Access Regimes and Institutions: The Economic Organisation of the Migrant Popo Fishermen of Pointe-Noire, Congo

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Indexing terms

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Summary

Within Popo society in Pointe Noire, Congo, fishermen
sell their fish to their wives at a price slightly below the
local market price. The wives process the fish and re-sell
it in distant markets, making a profit they mainly re-invest
in their husbands' fishing activities. The present paper
investigates this specific economic household organisation
in order to reveal the mechanisms producing and
preserving it. To accommodate the analysis the access
regime, describing the distributions of rights as well as
the different actors' ability to act upon their rights, is
introduced and defined. An important insight generated
by the analysis is how particular institutions exist to serve
the economic interests of dominant groups in the society.

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Contents

Introduction[1]

African households show a diversity of structural and organisational forms. The present paper addresses the specific household organisation found among the Popo fishermen of Pointe-Noire, Congo. Within this society, men are full-time fishermen, operating either as owners of boats and nets or as workers in different contractual relationships with an owner. The fish caught are sold to the wives of the fishermen, to a price slightly below the local market price. The women process the fish and sell them in distant city markets, making a profit they mainly re-invest in their husband's fishing activities. The objective of this paper is to analyse the observed social organisation in order to unveil the mechanisms producing and preserving the existent social order. More specifically we are interested in finding the explanations as to why men choose to sell the fish to their wives at a reduced price and why women confine themselves to supply credit to their husbands.

The paper proceeds in the following way. The discussion consists of four parts. First an outline of the present social organisation in the Popo society of Pointe-Noire, Congo, is given. The outline is based on the work of Jul-Larsen (1994) and describes the development of the institutional arrangement from the arrival of Popo fishermen in Congo in the sixties until today. In the second part the analytical concept *access regime* is introduced and defined. The access regime describes both the distribution of rights existing within a society and the different individuals' ability to act upon their

rights. The access regimes existing within the Popo society result in principal-agent relationships between owners and workers and between husbands and wives. This being the case, the third part analyses the exact relationship existing between owners and workers and husbands and wives respectively, and examines why they differ. In the last part a model explaining the existent organisational structure as the outcome of rational economic optimisation over time, is presented.

The Popo social organisation

Originally from Benin, the Popo society of Pointe-Noire, Congo, constitutes an easily identifiable group of about 1000 fishermen and 200-300 wives who live and work in separate village clusters outside the town centre. Both in relation to Popo fisheries in Benin as well as to local canoe fisheries in Congo, their production is characterised by a high level of specialisation and market-oriented production based on capital intensive technology. With few exception all the men are full time fishermen. The Popos have specialised in fishing of pelagic fish at open sea using driftnets from big motorised canoes. Each productive unit (canoe + nets) is operated by a male production unit, the company. The productive units are owned either individually or collectively by Popo fishermen. Dependent upon the number of owners and the number of owners actually fishing, the majority of companies also employ Popo workers who stay in different types of client relationships with the owners/chief of the company. In addition non-Popo labour, in the form of young local Vili workers, are used to different degrees by the companies. Vili workers are, however, considered less reliable than Popo workers.

The companies sell their catch immediately after it is landed on the beach. The income derived is shared among the fishermen according to a 50-50 share between means of production (capital) and labour. The labour share is divided among the company members according to a lot system. The owners take their part in the labour share provided they participate in production.

When the fish is sold on the beach the price is normally set by Congolese traders early in the morning. By far the greatest part, however, is sold to Popo women, wives of the crew members, at a somewhat lower price pr. unit. In principle every woman married to a crew member has the right to the same amount of fish from the canoe of her husband. In practise, however, it is an advantage to be the wife of an owner/company chief.

Each woman, whether she is the only wife or a co-wife, constitutes her own economic unit. She has her own ovens for smoking of fish and her own staff of young Congolese helpers. The smoked fish is sold in the markets of the nearby towns. For every female processor, access to fish is important and in order to increase her supplies she can buy pelagic fish from a small industrial fleet. She can also supply credit to her husband in order to enhance his productive capacity or she can get access to fish from another canoe by providing credit to the owner(s) of this canoe. In return for the credit the woman has the right to buy a certain share of the fish landed by the credit financed company at the reduced price.

To buy the boats and nets needed to create a company, financial means exceeding the Popo fishermen's cash funds are required. A fisherman or groups of fishermen wishing to establish a new unit, therefore, normally have to rely on some kind of credit. The first Popo fishermen arriving in 1967 established fishing companies based on partnership or co-ownership among the fishermen involved and financed their outlays by credit supplied by their extended families in Benin. The limited amount of available credit back home, however, and the fact that only scant repayments took place, resulted in home areas drying up as a founding source during the 1970.

The drying up created a need for additional sources of credit. The Congolese traders, to whom the fishermen originally sold their catches, were no alternative as they only bought limited volumes of fish and were reluctant to give credit to the Popo fishermen. The solution came through the wives. Wives brought over from Benin immediately took up smoking and re-selling of fish and soon made good profits. The women's processing capacity soon exceeded the amounts they could buy from their husbands. In order to increase their access to fish, therefore, women started investing in the fisheries. These investments increased the quantities caught and established buying-rights on part of the credit-supplying women. Credit supplied to the company of her husband increases the share allotted to the credit supplying wife relative to the shares of the other wives in the company. Credit supplied to outside companies gives the creditor the right to a given share of the catches of these companies. The number of other women with whom she has to share the catch is of main concern for a female creditor. No woman can under any circumstance claim more fish in a company than the share belonging to the wife (or the wives) of the chief. These share(s) depend upon

the total number of wives in the company. The lower the number of wives, the larger each share and the more attractive it will be for a woman to give credit to a company. Due to the interests of the creditors, therefore, as time went by the egalitarian organisation of co-ownership was replaced by a more hierarchical order characterised by one/few owners controlling companies consisting of contracted, unmarried workers. The owners found the women's supply of credit attractive as it did not include interests or repayments dates. It is only if and when a woman decides to renounce her right to buy fish that the question of repayment becomes relevant.

