunication, transportations, advertising, and finance). Strong state involvement persists in services especially in transport, communication and life insurance, while account for well over half of Pakistan's GDP and substantial employment.
(Wikipedia, Economy of Pakistan 2010)

CHART- 1-Time trend of industrial sector



1.2- DEFINITION OF GDP

"GDP measures the total output produced within a country's borders whether produced by that country's own firms or not during a specific time period that is usually one year."

The gross domestic product (GDP) is the godfather of the indicator world. As an aggregate measure of total economic production for a country, GDP represents the market value of all goods and services produced by the economy during the period measured, including personal consumption, government purchases, private inventories, paid-in construction costs and the foreign trade balance (exports are added, imports are subtracted).(www.investopedia.com 2011)

1.3-IMPORTANCE OF INDUSTRIAL SECTOR

The credit goes to industrialization which has dethroned the poverty and has made the people of developed countries like US, UK, Canada, Germany and Japan to enjoy the higher standard of living. This is the reason the wave of industrialization has also entered in the Far Eastern countries, known as "Newly Industrializing Countries" (NICs). It has been a desire on our part to start and perpetuate the process of industrialization. The importance of industrialization for our country is obvious from the following reasons:-

Increase in employment opportunities, Increase in output and incomes, Agriculture development, Development of allied and related

sectors, Attainment of internal and external economies, Industrialization brings social and economic changes, Industrialization will reduce BOP deficit, The increased saving and investment, Increase government revenues and Defense requirements.(www.scribd.com 2011)

1.4- COMPONENT OF PAKISTAN INDUSTRIAL SECTOR

The components of Pakistan's industrial sector are as follows:

1- Mining and quarrying
2- Fuel extraction industry
3- Manufacturing
4- Construction
5- Electricity, gas and water supply

1.4.1-Mining and Quarrying

Mining is the extraction of raw materials from the Earth's crust, usually from an ore body, vein or (coal) seam. Mining produces three types of mineral body, commodities-metals, industrial minerals, and fuels-that all countries find essential for maintaining and improving their standards of living. Mining is basic to the human way of living, as essentially everything we use in modern society (that does not come from a plant) is a product of mining sector.

However, the direct and indirect contribution that the mining industry makes to human prosperity is often not as well recognized, as it should be. Minerals are also unique in the sense of their non- renewable profile, as mineral deposited are finite, either physically or economically. This implies a special concern about their exploitation, and consumption in a way that could prevent or mitigate their scarcity or unavailability for future generations. (Umer Sheraz 2010 ; Mining Futures: Beyond the Headlines)

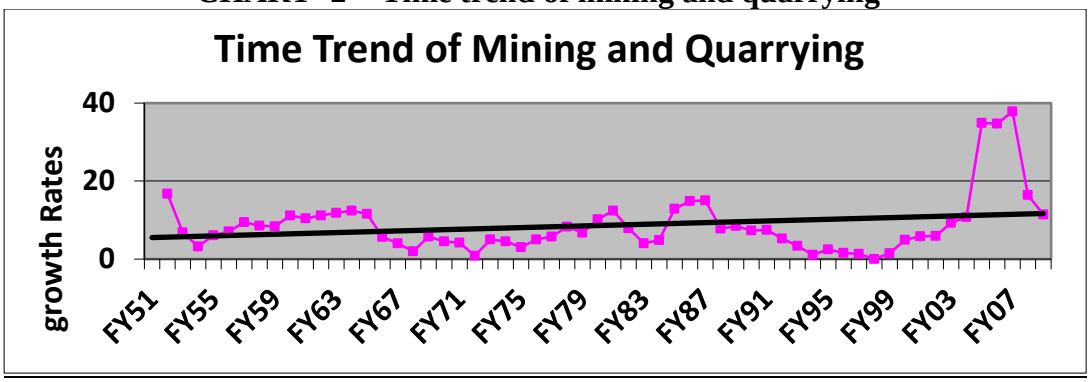
Pakistan has a widely varied geological framework, ranging from pre- Cambrian that includes a number of zones hosting several metallic minerals industrial minerals precious and semi- precious stones. The mining and quarrying sector is estimated to grow by 0.4 percent in 2010-2011 as against 2.2 percent in the last year. (Economic Survey 2010-2011)

Important minerals found in Pakistan are gypsum, limestone, chromites, iron ore, rock, salt, silver, gold, precious stones, gems, marble, copper, coal, graphite, sulpher, fire clay, silica. The ministry of Petroleum of Natural Resources formulates and implements petroleum, gas and mining policies. All minerals except petroleum and nuclear minerals are constitutionally owned by the Provinces. Federal govt.'s role is to provide geological data, assist in provincial coordination, and to facilitate foreign investment in the mining sector. It also finances mineral projects. The govt.

remains keen to attract foreign operations, including joint ventures. (Wikipedia 2010, Industry of Pakistan)

The main Pakistan mining operation, Saindak Metal Limited is state owned and produces copper, gold, silver, blister copper is exported. In November 2002, it was leased for ten years to a China firm under a US $ 350 million. The Pakistan Mineral Development Corporation (PMDC) four coal mines (10 percent of the country's coal deposits), four salt mines/ quarries (45 percent of total production) and silica sand quarry**.***(www.wto.org 2010)*

CHART- 2- Time trend of mining and quarrying



1.4. 2- Fuel Extraction Industry

Pakistan's energy needs are met principally from natural gas, oil and coal, Hydro electricity and nuclear power. The Toot area is one of the oldest oil- producing region in Pakistan with the first oil well was drilled in 1964 that started commercial production in 1967. Pakistan first oil field was discovered in the late 1952 at Sui in Balochistan. Pakistan imports about 3 quarters of its crude oil requirements and has large reserves of natural gas at Sui in Balochistan. (www.papg.org.pk 2011)

Private sector oil and gas development is a govt. priority. The independent Oil and Gas Regulatory Authority (OGRA) started regulating the oil and gas sector in March 2002. Pakistan is also a major producer of Bituminous coal' sub- bituminous, coal and lignite. Low sulfur coal was recently reported to have been found at the Baluchistan near Quetta as well. Pakistan produced about 45 tons of Uranium in 2006 and has recently used some in its own nuclear power and weapons. Baghalchur (a small town in Dera Ghazi Khan District, Punjab, Pakistan) is the site of abandoned Uranium mines now being used as a nuclear dump. Several Pakistani environmentalist groups are bitterly opposed to the nuclear dump being used by Pakistan Atomic Energy Commission (PAEC) have asked the government to invest in better techniques in the disposal of nuclear waste materials. Sindh's Thar Desert and Neyveli (in Pakistan) lignite mines will also be expanded soon for industrial usage to Special measures are being employed

to reduce the resulting fly ash, carbon footprint and sulphur fume emission problems after its burnt.(www.sidepad.com 2011)

