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A TEST OF DEPENDENCY THEORY
A CASE STUDY OF THE IVORY COAST

A THESIS SUBMITTED TO
THE UNIVERSITY OF OTTAWA
OTTAWA, CANADA

BY
TRISH VAN ROGGEN

IN FULFILLMENT OF THE REQUIREMENTS FOR
THE MASTERS OF ARTS DEGREE

APRIL, 1988



Trish Van Roggen, Ottawa, Canada, 1988.

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Introduction

The industrialization successes of several less-developed nations over the last twenty years have led some political economists to question the continuing validity of dependency theory (Marcussen and Torp, 1982: Chapters 4 and 6). Specifically, there has been a tendency to suggest that the theoretical paradigm requires adjustment from dependency theory to a theory of the internationalization of capital (Marcussen and Torp, 1982:6 and Frank, 1980:Chapter 5 for a description of the new international economic order). This latter, more abstract, theory suggests that "capital's tendency to broaden its sphere of operation" (Marcussen and Torp, 1982:145) has permitted several less-developed nations to achieve successful capitalist development (Turner et al., 1982, describes these nations and their types of development) by defying dependency theory's prediction of blocked capital accumulation (Marcussen and Torp, 1982: 116). This thesis is a response to this challenge to dependency theory.

It is not our intention to doubt the possibility that new capital movements do and will permit at least the partial industrialization of some Third World nations as the developed nations move into the post-industrial sectors associated with services and high technology.

However, the fragility of their successes (see Turner, 1982:Chapter 16) may indicate that few will achieve self-reliance. The principal dependency hypothesis here is that, "Peripheral industrialization is not independent or self-sustaining, but rather a 'distorted', incomplete and dependent form of development" (Weaver and Berger, 1984:54). It is our contention, therefore, that dependency theory is a powerful and flexible analytical tool that continues to explain the Third World's development difficulties. In view of this contention, this paper seeks to provide at least a partial validation of dependency theory: that dependent development remains deformed, despite the changing context of a new international economic order which has partially industrialized part of the less-developed world.

Objectives and Country Choice

Our objectives and country choice have a strong, logical connection. In seeking to test dependency theory in a changed world situation, it is only logical to choose a nation considered to be achieving successful, rapid, capitalist development. This project is, therefore, an exploration and statistical testing of some of dependency theory's hypotheses in the Ivory Coast.

Our approach to this undertaking is double-pronged. The first goal is to discover just what kind of 'development' the Ivory Coast has achieved since independence. Has rapid industrialization and a 7% average annual growth rate of the nation's gross domestic product since independence in 1960 (Michel and Noel, 1984:78) improved the nation's socio-economic and political characteristics such that its people enjoy an improved quality of life (as defined by Galtung, 1980:443) and the security of self-reliance or has its development path fallen into the pitfalls and blocked development pattern associated with dependent development as Amin predicted? (Amin, 1967. Marcussen and Torp, 1982:29). Statistics from the world recession years of the early 1980s indicate that the Ivory Coast has recently experienced the shocks associated with dependent development - negative economic growth and a 40% decline in the terms of trade (Michel and Noel, 1984: 77), for example.

This leads us to the second prong of this paper. Does dependency theory explain the Ivorian development experience? If we find that the Ivory Coast's development is dependent and, therefore, deformed, this paper should make a contribution to the continuing debate over the validity and flexibility of dependency theory. This contribution should be

especially relevant because the Ivory Coast is not a Latin American nation, for which the theory was originally contrived, and because the Ivory Coast has followed not only import-substituting industrialization strategies, for which dependency theory was also originally contrived, but has also attempted the agro-industrialization strategy. Finally, the fact that the Ivory Coast has pursued these industrialization strategies by following many of the principles of liberal economic development (modernization) theory makes it an attractive test-case because dependency theory is above all a critique and contradiction of that theory. Our tandem goals are, in brief, to evaluate Ivorian development and dependency theory's power to explain that experience.

Summary

This thesis is divided into four chapters, not including this introduction. Chapter One sets out the theoretical-conceptual framework within which this project is undertaken. As mentioned above, this framework is dependency theory. We have attempted a somewhat unique presentation of this theory. Rather than present a fairly disjointed description of dependency theory's principal hypotheses and concepts, we have integrated the components of the theory into the historical context of the theory's

own development. The aim of this type of presentation is more than to provide descriptive continuity: it is to show how the theory has evolved and maintained a flexibility and generality which allows, as our problématique contends, it to adapt to different Third World nations at different periods of time. If there is a drawback to this type of presentation, it is that the description, of necessity, is quite lengthy and incorporates the writings of several different authors. The advantage is that this should be a fairly complete and representative description of dependency theory.