The social organisation within the Popo society is thus characterised by men being full-time fishermen, either canoe owners (co-owners) or workers. The fish caught are sold to the wives at a price slightly below the local market price. The wives process the fish and re-sell it in the cities of the region, making a profit they partly re-invest in the fishing activity. Men and wives keep separate accounts, each contributing individually to household expenses. Despite this fact the economic dispositions of the spouses are not completely disintegrated. Due to male dominance within the household, the woman cannot decide on her economic transactions entirely independent of her husband but is expected to take his interest into consideration when acting. The major part of a woman's credit is thus directed towards her husband's company and outside credit is supplied only with the permission of the husband.

The Access Regime

In order to capture the factors facilitating the observed social order, the concept access regime is introduced and defined, and the access regime existing within the Popo society investigated. The *access regime* describes the distribution of rights between different members of the society as well as the different individuals' ability to act upon their rights. The distribution of rights depends on the existing property right regimes whereas the ability to act upon one's right depends upon the actor controlling the technology required to do so. The access regime can thus be seen as a categorisation of different individual access situations. These access situations depends upon a) the distribution of rights prevailing and b) the different individuals' ability to utilise legally accessible resources.

Three types of property rights can be distinguished (Eggertson, 1990: 34). *User rights* are defined as the potential uses of an asset that are legitimate for an individual, including the right to transform physically or even destroy an asset. *Income rights* are the rights to earn an income from an asset and to contract over the terms to other individuals, and *transfer rights* refer to the right to transfer the asset permanently to another party. These different forms of property right may prevail in different social settings in time and space, or exist simultaneously within the same social setting at the same time by different individuals holding different rights towards the same assets or the same individual holding different types of rights towards different assets.

The ability to utilise accessible resources depends upon the user controlling the technology required to do so. Lack of such control may render a *de jure* accessible

resource *de facto* inaccessible. Consider deep sea fishing. No legal restrictions prevent any individual from participating. In practice, however, only those with access to the required fishing gear will be able to act upon their right.

The access regime classifies access in terms of these two dimensions, property rights and control over technology. Dependent upon the number and types of property rights defined and the dispersion of technology in the society, a multitude of access regimes can be identified, not only across but also within societies as different access regimes can exist for different members of the society.

We will not go into the multitude of access regimes possible but, given the distribution of rights and the technology requirements prevailing, focus on whether members of the society can be said to be granted equal or unequal rights of property and equal or unequal access to technology. To exemplify what we have in mind, let us keep to the fishing example. First, assume all members of a village have equal right to fish in a lake nearby. Given that fishing is done with home-made fishing gear, all members have equal opportunity to utilise the lake. We define this access regime *egalitarian*. Should fishing in the lake require expensive fishing gear affordable by only a portion of the village members, a regime characterised by *technologically differential* access prevails. A *legally differential* access regime is, on the other hand, characterised by all members being technologically able to catch the fish, but only some of them, e.g. the ones living along the shore, are allowed the right to do so. Should only some of the shore residing people control the technology

required, a *legally and technologically differential* access regime can be said to exist. The different access regimes defined are summarised in table 1.

Table 1. Access regimes

		Distribution of rights	
		Equal	Unequal
control	equal	*Egalitarian*	*Legally differential*
over	unequal	*Technologically*	*Legally and technologically*
technology		*differential*	*differential*

An egalitarian access regime represents common resource situations, where common implies not only equal legal access but equal ability as well. In the existent literature the legal aspect is given priority and egalitarian access regimes are traditionally denoted open access or common property regimes. *Open access* implies no restrictions on the use of the asset; whoever wants to utilise it can go ahead and do so. *Common property* on the other hand restricts access to members of a specified group, e.g. a lineage, village or nation. Common property is divided into unregulated and regulated (Baland and Platteau, 1996). *Unregulated common property* limits the access to members of the group but imposes no rules as to how these members are to utilise the resource. *Regulated common property* both delimits the access and imposes and enforces rules on the use of the resource. *State property* can in some respects be regarded as an extended form of common property.

Common resources may in principle be utilised in an individualistic or collective manner. In the open access and unregulated common property situations, collective

action depends upon the individuals seeing it in their own interest to act collectively. Within regulated common property collective action is supported by rules imposed upon the individual by society. Of central importance here, irrespective of whether individualistic or collective action are dominating, is the fact that interaction between users must be characterised as interaction between equals. Any patterns of conduct which emerge are therefore restricted to the class of equal player relations.

Differential access regimes on the other hand are characterised by some having control over resources while others have not. This applies irrespective of the differential access regime being legally or technologically based. *Private property*, characterised by some individuals legally controlling the resource, is example of a legally differential access regime. Seen from the outside, from the larger society incorporating entitled as well as non-entitled groups, a *common property* situation may also give rise to legally differential access regimes. When focusing on similarities and differences between groups rather than within groups, the main difference between a private property and a common property regime is that the owners in the latter are groups rather than individuals.

In differential access situations, relations between individuals controlling resources and the rest normally develop. To relate our analysis to the economic literature, the people controlling the resources will in the following be called principals and the others denoted agents.[2] The principal-agent relationship can either be seen as the

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[2] Within economic theory the terms principal and agent traditionally define resource controlling and non-controlling actors in situations characterised by asymmetric information.

principal letting the agent utilise the resource against some compensation, or as the principal hiring the labour power of the agent in order to utilise the resource. A landowner renting out his land on a fixed rent basis fits the first description whereas a landowner employing wage labour to work the land fits the second. Output related payments may also be classified according to this distinction. Using share-cropping and piece-rate payment as examples, we see that share-cropping falls into the first category whereas piece-rates fall into the second.