1.4. 3- Manufacturing

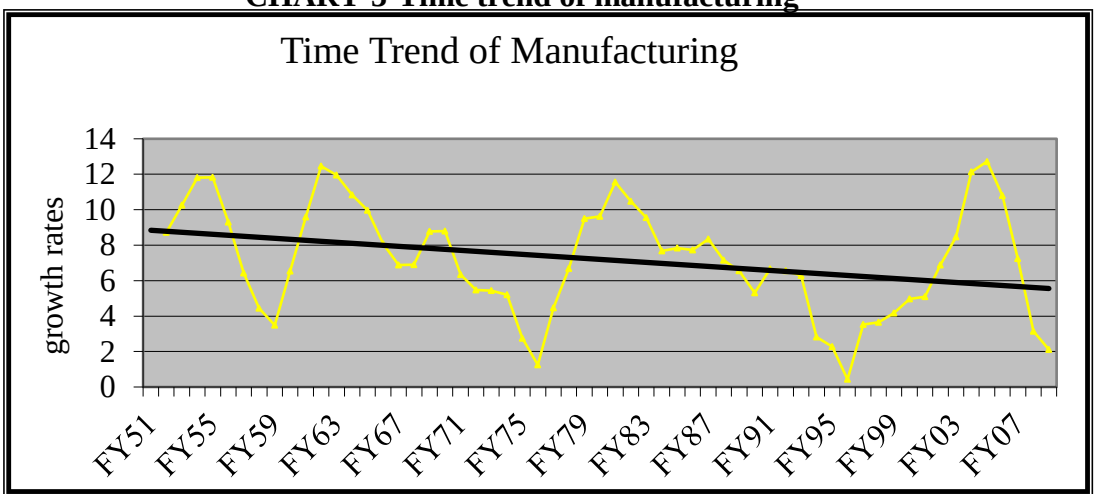
The manufacturing sector of any country bears significant importance. Globalization, and in particular, enhanced exports are generally believed to benefit developing countries. Manufacturing is the second largest sector of the economy of Pakistan after agriculture. The sector is dominated by textile, oil and gas, cement and automobile sectors in terms of assets size and credit allocation. Cotton textile production and apparel manufacturing are Pakistan's largest industries accounting for about 64 percent of total export. State involvement in manufacturing remains substantial especially in heavy engineering and steel. Govt. intervention in manufacturing remains targeted at protecting infant industries through tariffs and domestic support measures, including various tax concessions. The edible oil manufacturing industry is protected by relatively high specific tariff.(Iffat Ara 2004)

The manufacturing sector can be categorized into two sub-groups.

A-Large- scale manufacturing (LSM)

B- Small and medium enterprise (SME).

CHART-3-Time trend of manufacturing

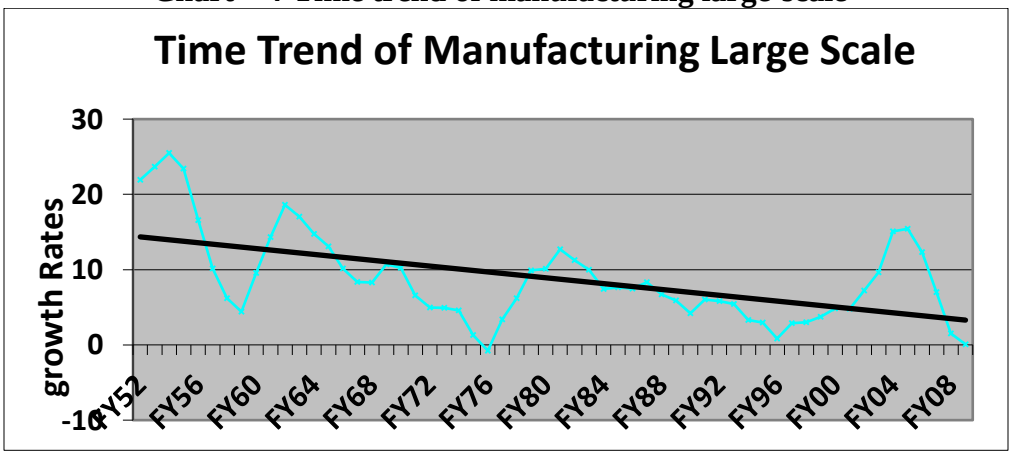


1.4.3.1) A-Large- scale manufacturing

This is true for the deteriorating law and order situation, energy crises; natural climates, growing input prices, and higher inflation further compound Pakistan's manufacturing sector's history as well recent

deceleration in the sector. The group-wise performance of large-scale manufacturing shows mixed results. The performance of LSM is not satisfactory during current year as compared to last year. The major positive contribution toward modest growth performance came from durables like growth in automobiles, growth in textile group and leather products, pharmaceutical and chemical group. There seen negative growth in petroleum group, cement industries, non-metallic mineral products, steel and electronic industries. State involvement in large-scale manufacturing remains significant, although it is declining as privatization continues. Industrial policy is based on accelerating industrialization aimed at increasing manufacturing value added and share of GDP to US $ 188 billion and 30 percent respectively, by 2030. (Economic survey of Pakistan: 2010-2011).