Our description of dependency theory begins with its origins as a response to the frustrated efforts of the Third World, especially Latin America, to achieve industrial development and to the failure of post-war modernization theory to adequately explain this problem (Sunkel 1979:44). At this point we do include a brief overview of modernization theory's main hypotheses based on the contention that Third World nations are simply 'un' developed, much like the developed nations were in feudal times and can, therefore, develop (modernize) with the infusion of modern capital, techniques, beliefs, etc. from the developed world (Valenzuela and Valenzuela, 1978:44). We then describe the major, general, development

difficulties the Third World was facing during the 1950s, revealing them as the context for the re-thinking of development theory that gave birth to dependency theory.

We describe this 'new' theory as a global, historical approach to that analysis of development, contending that any real understanding of a nation's development must be derived from its structuro-historical dynamic operating in a global political-economic system (Valenzuela and Valenzuela, 1978:43-4). Dependency theory's critical conclusion from this type of analysis was that, "underdevelopment was created by world capitalism and the socio-economic structure of the underdeveloped countries is a product of the forces of world capitalism" (Szentes, 1983:19). We briefly describe how these forces, according to dependency theory, have been at work since the inception of the capitalist world economy in the sixteenth century (Valenzuela and Valenzuela, 1978:44), creating a dominant core (the now developed nations) and a dependent periphery (the now underdeveloped nations) (Sunkel, 1979:44). This core-periphery dichotomy is described, including the structural mechanisms of underdevelopment which favors the core at the expense of the periphery (Arrighi in Munck, 1984:21) and perpetually reproduces a

core-periphery dichotomy through the international division of labour. We define this division (Ajschuler, 1978:4) and describe dependency theory's understanding of the evolution of the global economy, including a new international division of labour wherein partial industrialization of the periphery did not break the ties of dependency because these semi-industrialized nations continued to find their dynamic in foreign centres (Chilcote and Edelstein, 1974:26,17,40).

The main agent for this changing system has increasingly been, since the Second World War, the multinational corporation (Bornschier in Makler et al., eds., 1982:59). We describe this trend and show how, according to dependency theory, the ~~direct~~ (via subsidiaries) penetration of the multinationals into Third World economies has only deepened the structures of underdevelopment (see Salama and Tissier, 1982, for example). Because of all the mechanisms involved in this process and to show how dependency theory has managed to encompass changes in Third World development strategies, both of which are relevant to our investigation of the Ivory Coast, we then embark on a description of the the dependency process as made manifest in both strategies of import-substituting and export-substituting industrialization.

The final section of Chapter One presents the main mechanisms we investigate more fully in the following chapters. These mechanisms are then presented and defined as concepts of the state, direct foreign investment (multinational corporation penetration), dependency, underdevelopment and development. Next, the relationships dependency theory predicts to be at work when these concepts are operationalized are presented in the form of a model. Each of these relationships is also indicated by a causal proposition, for which theoretical justifications are provided.

Chapter Two is an historical, qualitative examination of the forces predicted to be at work in our model in the Ivory Coast. However, it is also a more general analysis, beginning with an historical backdrop to the Ivory Coast from its origins as a French colony. We then describe the major forces at work in post-independence Ivory Coast. These forces include, for example, Ivorian industrialization strategies, state activity and multinational corporations' subsidiaries. Important world economic trends bearing on this experience, such as major export product and energy import prices, are also mentioned here. Finally, the Ivorian development experience is evaluated in an attempt to answer the questions posed by

dependency theory, i.e., is the nation more or less self-reliant? What has the quality of development been? Are the majority of the people better off now than at independence? Have the structures of dependency and underdevelopment deepened, thus threatening the future? Indeed, does future development appear 'blocked' as dependency theory predicts? If so, is this the inevitable result of so-called successful capitalist development in the Third World?