Given the distinction between egalitarian and differential access to resources, and the different forms a relationship between principals and agents may take, our main objective is to determine the access regimes that can be said to exist within the Popo society and furthermore, given the access regimes, to reveal the exact relationship existing between the members of society. Before pursuing this further, however, we find it natural to relate our concept access regime to the economic literature on institutions.

The term *institutions* is given two related but different meanings in the economic literature. The first are institutions as *rules of the game*, providing the context in which economic actors operate. Institutions define the terms under which the various actors confront each other, influence their expectations and define their rights. As such, institutions are constraints human beings impose on themselves in order to reduce uncertainty and facilitate interaction (North, 1990). The second interpretation sees institutions as *organisations*, an area of activity within which the market does not co-ordinate the activities of the participants (Williamson, 1975; 1985).

We follow North in seeing institutions as rules of the game rather than as organisations. We depart from North, however, in our inquiries regarding the factors determining these rules of the game. Where North points to culturally transmitted values like codes of conduct, norms of behaviour and conventions we, without denying the influence exerted by such factors, focus on the prevailing access regime(s). In our view, therefore, the access regime(s) can be seen as the layer situated underneath the institutional framework influencing its characteristics.

The distinction between access regimes and institutions can be exemplified by making use of North's example which shows the distinction between institutions and organisations. North (1990:4) sees institutions as analogous to the rules of the game in a competitive team sport and the teams playing according to these rules are the organisations. This analogy gives us a good idea of the situation, but it does not cover the total situation. It does not specify why people in a given society play one particular game and not another. Why do they favour soccer and not baseball? Transferred to the focus of analysis of this paper we find that institutions are the rules of the household game. But how can we account for the diversity of such organisational rules observed? It is to be able to address questions of this type that we find it necessary to define and delineate the access regimes. The hypothesis it that the access regimes prevailing within society influence and to a large degree determine the institutions or organisational rules found.

The Popo access regimes

Investigating the access regimes existing within the Popo society in Pointe-Noire, we find that Popo fishermen who originate from Benin have to secure residence and work permits from local and central Congolese authorities in order to stay and work in Congo. In principle, each man has to obtain a legal residence and work permit on individual basis. In practise however, only 1/5 of the Popo population possess such permits as they are difficult to obtain at a reasonable price. The majority base their security upon collective rights negotiated by the Popo political institution 'l'Association des Ressortissants Beninois' (ARB). As a collective institution, ARB does not discriminate between Popo men, but work to secure the same immigration status for all. Within the Popo society, therefore, legal access to the resources of the sea are egalitarian among men.

The ability to utilise these resources, however, depends upon control over working capital like canoes, motors and fishing nets. The financial outlays required to buy such items prevent all men from buying their own, thereby creating a technologically differential access regime between them. Due to unequal control over technology, a principal-agent relationship is established between owners and workers. Within this relationship, the owners rent out their equipment to the workers against a share of total output as rent. The share-rule is a 50-50 income split between capital and labour. Between the different workers utilising the same equipment, the dividing rule is a equal share rule.

The situation of Popo women differs from that of the men as the women's residence and work permit are granted them as wives and not as individuals in their own rights. Women, therefore, have no legal access to the fish resources of the immigrant country but have to rely on their husbands' access. Related to control over working capital, women also face a different situation than men. Husbands, in the role of household heads, have the right to control all the fishing capital of the household, regardless of how it is attained. As a result women are prohibited from becoming capital-owners. Between men and women, therefore, a legally differentiated access regime is established.

Since women are prevented from controlling the technology (and from acting as workers), they have no direct access to the fish but are dependent upon their husbands to get access. The relationship between husband and wife is thus analogous to the situation between owners and workers in the sense that the husbands/owners can be seen as principals and the wives/workers as agents. Within Popo society, therefore, two types of principal-agent relationships exist: a technologically based relationship between owners and workers and a legally based one between husbands and wives.

The Popo principal-agent relationship

The principal-agent relationship between owners and workers is a share-tenancy relationship where the principal and the agent share the output according to an agreed share-rule. Such output sharing arrangements are shown to be efficient in situations characterised by asymmetric information problems, either due to the principal lacking

information about the agent's ability to perform certain tasks (adverse selection) or his actions when performing them (moral hazard). In the Popo case the owner may lack information about his workers' actions either because, for one reason or another, he prefers to stay ashore and not take part in the fishing activity or because he is operating more than one canoe. In order to provide the incentives needed to induce the workers to work hard, payment is related to output.

The relationship between husbands and wives on the other hand is a seller-buyer relationship and not a traditional agency relation. Why is this so? Why do the men prefer to sell the fish to their wives rather than to design a more standard agency relationship where the women act as their husband's sales agents? The rationale can be investigated by drawing upon the distinction between competing and complementary activities and the degree of manipulation open to the agent. Two or more activities are defined as *competing* when the performance of one activity prevents a person from performing the other(s). Typical competing activities are activities that have to be performed at different places during the same time period. In the Popo fishing community, fish caught in the fishing season must be processed and brought to the market while it is still fresh. This implies, given that leisure time is constant, that time used to process and/or trade compete with fishing time. *Complementary* or non-competing activities on the other hand, are activities which often supplement each other and are easily performed by one person. Sequential activities fall into this category. In agrarian societies, where crops are stored after being harvested, growing and selling can be performed in sequence. Selling, therefore, does not interfere with production and one person can easily perform both activities.