Chart – 4-Time trend of manufacturing large-scale



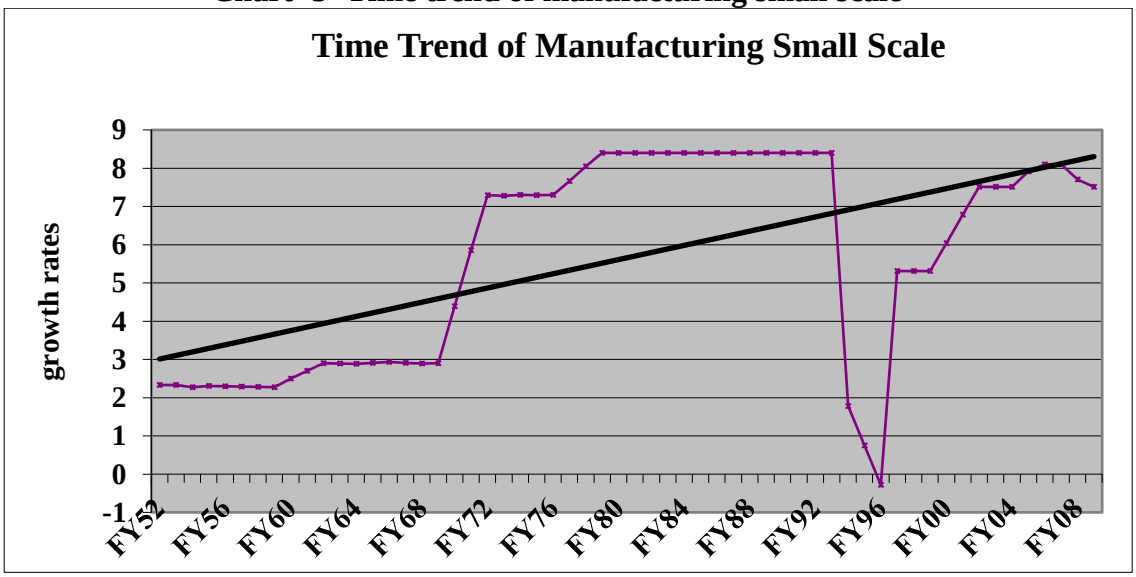
1.4.3.2- B-Small and medium enterprise (SME)

The SMEs are the backbone of economic growth of a developing country. Due to their sheer number, size and nature of operation, this sector of economy promotes endogenous source of growth and strengthens the infrastructure for accelerated economic expansion and development. The potential of SMEs to promote domestic- led growth in new and existing industries and to strengthen the resilience of the economy in a competitive and challenging environment are inarguable. Deposit their heterogeneity; SMEs are generally concentrated in selected activities such as: (i) Metal working, (ii) Furniture, (iii) Agro- based, (iv) Sports goods, (v) Fisheries, (vi) Poultry (vii) Gems and Jewelry and (viii) Food and Catering. In Pakistan the significant role of SMEs is clearly indicated by research and statistic. According to more recent estimates, SMEs contributes 40 percent to GDP. Significance of their role in economic development is endorsed by the fact that, in 2009-2010, a period in which real GDP of Pakistan grew by 3.8 percent the small scale sector provided much support to overall pattern and

grew by 7.5 percent. Hence, it is clear that in time of economic downturn, SMEs outperform large enterprises providing much support to overall economic growth. (Economic survey of Pakistan; 2010-2011)

Pakistan's micro- enterprises also face many binding constraints in entry and growth phases. At the entry stage these are: (i) Fixed Capital (ii) Working Capital (iii) Recovery of credit given to customers. (iv) Access to product design. (v) Access to tools, equipments raw materials: particularly for the units in small. (vi) Access to markets: inadequate demand; more for units in small towns. (vii) Skilled labor. (viii) Taxes. (ix) Transport and communication facilities, and (x) Government regulations. In the growth phase the constraints change and so do their importance.(www.scribd.com 2011)

Chart -5- Time trend of manufacturing small scale

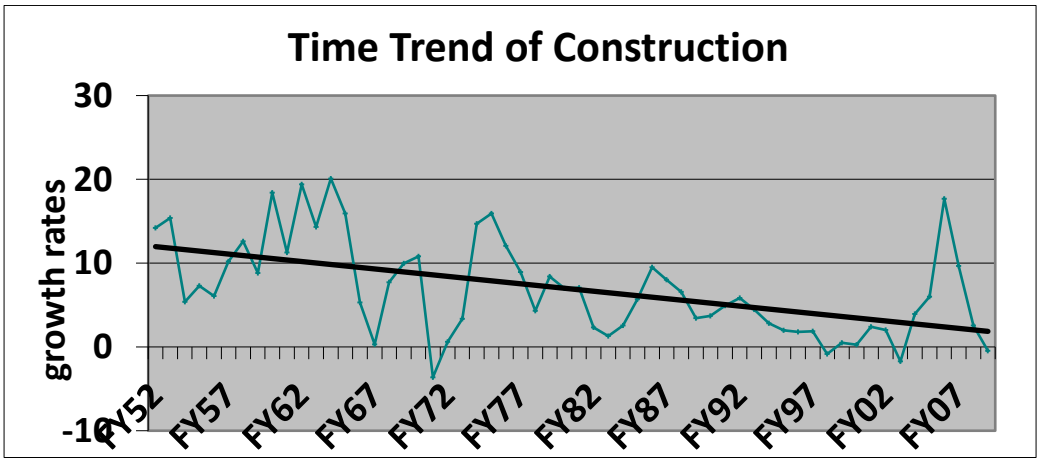


1.4.4- Construction

Construction sector includes hospitals, schools, townships, offices and other buildings; urban infrastructure (including water supply, sewerage, drainage); highways, roads airports, railways, ports, power systems; irrigation and agriculture systems; telecommunication etc. It deals with all economic activities directed to the creation, renovation, repair or extension of fixed assets in the form of buildings, land improvement of engineering nature. Construction and engineering services industry play an important role in the economic uplift and development of the country. Unfortunately construction sector is one of the most neglected sectors in Pakistan. Although the construction sector has only 2.3 percent share in GDP, its share of employed labor force disproportionately large at 6.1 percent in 2007. (Raza Ali Khan 2008)

After the devastating 2005 Kashmir earthquake, the cost construction in Pakistan increase 30 to 50 percent due to implementation of new building code. The price of cement has increased by 50 percent and govt. banned export of cement. The higher demand for construction workers also reflected in a continued double-digit rise in their wages since FY2005.(Wikipedia 2009)

Chart-6-Time trend of construction



1.4. 5-Electricity, Gas and Water Supply:

Pakistan have extensive energy resources including fairly sizable natural gas reserves, some proven oil reserves, coal (Pakistan has the fourth largest coal reserves in the world) and a large hydropower potential. However the exploration of energy resources has been slow due to a shortage of capital and domestic political constraints. Domestic petroleum production totals only about half the country's oil needs, and the need to import oil has contributed to Pakistan's trade deficits and past shortages of foreign exchange. The current govt. has announced that privatization in a gas and oil sector is a priority, as is the substitution of indigenous gas for imported oil, especially in the production of power. Pakistan is the world leader in the use of compressed natural gas (CNG) for personal automobiles.(Wikipedia 2011).

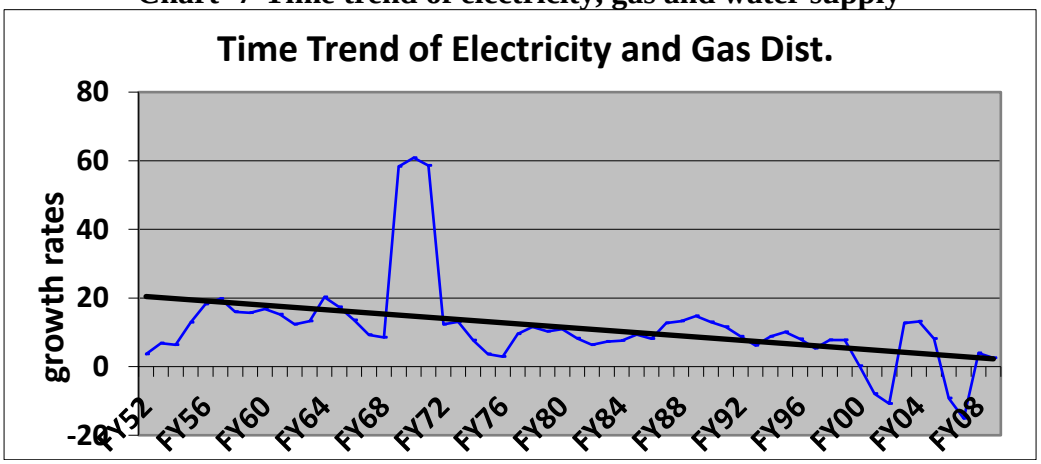
Today Pakistan is facing serious energy crises. Despite consequent rising demand of energy, no worthwhile steps have been taken to install new capacity for generation of the required energy sources. Now, the demand exceeds supply and hence "Load shedding" is a common phenomenon through frequent power shutdown. There is a shortfall of about 3000 to 4000NM per day by 2010. The shortage is badly affecting industry, commerce and daily life of people. The Govt. is understandably engaged in a vigorous effort to expand the Nation's power generation capacity through building of dams and inviting foreign investors for establishing thermal units

in the country. Pakistan is also working to expand the use of wind turbines. Pakistan Alternative Energy Development Board (AEDB) recently approved New Park Energy Phase 1, a 400-MN wind project near Port Qasim. (Noor-Ul-Haq 2006).

The Regulatory function of petroleum industry including Liquid Petroleum Gas (LPG), and Compressed Natural Gas (CNG) activities and petroleum product pricing functions were transferred to OGRA in March 2006. Pakistan is constructing several regional gas pipelines, e.g. Iran-Pakistan- India, Turkmenistan- Afghanistan- Pakistan, and Qatar- Pakistan. Moreover, subsidy on gas was given on fertilizer industry and on chemical plants. The sector regulatory remains the National Electric Power Regulatory Authority (NEPRA).

Until the 21st century Pakistani water sector policies were mainly focused on water resources and irrigation. This has changed with the National Drinking Water Policy (NDWP), the National Sanitation Policy (NSP) and the Clean Drinking Water for all programmes, which were prepared by the Ministry of environment as integral parts of the Medium Term Development Framework (MTDF) 2005-2010. A major shift of sector responsibility took place under the 2001 Local Government Ordinance. (Internship report on Sui Gas 2009)

Chart -7-Time trend of electricity, gas and water supply



Finally, the characteristics of industrial sector of Pakistan indicate that it has rather fixed share of specific industries since last several years. Economy is growing relatively steady on an average around 7 percent. The reasons for slow and fluctuating growth were political, economic and financial shocks. On the other hand the share of relatively medium or high level of technology products remains low or decreasing over the time. Although the govt. intended to expedite the process of reforms, structural changes and integration, the political instability and war on terrorism by the

western powers in the region the progress remained inconsistent during last several years, especially after the event of nine-eleven.(Tariq 2009)

The main objective of the study is to estimate the impact of growth in industrial sector on GDP growth. Further to suggest policy recommendation for the improvement of the sector based on the findings of the study. The study is planned to analyze the impact of industrial sector on GDP. This study includes five sections. First section explains brief introduction about topic, objective, and organization of study. Second section presents the review of existing literature, third chapter discusses the methodology used in the paper, section fourth gives the results and finally fifth section concludes the Paper and gives suggestion.

2-LITERATURE REVIEW

Sabir and Ahmed (1993) studied the impact of structural adjustment policies on TFP, concluded that, although the average growth in overall economy has declined from GDP and residential and non-residential investment, using quarterly national income and gross domestic product data for the period 1959-1992. Results showed that residential investment causes, but is not caused by GDP, while non-residential investment does not cause, but is caused by GDP. They concluded that housing leads and other types of investment lag the business cycle.

Tse and Ganesan (1997) also used the same econometric technique (Granger causality test) to determine the causal relationship between construction flows and GDP using quarterly Hong Kong data from 1983 to 1989. They found that the GDP leads the construction flow and not vice versa.

Sabir and Ahmed (2002) studied the impact of structural adjustment policies on TFP, concluded that, although, the average growth in overall TFP of the overall economy has declined from 2.8 percent in the pre-reform period (1973-88) to 0.7 percent, in the post-reform period (1988-2002), in the manufacturing sector it declined from 5.9 percent to 1.9 percent, respectively during these two periods. In addition, their results indicate that during pre- and post-reform periods, the relative contribution of TFP to overall value added has declined from 48 percent per annum to 16 percent per annum whereas in the manufacturing value added its contribution has declined from 79 percent per annum to 45 percent per annum. They also noticed that human capital has been the major factor that contributed to TFP growth during these periods.

Hoque and Musa (2002) found that period between 1994 and 2001; the IPOs of Dhaka Stock Exchange (DSE) was largely under priced at 285.21 percent. At the same period the degree of under pricing in Malaysia was 46.44 percent.

IMF (2002) had computed TFP of the overall economy of Pakistan for the period 1961-2001. The findings indicate that, on average, TFP experienced negative growth in the 1960s, positive in the 1970s and 1980. However, in the 1990s the growth decline to just 0.6 percent per annum. Furthermore, human and physical capital has primarily bolstered the GDP growth during this period.

Pasha et. Al (2002) pointed out that the growth of TFP of the manufacturing sector shows a persistence declining trend during 1973-98, average annual growth rate of TFP declined from 9.4 percent during 1968-83 to meager 1.4 percent during 1993-98 per annum contribution of TFP in overall economic growth that was 55 percent during 1968-83 declined to as low as 16 percent. They further concluded that human capital has played a leading role in the growth of TFP of manufacturing sector, of the 4.6 percent annum growth of TFP during 1973-98, 1.8 percent was the contribution by human capital.