When more than one activity has to be performed, delegation of different tasks to different people may increase total return due to gains from specialisation. Furthermore, given the presence of competing activities, delegation may raise total output further by reducing 'dead time' losses. We define a dead time loss as the time required to make a person able to perform a given activity. This time is often constant and independent of the time used to perform the activity itself. Transport time to and from the market and/or the fishing banks are examples of such dead time losses.

Delegation, however, may incur costs as well as benefits. From an owners point of view, the cost associated with letting someone else bring the goods to the marked, include the risk of being cheated or the cost incurred by designing an incentive scheme making it not worthwhile to cheat. The possibility of being cheated and the cost of designing an incentive scheme depend upon the principal's ability to control the actions of the agent. This control may be direct in the form of monitoring or indirect through the use of signals.[3]

For competing activities, where the reduction of dead time losses makes up a big part of the gain from delegation, direct monitoring may not be economically viable. Control is thus dependent upon the use of signals. For signals to function as controlling devices, however, they have to be objectively observable and not be subject to manipulation by the agent. For sequential activities manipulation is deterred by the principal being present observing the output.[4] Output, therefore, becomes an

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[3] A combination of the two is also possible. A principal may hire a foreman monitoring the workers, and use quantity of output produced etc. as signals of the foreman's labour input.
[4] Within agrarian societies it is common for the landowner to be present at his share-crop rented land at

objective, observable signal of labour input. Within Popo society, the need to control output may be the rationale for owners who control more than one canoe to stay ashore rather than take part in the productive activities of one of the companies. Staying on the beach where the fish is landed give the owners the opportunity to control total output. Output, therefore, becomes an observable signal of labour input.

With regard to marketing the Popo fishermen face a different situation. As fishing and selling compete for the same time, the fishermen cannot both fish and/or control the output and be present at the market place observing the income. Since sales-income is a function of the quantity and quality of the processed fish as well as the women's negotiating capability and the demand and supply conditions in far away markets, the man has little or no information about total income derived. His lack of information create room for manipulation in the form of under-reporting by the woman. Market income, therefore, cannot function as a signal upon which he can design an agency contract.[5] The outcome is a seller-buyer relationship between the husband and wife/wives.

In situations characterised by completely competing activities, therefore, delegation will take the form of a seller-buyer relationships. Too see this consider a principal who controls a commodity x. He can either sell the commodity in the local market at a price p, or let someone sell it for him at the price q in a more distant market. The

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harvest time, observing or participating in the harvest.
[5] This situation differ from the traditional sales agent situation in the sense that a sales agent is selling the product only indirectly. The customers direct their orders to the producer. In this way a sequential situation is created, giving the producer/owner the ability to observe output thus making output an observable signal of labour input.

agent selling the good in the distant market is entitled to a share α of total income derived. The agent's income is thus given by $I^w = \alpha q x$ and the principal's by $I^m = (1-\alpha)qx$. The principal, however, lacks information about the true price at the distant market. This lack of information make it possible for the agent to manipulate the price in order to maximise her own welfare. The agent thus faces the maximisation problem,

$$\underset{\{q\}}{Max}\, I^w = \alpha q x$$

$$s.t.\ (1-\alpha)qx \geq px$$

The restriction reveals that the principal must get an income at least equal to his alternative income in order to be willing to let the agent bring the goods to the distant market. Otherwise he will choose to sell it in the local market.

The agent's first order condition is given by $\lambda = \frac{\alpha}{1-\alpha}$, where λ is the non-negative lagrange multiplier. The first order condition shows that the far away market-price reported by the agent is determined by the restriction alone. By solving the restriction with respect to q we have $q = \frac{p}{1-\alpha}$. The principal's income is equal to $I^m = \frac{(1-\alpha)px}{(1-\alpha)} = px$. Irrespective of the strategy chosen, the principal's income will not exceed the income derived by selling the commodity in the local market.[6]

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[6] We have for simplicity assumed a risk-neutral agent. The result, however, is independent of the agent's risk attitude. A risk-averse, risk-neutral and risk-loving agent would all find it optimal to choose q such that the principal's income equals px.

Furthermore, by selling the commodity in the local market the principal avoids the risk of being cheated by agents disappearing with the commodity or claiming that all/part of it have been destroyed by accidents. In situations characterised by competing activities preventing the principal from observing the output, a seller-buyer relationship is superior to an output dependent arrangement. Due to lack of control devices, therefore, it is optimal for the husband to sell the fish to his wife/wives. But why does he sell her the fish at a price below the local market price? This question is a central topic addressed in the next section.

Model: Husband-consented credit supply

The Popo social organisation consists of independent men and women performing individual economic activities, keeping individual accounts. Despite this atomistic structure, a wife cannot decide on her economic dispositions entirely independent of her husband. As a result the majority of a women's credit is directed towards her husband's companies and credit to other canoe-owners is supplied only with the consent of her husband. Why is this so? Has it something to do with the husband-wife relationship or is it a reflection of more general patterns of human interaction?

In this section a formal model is presented which shows that in a longer time perspective it is profitable a) for a wife to restrict herself to the directives of her husband and b) for a man to sell the fish to his wife at a price below the market price. As a point of departure it is assumed that the relationship between husband and wife is the result of the legally differential access regime existing between men and women. The access regime denies women the right to control the fish resources thus making

them dependent on their husbands for access. A husband usually pays his wife's travel costs from Benin to Congo and allows her the right to enter the processing and trade in fish. Since the profit earned makes the wife relatively wealthy she becomes economically independent of her husband. Why then, do Popo women stay subordinate to their husbands? Why do they not choose to control their own, independent companies as other women fish traders, e.g. the Fante women in Ghana are doing (Overå, 1992). By controlling their own companies, the women would obtain the right to the capital share of the catch. Economically, therefore, subordination has its price.