Wizarat (2002) computed total factor production (TFP) of the large scale manufacturing sector for the period 1951-91. Her results show an increase in TFP trend. Moreover, she found that the contribution of TFP to economic growth has been negative (-27 percent), on average, during the period 1955-91. According to her study economic growth was largely driven by capital (88 percent) and labor (40 percent).

Ghosh and Maji (2003) examined the efficiency of working capital of the Indian cement companies during 1992-1993 to 2001-2002. For measuring the efficiency of working capital management, performance, utilization, and overall efficiency indices were calculated instead of using some common working capital management ratios. Setting industry norms as target-efficiency levels of the individual firms, and also tested the speed of achieving that target level of efficiency by an individual firm during the period of study. It was found that the Indian Cement Industry as a whole did not perform remarkably well this period.

Eljelly and Abuzar (2004) empirically examined the linkage of profitability, as indicated by the current ratio and cash cycle. They studied a sample of Saudi Arabian companies covering the years 1996 to 2000. They find a significant inverse relationship between company profitability and liquidity, while a direct strong relationship was identified between company size and profitability.

Iffat Ara (2004) assessed the competitiveness of manufacturing sector of Pakistan by comparing the trend in the growth of factor and non-factor input prices with that of export price and also looked at the trend in the growth of productivity. She found that over the period 1972-73 to 2002-2003, both the factor and non-factor prices have grown at a rate higher than that of general price level as well as of export price. She further suggest that even though

the growth in productivity is offsetting the negative impact of the growth in input factor prices, the growth in productivity itself depicts a declining trend especially for the most recent period, 1999-03.

Shah and Sana (2006) used a very small sample of 7 oil and gas sector firms to investigate this relationship for period 2001-2005. The results suggested that managers could generate positive return for the shareholders by effectively managing working capital.

Lazaaridis and Tryfonidis (2006) investigated the relationship of corporate profitability and working capital management for firms listed at Athens Stock Exchange. They reported that there is statistically significant relationship between profitability measured by gross operating profit and the Cash Conversion Cycle. Furthermore, Managers can create profit by correctly handling the individual components of working capital to an optimal level.

Rehman (2006) investigated the impact of working capital management on the profitability of 94 Pakistani firms listed at Islamabad Stock Exchange (ISE) for a period of 1999-2004, and studied the impact of the different variables of working capital management including Average Collection Period, Inventory Turnover in Days, Average Payment Period and Cash Conversion Cycle on the Net Operating Profitability of firms. It is found that there is a strong negative relationship between above working capital ratios and profitability of firms. Furthermore, manager can create a positive value for the shareholders by reducing the cash conversion cycle up to an optimal level.

Padachi (2006) has examined the trends in working capital management and its impact on firm's performance for 58 Mauritian small manufacturing firms during 1998 to 2003. He explained that a well designed and implemented working capital management is expected to contribute positively to the creation of firm's value. The results indicated that high investment in inventories and receivables is associated with low profitability and also showed an increasing trend in the short term component of working capital financing.

Islam, Ali and Ahmed (2006) investigate the behavior of initial public offerings of the Dhaka Stock Exchange during the period of 1995-2005.They studied 117 companies and find the 102 IPOs were under priced, 13 over priced while only 2 were accurately priced.

Rehman and Nasr (2007) analyzed profitability and working capital management performance of only 94 firms listed on Karachi Stock Exchange for period 1999-2004 only by using Ordinary Least Square and Generalized Least Square. Their findings of study suggested that there exist a negative relationship between working capital management measures and profitability.

Afza and Nazir (2007) investigated the relationship between aggressive and conservative working capital policies for a large sample of 205 firms in 17 sectors listed on Karachi Stock Exchange during 1998-2005. They found a negative relationship between the profitability measures of firms and degree of aggressiveness of working capital investment and financing policies.

M. Shahbaz and N. Aamir (2007) analyzed the direct foreign investment and income distribution for Pakistan for period from 1970-2005. Their study is a pioneering effort regarding country case like Pakistan. They used modern technique in finding the order of integration for running actors. They used ARDL bounds approach and error correction method (ECM). Their findings reveal that increased FDI in Pakistan worsens income distribution because it is focused towards capital intensive industrial and services sectors of urban localities.

K.M.Yousaf Tariq (2008) used the data from 1990 to2007 and find that trade liberalization reforms since 1998 have not changed the composition of exports of Pakistan's manufacturing sector.

Khan Ali Raza (2008) investigate the role of constructio0n sector in economic growth by using co-integration and Granger casualty test find that there is strong casual relationship between the aggregate economy and the construction sector of Pakistan. He used annual data for construction sector and economic GDP of Pakistan from 1950 to 2005.

Rehman A. et al (2008) analyzed the working capital management and corporate performance of manufacturing sector in Pakistan. They used panel data from 1998 to 2007 and conclude that firms in Pakistan are following conservative working capital management policy and the firms are needed to concentrate improve their collection and payment policy.

Usman, (2008) investigate the impact of oil price and exchange rate volatility on economic growth in Nigeria on the basis of quarterly data from 1986Q1 to 2007Q4. He analyzed the time series properties of the data by examining the nature of causality among the variables. Furthermore, he applied Johansen VAR-based co integration technique and vector error correlation model. The result showed unidirectional causality from oil prices to real GDP and bidirectional causality from real exchange rate to real GDP and vice versa.

Afza and Nazir (2009) investigated the working capital management efficiency of cement sector of Pakistan for the period 1988-2008. Instead of employing the traditional ratios, they measured the working capital efficiency in terms of utilization index, performance index and total efficiency index as suggested by Bhattacharya (1997). Findings of the study indicate that the cement sector as a whole did perform well during the study period.

Samreen, Khalid and Aslam (2009) investigated the potential impact of coal on electricity generation and economic growth of Pakistan. They used secondary data from 1995 to 2007 and applied OLS technique attributed to Carl Friedrichgauss. The result showed that coal is efficient estimator then other energy resources; there is positive relation between electricity generation and coal.

Khuram Khan et. Al (2009) examined the affect of corporate governance on a firm's performance. Their research had been carried out on the Tobacco industry of Pakistan and focused on three aspects namely ownership concentration, CEO duality and Board's Independence. They had been used data from three listed companies of the Tobacco industry, namely Pakistan Tobacco, Lakson Tobacco and Khyber Tobacco for the period 2004-2008. They had been measured Firm's performance through Return on Equity (ROE) &Return on Assets (ROA). They conclude that there is strong and positive impact of corporate governance on firm's performance.

IO Chhappra and NA Naqui (2009) investigated the relationship between the Working Capital Management (WCM) and firm's profitability in the textile sector of Pakistan. They selected a sample size of 55 textile companies in Pakistan for a period of six years, from 2003 to 2008 and used correlation, regression analyses and ANOVA Test. Their results showed a strong positive significant relationship between WCM and firm's profitability and a significant negative relationship between debt used by the firm and its profitability in Pakistan's textile sector.

Udah, Enang B (2009) investigate the causal and long-run relationship between electricity supply, industrialization and economic development in Nigeria from 1970-2008. To achieve this, he used time series data and employed the Granger Causality test and the ARDL bounds test approach to co integration proposed by Pesaran et al (2001). The Granger Causality results showed that there is a feedback relationship between GDP per capita and electricity supply, and no causal link in the case of industrial output and GDP per capita.

Bedi-uz-Zaman, M.Farooq and Sami Ullah (2009) investigate the sectoral oil consumption and economic growth in Pakistan for the period of 1972-2008. They used different time series techniques, the result showed that major sectors of oil consumption (transportation, power generation and industry) are positively contributing.

Umer Sheraz (2010) worked on Mining Futures: Beyond the headlines, in his article he used the six pillars method of future studies to address the futures of mining from multiple aspects. He conclude that mining is more than just technology or economics of pricing and sound policies initiatives are needed to direct society and re-think current trends in international governance of resource use, and material-intensive life styles.,

while the minor sectors of oil consumption (household, government and agriculture) are negatively contributing in economic growth.

3-METHODOLOGY AND DATA

This section discusses the methodologies that are employed to meet the objectives of the study. The variables used in this study of impact of industrial sector on GDP include growth of gross domestic product (gGDP), dependent variable, and growth of industrial sector (gIND), growth of mining and quarrying (gMQ), growth of manufacturing (gMANF), growth of manufacturing large –scale (gMNLS), growth of manufacturing small-scale (gMNSS), growth of construction (gCONS), growth of electricity, gas and water supply distribution (gEGD) as a independent variables.

The sample period covers time series data from 1950 to 2010. All the relevant data is obtained from Economic Survey of Pakistan, Pakistan Bureau of Statistic and State Bank of Pakistan.

Many economic time series are non-stationary at levels. One way of getting the interesting information about the stationarity of time series is to plot the original series and making correlogram at both level and first difference. The second, most rigorous way is to use the Augmented Dickey Fuller (ADF) which is the wider version of the standard Dickey Fuller (DF). This test is employed to verify the presence of unit root in the series.

3.1-IMPLICATION OF STAIONARY AND NON-STATIONARTY TIME SERIES

As we begin to develop models for time series, we want to know whether the underlying stochastic process that generated the series can be assumed to be invariant with respect to time. If the characteristics of stochastic process change over time, i.e., if the process is non-stationary, it will often be difficult to represent the time series over past and future intervals of time by a simple algebraic model---the random walk with drift is an example of non-stationary process for which a simple forecasting model can be constructed. By contrast, if the stochastic process is fixed in time, i.e., if it is stationary then one can model the process via an equation with fixed coefficients that can be estimated from past data.

Observing the results of Unit-Root Test in the result section; it is clear that all the data series are stationary at same level. So when data series are stationary, we can use the Ordinary Least Square Method to regress the series to get results. The method of ordinary least squares is attributed to Carl Friedrichgauss, a German mathematician. Under certain assumptions, the method of least squares has some very attractive statistical properties that have made it one of the most powerful and popular methods of regression analysis (Damodar, Gujrati and Sangeetha, 4th ed).

3.2-LEAST SQUARE METHED FOR (REGRESSION)

Least squares or ordinary least square (OLS) is a mathematical optimization technique which, when given a series of measured data, attempts to find a function which closely approximates the data (a "best fit"). It attempts to minimize the sum of the squares of the ordinate differences (called residuals) between points generated by the function and corresponding points in the data. Specifically, it is called least mean squares (LMS) when the number of measured data is 1 and the gradient descent method is used to minimize the squared residual. LMS is known to minimize the expectation of the squared residual, with the smallest operations (per iteration). But it requires a large number of iterations to converge.

3.3- MATHEMATICAL PRESENTATION OF MODEL

To test the relationship between gross domestic product and different components of the industrial sector following model is used:

gGDP=*f* (gIND, gMQ, gMANF, gMNLS, g MNSS, gCON, g EGD, ε**)**
gGDP : Growth of Gross Domestic Product
gMQ: Growth of Mining and Quarrying.
gMANF: Growth of manufacturing sector.
gMNLS: Growth of large-scale manufacturing sector.
gMNSS: Growth of small and medium enterprises sector.
gCON: Growth of construction industry.
gEGD: Growth of electricity, gas and water supply sector.
ε: Error term.

3.4- Model Specifications

gGDP= **ß0** + **ß1** (gIND) + **ß2** (gMQ) + **ß3** (gMANF) + **ß4** (gMNLS) + **ß5** (gMNSS) + **ß6** (gCON) + **ß7** (gEGD) +

3.5- Data Analysis and Discussions

This section includes descriptive as well as quantitative analysis and results of these two types of analysis are discussed in this section.

3.6- Quantitative Analysis

For analysis of data one method is used in this study: that is regression. Initially regression is used to check the impact of different independent variables on the dependent variable and also to test significance of this impact.

4-RESULTS AND DICUSSION

4.1-ANALYSIS OF RESULTS OF UNIT ROOT (TABLE 4.1) :

To test the stationary we have used ADF test because DF test is based only on AR (1) process while ADF test extra lagged terms of dependent variable in order to eliminate auto-correlation. In table (**4.1)** I tested the null hypothesis of unit root against alternative of stationary at level or first difference.

The augmented Dickey-Fuller (ADF) statistic, used in the test, is a negative number. The more negative it is, the stronger the rejection of the hypothesis, that there is unit root, at some level of confidence. In one example, with three lags, a value of -3.17 constituted rejections at the p-value of 10 percent.

Results show that all the variables are stationary at level when order of integration is I (1) and intercept & trend are considered. OLS estimation technique is applied to calculate the results.

Table 4.1 ADF Test Results of Industrial Sector Components and GDP.