The subordination of Popo women can to a large degree be explained by the fact that the Popos are migrants in the Congo. As described earlier, Popo men receive collective residence permits through the Popo political organisation, ARB. This political organisation does not interfere in family matters, however, and the permits of wives are therefore conditional upon their husbands' consent. The fact that women lack individual work and residence permits, gives the household heads the means necessary to maintain the differential access regime. If wives, against the interests of their husbands, establish their independent companies, they risk being sent back to Benin and put out of business for good. Moreover, a husbands who sends his wife back to Benin is not obliged to pay her the investment money back. In this respect, therefore, the legally differentiated access regime existing between men and women is due to the husband-wife relationship. It is, more specifically, due to the marriage rules allowing husbands the right to sanction rule breaking behaviour, thereby keeping up the legally differentiated access regime.

A woman who wishes to become independent has the opportunity to divorce her husband. This, however, would not help her become owner of independent companies in Pointe Noir. The process of separation takes a long time and during this time the husband decides over her and has the right to send her back to Benin. As a divorcee the woman would not be able to return to Pointe Noir and continue her economic activities. The ARB organisation ruling the Popo society in Pointe Noir would not allow her back into society. Allowing a divorced woman back into the society of her former husband is bound to result in conflicts. Since the society is interested in keeping conflict levels low a divorced woman are not allowed to re-enter.

On the part of the husbands, the mere possibility that women might start independent companies is a threat they have to take seriously. By establishing their own companies the women would direct their credit to these companies instead of to their husband's companies thus reducing the men's catches and income. The establishment of independent companies would in addition influence the existing companies' supply of labour. In order to run a company, a given amount of labour is required. Given that new companies are established by workers leaving their primary companies in order to organise new ones, owners of existing companies would lose part of their work force. To make up for the lost labour, the owners of the primary companies must either utilise local Congolese workers who are considered unreliable or import new Popo workers from Benin, paying the travelling costs. The establishment of new companies thus reduce the owners'/husbands' income in two ways; a) due to reduced investments and thereby reduced catches and b) due to the replacement costs of the workers lost. An obvious strategy to counteract such a development is for the

husbands to make it more profitable for their wives to direct their credit to the companies controlled by them. Selling wives the fish to reduced prices is one way of doing this.

The price reduction, however, is costly for the husbands as it directly reduces their income. After having received the investment money, therefore, a husband might be tempted to refuse to reduce the price. The wife must then be expected to claim her investment money back in order to invest it in other types of "wife appropriate" economic activities with higher returns. By sending his wife back the Benin the man avoids paying her money back. By doing this, however, he cuts himself off from future investments from his wife. He could in principle marry another wife later on and bring her to Congo to enter the fish trading business. Such a strategy is a) costly as it requires him to pay lots of travel money and b) has uncertain outcomes as the word of his behaviour will spread among the Popos back home. A new wife must thus be expected to refuse to invest in his fishing activities as she knows that irrespective of her behaviour she will soon be sent back to Benin. In the following, therefore, a man refusing to sell the fish to his wife at a reduced price is assumed to be unable to attract future investments from his wife/wives.[7]

The inability of ARB to interfere in family matters prevents the organisation from being a third party with power to sanction any explicit contract between husband and wife. Implicit contracts are thus the only type of contracts available for spouses. The

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[7] A potential new wife's reaction to the return of a former wife depends upon the reason for this return. It is only when the return is due to inappropriate behaviour on part of the husband she will decide not to invest in his company. This will not be the case when the return is due to inappropriate behaviour on

contractual relationship between the spouses is as a result assumed to be in the form of an implicit contract.

The theory of repeated games with perfect/imperfect monitoring indicates that co-operation in agency relations can be sustained within implicit contracts by conditioning future patterns of co-operation on the history of the relations. The Popo community at Pointe-Noire is a small, transparent community where the actions of all the members of the society are eventually known by all. Within Popo society, therefore, monitoring appears to be close to perfect. The model presented thus assumes a perfect and complete information economy where husband and wife live an infinite number of periods and where each person has a time discount factor δ, $0 \le \delta \le 1$.[8]

To simplify the analysis we concentrate on the owner-wife relationship and assume each owner to have one wife only.[9] The owners are furthermore assumed not to participate in the fishing activities, rendering the owner's share equal to the capital share, r, of the amount caught. In each period the man can either sell his output to the local Congolese trader at the local market price, p, or sell it to his wife at a price below the local market price. The catch per company at time t is assumed to be a function of capital input in that period, $x_t = f(k_t)$. The capital stock each period consist of the capital stock left over from the previous period and investments at the

part of the former wife.

[8] Like everyone else, the Popo's do not enjoy an infinite lifespan. The results obtained from this infinite-horison model, however, are equivalent to those obtained from a finite-horison model with a constant probability of termination.

[9] A wife of a worker receives such a small part of the catch that she has a very small opportunity of

start of the present period, $k_t = (1 - \beta)k_{t-1} + i_t$. The existing capital stock is assumed to depreciate at a given rate β each period. The capital stock in the first period is equal to k_0.

The existing capital stock is owned and controlled by the owners whereas investments each period are controlled by the women. The woman can choose between investing in her husband's company or in an independent company where she gets the right to the capital share of output. Her investment in any period is a function of her income in the previous period and her consumption requirements in this period. As both her income and her consumption requirements are influenced by exogenous shocks (e.g. the quantity and quality of fish caught, the price level in the city markets, the health situation of the family etc.) the woman's actual investment in any period is a random variable. Due to this randomness her husband cannot tell whether a small investment in his company is due to exogenous factors or due to his wife investing in an independent company. The husband learns about his wife's investments at the end of the period when the woman, in order to reaps the benefits of her investment, has to be at the beach publicly demanding her share of the independent company's catch.[10]

The woman's choice between investing in her husband's company or an independent company depends on the benefits derived in either case. Since actual investments are random, the benefits are calculated on the basis of expected investments each period.

becoming a creditor.
[10] The point of disclosure might be postponed by the woman sending helpers to the beach to collect her share of the catch. But in a small transparent society like Pointe Noire the woman financing the independent company will be disclosed eventually.