Variables	Level		First Difference	
	Intercept and Trend	Order of Integration	Intercept and Trend	Order of Integration
gIND	-4.94* (-4.13)	I(1)	-7.67* (-4.13)	I(0)
gMQ	-3.84** (-3.50)	I(1)	-7.55* (-4.13)	I(0)
gMANF	-5.04* (-4.13)	I(1)	-7.73 (-4.13)	I(0)
gMNLS	-4.78* (-4.13)	I(1)	-7.84* (-4.13)	I(0)
gMNSS	-3.26*** (-3.17)	I(1)	-7.91* (-4.13)	I(0)
gCONS	-4.31*** (-4.13)	I(1)	-6.54* (-4.13)	I(0)
gEGD	-5.00* (-4.13)	I(1)	-7.24* (-4.13)	I(0)
gGDP	-3.33*** (-3.17)	I(1)	-7.03* (-4.13)	I(0)

Note: * denotes the rejection of the null hypothesis at 1 percent level of significance, ** denotes the rejection of the null hypothesis at 5 percent level of significance and *** at 10 percent level of significance. Values in the parenthesis are MacKinnon critical values for rejection of hypothesis of a unit root. **Legend: -** gMQ is growth in mining and Quarrying, gMANF is growth in manufacturing, gMNLS is growth in manufacturing large scale,

gCONS is growth in construction and gEGD stands for growth in electricity and gas distribution.

4.2-ANALYSIS OF RESULTS OF REGRESSION

Simple linear regression technique is used to analyze the impact of different determinants one by one. However results have been shown in table 4.2. It is also used here to avoid the issue of co integration to the maximum extent.

Table 4.2:- **Results** of regression by using model equation (3.4)

	gMQ	gMANF	gMNLS	gMNSS	gCON	gEGD	Overall gIND
Constant	**5.08 (17.73)**	**2.18 (3.94)**	**2.25 (3.67)**	**4.19 (9.35)**	**4.09 (9.80)**	**4.20 (9.84)**	**2.60 (4.35)**
GGDP	**-0.01 (-0.93)**	**0.20 (5.19)**	**0.17 (4.66)**	**0.06 (1.94)**	**0.06 (2.43)**	**0.04 (2.07)**	**0.16 (4.17)**
R^2	**0.01**	**0.31**	**0.27**	**0.060**	**0.09**	**0.07**	**0.23**

Regressions estimated using data for 1950-2010. Number of observations is 59 after adjusting endpoints. T values are given below the coefficient estimate in each cell.

There is positive relation between growth in GDP and Industrial Sector. The R- square value of about 0.22 which means 22 percent of the variation in GDP growth is explained by the growth in industrial sector.

There is negative relationship between growth in mining and quarrying sector and GDP. The R-square value of about 0.014 its means that 1 percent of the variation in GDP growth is explained by the growth in mining and quarrying sector.

There is a positive relation between GDP growth and growth in manufacturing sector. The R- square values of about 0.31 its means that 31 percent of the variation in a GDP Growth is explained by the growth in manufacturing sector.

There is a positive relationship between GDP growth and growth in large-scale manufacturing. The R-square value of about 0.27 states 27 percent of the variation in GDP growth is explained by the growth in large-scale manufacturing.

There is a positive relationship between growth in small- scale manufacturing and GDP. The R-square value of about 0.06 shows that 6 percent of the variation in GDP growth is explained by the growth in small-scale manufacturing.

There is a positive relationship between growth in construction sector and growth in GDP.The R-square value of about 0.09 states that 9 percent of

the variation in GDP growth is explained by the growth in construction sector.

There is a positive relationship between electricity, gas and water supply sector and GDP growth. The R-square value of about 0.07 shows that 7 percent of the variation in a GDP growth is explained by the increase in growth of electricity, gas and water supply sector.

5-CONCLUSION AND RECOMMENDATION

5.1- CONCLUSION

This paper is an attempt to investigate the relationship between economic growth and different components of industrial sector of the economy of Pakistan. Secondary data for 61 years from 1950 to 2010 was used for this purpose. The first step in the empirical analysis involves testing the time series characteristics of the data series using ADF tests. Simple linear regression and time series techniques are applied to estimate the relationships. All the variables used in this study are stationary in their first differences.

Regarding the hypotheses of the study it is concluded that the entire hypothesis has a positive impact on GDP partially accepted. Because in simple linear regression all the component of industrial sector shows a positive relationship with GDP except mining and quarrying sector that not only shows the negative relationship but also gives an insignificant result. All other results are statistically significant and consistent in simple linear regression.

5.2- RECOMMENDATIONS

I wish to suggest the following steps in order to improve the industrial output:

Small firms are generally inefficient and have to be made efficient through proper policy support and guidance. Small industry needs to be made buoyant and progressive partner in development process. The best way to do so is to establish strong small-large links in production, wherever feasible. Large- Small links may not get established automatically, they are to be developed with Government policy support.

There is need for Pakistan industrial sector to focus on: (a) develop of new products; (b) import replacements; (c) export goods; and (d) goods with growing demand. It would be appropriate to put the scarce national resources, in particular, capital to use for the production of new products rather than duplicate lines of production that are being carried on, even with inefficiencies.

To achieve higher growth, special incentives may be provided for setting up of industries for the manufacture of international quality. A system

to transfer technology to industry for commercialization, promote export centers for industrial development. The government of Pakistan has to secure continuous flow of Gas and Electricity to business without frequent load shedding. Government investment is required in improving Pakistani infrastructure within the country. Government should develop a reasonable infrastructure and other ancillary facilities.

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ROLE OF ENGINEERING EDUCATION IN NIGERIAN ECONOMIC DEVELOPMENT

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Abstract

This article examines engineering education as an economic development of global society and how these themes can impact on a country economic growth. The central issue of this article is the argument that engineering education changes global environment and it will increasingly depend on a country's ability to understand the role of human capital. The article further describes the importance uses of engineering education and knowledge technology in appropriate ways for development of a country. This article continues to express the influence of knowledge in development of regional economic growth. The article also presents a revision of economic growth theories that are fully related to the Engineering Education for a country to be considered.

Keywords: engineering education, economic development, knowledge.