To simplify we assume the woman's expected investment to be equal to a given amount $\underline{i}$ each period.[11] If the woman chooses to co-operate and invest in her husband's company, the expected catch of his company in period t is given by

$$x_t^c = f\left[(1-\beta)^t k_0 + \frac{1-(1-\beta)^t}{\beta}\underline{i}\right].$$ If, on the other hand, she decides to defect and invest in an independent company, the catch of her husband's company in period t is given by $x_t^d = f\left[(1-\beta)^t k_0\right]$. A woman investing in her husband's fishing activity gets an output equal to $[q-(p-d)]rx_t^c$ each period, where q is the price at the distant city market and d the deduction in the local price she receives as a wife.[12] [13] By financing an independent company, on the other hand, the woman gets the right to the owner's share of the investment induced output. As a wife she also retains the right to buy her husband's share of output from his companies. In the first period, therefore, her output is equal to $qrx_0^i + (q-(p-d))rx_0^d$, where $x_0^i = f(\underline{i})$.

Given that each owner pays his share of the replacement cost resulting from workers leaving existing companies in order to establish independent ones, the number of existing companies are unaffected by the establishment of independent ones. The effect on total output is thus non-negative, $x_t^i + x_t^d \geq x_t^c$.[14] As a result the woman's

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[11] By assuming the probability distribution of the factors influencing the woman's actual investment any period, as well as her optimal investment profile over time, to be common knowledge, the woman's optimal expected investment over time can be calculated. Since our objective is not to determine her optimal investment profile, but rather, given this profile, to investigate whether it pays her to co-operate or defect, we simply assume her optimal expected investment each period to be equal to $\underline{i}$.

[12] Given a seller-buyer relationship the woman has no incentive to conceal the market price, q, in distant markets.

[13] It is assumed that the actors, lacking information about future prices, project the present price levels into the future.

[14] Given that the owner would have established a new company with the same amount of capital

stage output from financing an independent company exceeds her stage output from financing her husband's company.

A husband finding out that his wife is financing independent companies, can choose to let her stay in business in Congo or send her back to Benin. In Benin the woman's income is reduced to her reservation income level, w. By financing an independent company the woman gets a higher income in the first stage, but given that the financing triggers her deportation back to Benin, her outcome in every future stage will be equal to her reservation income level.[15]

A man prefers to sell to Congolese traders if his wife finances independent workers, $prx_t^d > (p-d)rx_t^d - \mu cl$. The last term captures the replacement cost, where μ denotes the relative reduction in the owner's labour force, l, due to the establishment of an independent company and c represent the replacement cost per unit labour. It is assumed that co-operation is efficient, $qrx_t^c > prx_t^d + w$, and that cheating entails a loss, $qrx_t^c > qr(x_t^i + x_t^d) - \mu cl$.[16] The agent prefers cheating to receiving her reservation income level, $qrx_t^i + (q - (p-d))rx_t^d > w$.

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equipment had he received the investment money, total output in an exclusively owner controlled situation would be equal to total outcome in an situation with an independent company.

[15] Several authors have argued that the game remaining after one side defects is identical to the game as a whole, so equilibria available at the beginning of the game should be available also after one side defects. The players, therefore, should renegotiate from the punishment we propose to a new equilibrium with higher payoff for both players thus wrecking our original trigger strategy equilibrium. Other authors have adopted different perspectives on re-negotiation (see Fudenberg and Tirole 1991, Ch. 5 for a literature review). Because this literature is still in flux and especially because purely game-theoretic analyses of re-negotiation abstracts from institutions that would influence the re-negotiation in the husband-wife relationship we consider (e.g. the importance of male pride and the shame brought upon a man who has been cheated upon by his wife), we do not adopt any of the existing approaches to re-negotiation.

[16] When cheating entails a loss the extra gain obtained by a cheating women is smaller than the loss

Consider the trigger strategy according to which a husband offers his wife the right to buy his share of output at a price $(p - d*)$, let her stay in Pointe-Noire and continue her processing and trade in fish given that she does not invest money in independent companies and sends her back to Benin if such financing is ever observed. A wife's strategy calls for only financing her husband if she is allowed a deduction equal to $d*$ and for financing independent companies if the deduction is smaller than $d*$. Will the trigger strategy make up a Nash-equilibrium?

To address this question the deduction $d*$ that will be offered by the husband must be determined. The proposition below present the relation between the lowest deduction for which the wife's best response is to finance her husband only.

Proposition: Assume that $\delta \in (0,1)$. The optimal deduction, that is the smallest deduction for which the wife's best response is to finance her husband only, is $d* = d(p,q,r,w,\beta,\delta,i,k_0)$. The deduction d is monotonically decreasing in r,q,δ,i and k_0 and monotonically increasing in p,w and β.