Introduction

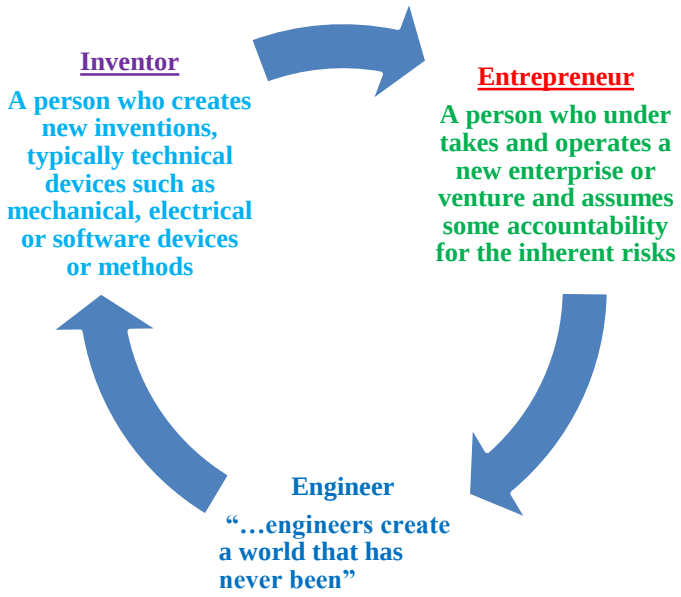
Nigeria as the most populous country in Africa and number seven world rated population nation with over more than one hundred and seventy million people (170,000,000) has big advantage to provide its economic growth through engineering education because changes in the global environment require changes in engineering education. The general conception of investment in human capital originated not long ago. It's the government, marketers, companies, private organization and individuals that can make this changes happened. Spending on human capital through standard engineering education is the best value a country can enrich his economic development. Development is the driving engine of environment, economy and society. Counting on this fact, basic engineering skills such as knowledge of the engineering fundamentals and technologies have become commodities that can be provided through lower cost of engineers in many developed and developing countries. As the world is upgrading every

seconds of today-today; many countries look forward for better alternative to strengthen their economic growth. Base on this conception, Nigeria has found itself among states that need engineering education to improve their economic growth. Engineering education play a key role of sustainable economy development of any country. Engineers do make the society look real life and glamour. Therefore, the Government of Nigeria investing in engineering education, it's a good investment any country can think of because human capital long-life return will contribute to the labor market and not only that but also to create jobs opportunity for individuals; human empowerment and will impact on the economic development of the entire nation and finally, it will make their engineers proceed and sell in the global market.

Engineering education

The notion of engineering education is to prepare students broadly knowledge of new technology through engineering skills profession. Engineers are visional people who create things by making use of technology to integrate our environment and developing oneself and other. Engineering education simultaneously play an active role and contribute to sustainable development by creating learning environments for students. Therefore, there is nothing more fundamental to the future of a nation engineer's enterprise that the notion of attracting talented young men and women to acquire engineering degree and providing them with an educated adopted for the apparent and future society. The impact of engineering education on economic growth, it always remind me the opinion of the engineering profession by the great **Theodore Von Karman** when he quoted, "Scientists study the world as it is; while engineers create the world that has never been."

This fantastic opinion of **Theodore Von Karman** was also illustrated with this simple diagram shown below.



Sources: *Wikipedia, Theodore Von Karman, 2008.*

Considering this brilliant conception, it is very obvious that with proper teamwork, leadership and social awareness and not only but also domain specific-knowledge and experiences; an engineer can knows how things work and what customers want through integration of general engineering skills. The creative aspect of it, they can determine whether customer value and enterprise value are business sense.

There will be always competition in the global economy market among the developed and developing countries because every leader want her country to be seen as the best economic growth in the world. Hence, engineering education will continue to play a vital role in economic development. This remind me of Dubai a city in United Emirate were infrastructures constructed by engineers have transformed the entire city to business center with multinational companies and tourist coming in every day. This has create jobs opportunity and reduces unemployment rates and brought in sustainable economy development into the entire state. As Nigeria population increases every day, there is need of well-prepared engineers that can create and develop products and system that will improve safety and quality of people life for change of environment. Considering all these fact, Nigeria as a nation has to wake up and take drastic creative ideas to reform their engineering education because the global market of engineers will

continue to need competence engineer graduates and skills technology with new innovative and creative ideas to build our present and future society.

Economic growth and human capital:

The idea of engineering education is the main factor of this article. As a capital good is generated from the concept of "human capital" that requires a high quality of human skills to obtain development. Human skills are as important in productive input of development process of natural wealth. Since engineering education play an active role in both creation and improvement of human capital, its relevance and importance to economic growth and development. According to Jhinagan (2005), the process of economic growth is traditionally practice to include more importance to absorb physical capital to human capital.

The best investment a country or government can give to his people, is to give them quality engineering education. This means you are teaching them how to fish but not giving them fish only. Indirectly, human capital contribute to growth productivity and employment; and for this to happen, its require knowledge based, skill, and talented of other workers. According to the concept of ***Schumpeter*** has in mind when he describe ***"by 'development' therefore, we shall understand only such changes in economic life as are not forced upon it from without but rise by its own initiative from within" (quoted in Higgins, 1968, p. 93).*** With this description of Schumpeter, Spending money on engineering education as part of human investment will massively yield the country human capital long-life return of knowledge based and this will influence on the development of the regional economic growth and create jobs for unemployment people. According to the theory observes education and training as a key factor of human resources and development that influences economic growth. It was described by Schultz (1971) in his own conceptual opinion that say: ***The most distinct feature of our economic system is the growth in human capital. Without it, there would be only hard, manual work and poverty except for those who have income from property. (Schultz, 1971, p. 47).*** The originating of new growth theories are therefore significant in the introduction of the active role of human capital in the growth of economies. According to the **Spillovers** theory of technology, the economic growth and income of many countries as country productivity depend on the available important of new technologies and scientific knowledge accumulated and these have create differences among countries in global economic growth market competitiveness as was described by (Eaton and Kortum 2002 and Klenow and Rodriguez-Clare 2005 for reviews).

According to (Todaro and Smith 2003), human capital is the term economists usually use for both education and other human capacities that can raise productivity when increased. Therefore, Engineering and

technology are the two closely related human capital components that work together to make the individual more productive and develop economic growth of a country per say.

Conclusion

In conclusion, investing in engineering education and skills technologies will contribute to the economic development and create jobs opportunity for individuals in long term return. As it was argue above, human capital theory describe that individuals develop their capacity to generate incomes and improve career disciplines through education and skills training in reproduction of economic development. Engineering education stimulate importance role in the knowledge based society because the knowledge and human capital generated by engineering education they drastically changes the economic development. The productivity of human capital in knowledge growth influence regional economic growth. Therefore, the effective output of growth and economic development would be even more pronounced than the pronounced entrepreneurs apply and disseminate the knowledge in a region. There is need for changes to be made in the Nigeria engineering education is conceived and delivered to enable engineering graduates to fit in the global sustainable development and also to make impact in the economic growth. Promotion of engineering education standard in Nigeria will drastically increase returns to human capital in knowledge growth and create opportunity for young engineers to sell in the global labor market.

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