Proof: To show that a wife cannot gain by financing an independent company one period if offered $d*$, denote by V_c^w the present value of lifetime expected income for a co-operative wife who restricts herself to finance her husband and denote by V_d^w the

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incurred by her husband. It is thus not possible for a women to compensate her husband for every loss he experiences due to the establishment of an independent company. Independent companies thus threaten the interests of the husband.

lifetime expected income of a defecting wife who finances an independent company once. The wife's lifetime expected incomes are:

$$V_c^w = \left(q - (p-d)\right)r \sum_{t=0}^{\infty} x_t^c \delta^t$$

$$V_d^w = qrx_o^j + \left(q - (p-d)\right)rx_0^d + \frac{\delta w}{1-\delta}$$

The lifetime expected income for a co-operative wife, V_c^w, is the sum of an infinite power series. This power series is a valid representation of the woman's discounted income function given that its limit exists and is equal to the woman's income function. According to the ratio test for convergence, the infinite series $\sum_{n=1}^{\infty} x_t^c \delta^t$ converges to a limit provided that $\lim_{t\to\infty} \left| \frac{x_{t+1}^c \delta^{t+1}}{x_t^c \delta^t} \right| < 1$ or $\lim_{t\to\infty} \frac{x_{t+1}^c}{x_t^c} < \frac{1}{\delta}$ when $t \to \infty$. As time approaches infinity, $k_t = k_{t+1} = \frac{i}{\beta}$, resulting in $\frac{x_{t+1}^c}{x_t^c} = 1 < \frac{1}{\delta}$. The power series converges.

A wife will not finance an independent company given that $V_c^w > V_d^w$. Substituting and rearranging yields that a wife's best response is to restrict herself to finance her husband given that:

$$d^* \geq \frac{\frac{\delta}{1-\delta}w + qrx_o^i}{r\sum_{t=0}^{\infty}x_t^c\delta^t - rx_0^d} - (q-p)$$

the properties of d^* can be derived from this expression (see appendix)∎

Under a trigger strategy the wife is motivated to finance only her husband by the premium over her reservation income level received as a processor and trader in fish and by the stick of being sent back to Benin. If the induced difference between the present values of the lifetime expected income of a wife placed in Pointe-Noire and Benin is higher than the one-period gain from investing in an independent company, the best response of a wife is to restrict herself to finance her husband. As a result the optimal deduction decreases as the wife can gain less by cheating (lower x_o^i and x_0^d) compared to the gain obtained by investing in her husband's activity. The gains obtained by cheating and by co-operation is influenced by the form of the production function f. The more concave the production function, the higher the first period gains obtained by cheating. Furthermore, the lower the cost associated with buying the fish from her husband (lower local market price, p), the lower the wife's alternative income (lower w) and the more she gains by coming to the Congo (higher r and higher q) the smaller the optimal deduction. [17] The required deduction decreases also the

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[17] If the share, r, is sufficiently low, a wife's income from acting as a trader in Congo may be lower than her alternative income in Benin. This may be the reason why so few workers (receiving only $\frac{1}{n}(1-r)$ of total output, where n denotes the number of workers in the company) are married or have brought their wives to the Congo.

smaller the capital deduction, β, and the more the woman values future incomes (higher δ).

For the trigger strategy to constitute a Nash-equilibrium, each owner/husband should find it optimal to let his wife buy his output at a reduced price every period. If he chooses to keep to the contract to sell her the fish at a reduced price each period, his period income is equal to $(p-d)rx_t^c$. If he refuses to fulfil the contract his income for the first period is equal to prx_0^c, but his income every successive period is reduced to prx_t^d. The man's lifetime expected incomes are given by,

$$V_c^m = (p-d)r\sum_{t=0}^{\infty} x_t^c \delta^t$$

$$V_d^m = prx_0^c + pr\sum_{t=1}^{\infty} x_t^d \delta^t$$

As time goes towards infinity x_t^d goes towards zero.

Given that his lifetime expected income is higher by keeping the contract than the lifetime expected income by breaking it, the husband will choose to sell the fish to his wife at a reduced price every period. On the equilibrium path the condition amounts to a price deduction low enough, that is,

$$d^* \leq p\left(1 - \frac{x_0^c}{\sum_{t=0}^{\infty} x_t^c \delta^t}\right)$$

The larger the difference between lifetime expected output derived by a continuously investment-enhanced capital stock compared to a one-time enhanced capital stock, the larger the scope of a price deduction. More specifically, the scope of a price deduction is larger the higher the local price, p, the higher the investment, i, the smaller the depreciation rate, β, and the higher the discount factor, δ.

For these strategies to be a Nash-equilibrium,

$$p\left(1 - \frac{x_0^c}{\sum_{t=0}^{\infty} x_t^c \delta^t}\right) \geq d^* \geq \frac{\frac{\delta}{1-\delta}\frac{w}{r} + qx_0^i}{\sum_{t=0}^{\infty} x_t^c \delta^t - x_0^d} - (q - p)$$

For a d^* in the specified range the man will find it optimal to sell the fish to his wife at the reduced price and the wife will find it optimal to finance her husband only. In order to maximise his income the man will choose the smallest deduction possible, that is he will choose d^* equal to the right hand side of the above equation.

By seeing the economic dispositions of Popo men and women in a longer perspective, the existing organisation which is characterised by Popo men selling their share of the catch to their wives at a reduced price and receiving credit from their wives in return, is shown to be an optimal arrangement from both the men's and the women's point of view. The arrangement is optimal given the legally differential access regime prevailing between men and women which restricts access to working capital and thereby to fish for men only. Furthermore, the migrant status of the Popo

population in Congo coupled with the fact that only men have obtained residence and work permits, give husbands the means necessary to uphold the legally differential access regime.

The importance of controlling the working capital also explain why women are delegated the role of processors and traders in fish. Since the differential access between owners and workers is technologically based, a worker being able to accumulate enough capital has the right and the ability to become an owner. The more workers are transferred into owners, the harder the competition for labour and fish. The more new owners, the higher the replacement cost of the primary owners. And the smaller the pool of workers, the more each owner would have to offer the workers in order to attract their labour, and the less the capital share. Furthermore, the higher the number of operating companies, the smaller the average catch per company. Established owners, therefore, have no interest in letting male Popo workers establish themselves as fish-traders accumulating capital. Selling the fish to the wives prevents such a development.

Selling it to them at a reduced price makes it more attractive for the women to direct their investments towards their husband's companies. Reducing the price, however, is only one way of achieving this. The husbands could alternatively sell at the local market price and attract the credit by paying their wives an interest rate somewhat above the market rate. However, in marine societies where catch variability has a very profound impact on monthly income levels, a price reduction has the benefit of relating "interest" payments directly to catch levels. In a "price reduction" situation

the woman has the right to a given share of the catch determined income. The man is thus secured from having to pay high "interest" when income is low. In an interest payment situation on the other hand, there might be a tendency for catch levels and interest payments to vary in opposite directions. When catches are low, the women have less money to lend out, and other members of society often need to borrow to cover consumption requirements. The higher the demand relative to supply, the higher the interest rate and the more expensive it become for husbands/owners to pay interest in excess of the market rate.

The existing social and economic organisation is thus explicable as the outcome of rational economic considerations by the individuals, given the insecurities existing and the access regimes prevailing in the society.

Conclusion

The social organisation of Popo society, characterised by men being fishermen and women fish-traders has been shown to be optimal from the point of view of the male capital owners. By defining working capital, and thereby the fish itself, as legally inaccessible to married women, the men create a legally differentiated access regime between men and women. The husband's ability to send any wife not abiding by the husband-wife rules back to Benin maintains this legally differentiated access regime. The legally differentiated access regime between men and women, in combination with the technologically differentiated access regime existing between owners and workers and the fact that fishing and trading are competing activities, make it optimal

for the owners to sell the fish to their wives at a reduced price. The wives on her side, knowing that the only way to stay in business is to abide by her husband's restrictions on her credit giving, finds it optimal to do so since abiding by the restrictions maximises her expected lifetime income.

Important insight generated by the analysis is how particular institutions exist as means serving the economic interests of dominant groups in the society. Dominant in the sense that they can prevent others from participating in the productive activities of the society on same terms as they participate themselves. In Popo society at Pointe-Noire men deny women the right to possess working capital, thus creating a legally differentiated access regime between men and women. In combination with the technologically differentiated access regime existing between owners and workers, the existent institutional order is shown to be the order best serving the interests of the owners. Contrary to North (1990; 6) who primarily sees institutions as "constraints human impose on themselves in order to reduce uncertainty and facilitate interaction", institutions in our view may just as well be devices created by human beings in order to facilitate some person's interests at the expense of others.

Following this line of reasoning our analysis demonstrates that it is important to reveal not only "the conditions under which co-operation exist" (North, 1990:14) but also the form the co-operation takes when analysing the institutional set-up in a society. By investigating whether co-operation will be mutually beneficial or benefit some groups more than others due to one part being able to define the co-operative terms, new insight into the institutional setting can be gained. To accommodate the

analysis, the prevailing access regime should be specified, since the origin of the

observed institution may be traced through the access regime.[18]

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[18] The fact that institutions, once created, may exist unaltered in spite of changes in the underlying factors, may require an investigation, not of the previous access regime, but of the one existing when the institution came into being.

Appendix: The effect of changes in exogenous variables on the optimal price deduction.

$$d* = \frac{\frac{\delta}{1-\delta}\frac{w}{r} + qx_0^i}{\sum\limits_{t=0}^{\infty} x_t^c \delta^t - x_0^d} - (q - p)$$

An increase in the price p increases the optimal price deduction.

$$\frac{\partial d*}{\partial p} = 1 > 0$$

An increase in the price q reduces the optimal price deduction given that the total catch the first period if the woman defects is smaller than the discounted stream of catches if she co-operates. This condition is assumed fulfilled.

$$\frac{\partial d*}{\partial q} = \frac{x_0^i}{\sum\limits_{t=0}^{\infty} x_t^c \delta^t - x_0^d} - 1 < 0 \text{ for } x_0^i + x_0^d < \sum\limits_{t=0}^{\infty} x_t^c \delta^t$$

An increase in the share r reduces the optimal price deduction.

$$\frac{\partial d*}{\partial r} = -\frac{\frac{\delta}{1-\delta}\frac{w}{r^2}}{\sum\limits_{t=0}^{\infty} x_t^c \delta^t - x_0^d} < 0$$

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An increase in the reservation income w increases the optimal price deduction.

$$\frac{\partial d^*}{\partial w} = \frac{\frac{\delta}{1-\delta}\frac{1}{r}}{\sum_{t=0}^{\infty} x_t^c \delta^t - x_0^d} > 0$$

An increase in the depreciation rate β increases the optimal price deduction.

$$\frac{\partial d^*}{\partial \beta} = \frac{-\sum_{t=1}^{\infty} \delta^t \frac{\partial f}{\partial k_t}\left(-t(1-\beta)^{t-1}k_0 - \sum_{t=1}^{\infty} t(1-\beta)^{t-1}i\right)(N)}{D^2} > 0$$

where $N = \frac{w}{r}\frac{\delta}{1-\delta} + qx_0^i$ and $D = \sum_{t=0}^{\infty} x_t^c \delta^t - x_0^d$

An increase in the woman's time discount factor δ decrease the optimal price deduction given that the ratio between the marginal change in the discounted value of the woman's reservation income level and the marginal change in the discounted stream of catches, is smaller than the ratio N/D. As long as it was profitable to co-operate at the original discount factor, an increase in this factor will decrease the deduction needed to make co-operation optimal from the agent's point of view.

$$\frac{\partial d^*}{\partial \delta} = \frac{\frac{w}{r}\frac{1}{(1-\delta)^2}(D) - N\left(\sum_{t=1}^{\infty} t\delta^{t-1}x_t^c\right)}{D^2} < 0 \quad \text{for} \quad \frac{\frac{1}{(1-\delta)^2}\frac{w}{r}}{\sum_{t=1}^{\infty} t\delta^{t-1}x_t^c} < \frac{N}{D}$$