Chapter Three, the quantitative examination of the dependency theory hypotheses set out at the end of Chapter One, is divided into two parts. Part A outlines the research strategy, this being a diachronic analysis of the Ivory Coast based on a 'most similar' comparison. The indicators to be used in the statistical tests performed in Part B are also presented here, including operational definitions of the concepts in the model, the validity and reliability of each indicator and overall data quality. The methods of the statistical tests are explained as well as the logic of applying different tests and the assumptions of causal modeling and causal inference.

Part B presents the results and interpretations of the statistical analysis. Each of the propositions presented at the end of Chapter One is

tested, evaluated and illustrated graphically.

Chapter Four is the thesis' conclusion. Here we recall the objectives of the project and evaluate post-independence Ivorian development and dependency theory's power to explain that experience. Next our findings in relation to these objectives are summarized: that although some limited successes have been achieved, dependency theory does indeed explain the Ivorian 'development' experience.

Chapter One : The Theoretical-Conceptual Framework.

I Background.

Since this research project is situated within the framework of dependency theory, this section of our thesis focuses on a description of that perspective. Included here is a brief introduction on the origins of dependency theory followed by its development as a theory and its major hypotheses, how these relate to the different periods and strategies of development in the Third World and how these, in turn, relate to our investigation of the Ivory Coast. Our attention to the other major paradigm, the modernization perspective, will, therefore, be relatively limited.

The new era of international relations marked by the end of World War II provoked many important changes in the world, its affairs and the way that these were analyzed and understood. Once plans for European and Japanese reconstruction were underway, social scientists began to focus their attention on the now former colonial nations of Asia, Africa and Latin America. In attempting to understand the problems of nations which had not yet industrialized, these analysts gave birth to development thinking in the 1950s (Sunkel, 1979:19).

This analysis or attempt to understand the marked contrast between the 'developed' and the rest of the free world prompted the formulation of what is known as the 'modernization' perspective (Valenzuela and Valenzuela, 1979:31). Based in part on neo-classical economic theory, this perspective continues to contend that Third World nations are simply 'un' developed, much like the developed nations were in feudal times and can, therefore, develop (modernize) through the transmission of modern techniques, institutions, structures, knowledge, beliefs, capital, etc., from the developed world. However, this Rostowian, linear path to modernization ignores changes in the world system (Valenzuelas, 1979:36), arguing that it is the Third World's feudal characteristics which block their development by resisting exogenous forces of modernization (Valenzuelas, 1979:35).

Dependency theory also recognizes the forces of these external factors on the Third World nations but is diametrically opposed in its understanding of their effect on these nations. Rather than seeing the results of these forces as developmental, dependency analysis shows that these are the very causes of underdevelopment, that, "Underdevelopment was created by world capitalism and the socio-economic structure of

world capitalism" (Szentes, 1983:19).

II Dependency Theory

Dependency theory evolved out of a re-thinking of Third World development problems in the 1960s and 70s and continues in the 1980s as the world situation itself evolves. Specifically, the development of this new, alternative perspective was encouraged by the inadequacies of the modernization approach to explain (particularly Latin American) developmental difficulties and the failure of its prescriptions to overcome these problems (Sunkel, 1979:25). In brief, these problems were as follows (Sunkel, 1979:25-6): economic growth became increasingly unequal with the concentration of wealth in the hands of a small entrepreneurial and professional élite while un- and under-employment created mass marginalization. Industrial expansion and diversification did not extend into the export structure where primary product exports continued to predominate. The take-over of the most dynamic sectors of the economy by multinational corporations led to increasingly capital intensive modes of production, adding to the unemployment problem, and promoted conspicuous consumption to the detriment of existing capital stock and foreign exchange reserves because of the increased importation

of these consumer products. The rural sector came increasingly under the control of landowning élites, forcing small holders out and adding to the urban unemployment problem through mass rural migrations to urban centres. Although governments did attempt progressive economic reforms, they were insufficient to the task. The dominant élites benefitted from the system and had, therefore, no incentive to challenge the status quo. In addition, since government revenues were derived largely from the stagnating foreign sector while foreign payments on the current and capital accounts rose with the increase in investment, consumption, foreign ownership and public debt, the government had no room to make progressive reforms. "These and other disequilibria fuelled internal inflation and balance of payments crises" (Sunkel, 1979:26). This situation, accompanied by the need to control inflation (as well as the urban and rural poor who were rising up against established authority), led to severe deflationary policies and, hence, the requirement for authoritarian regimes. "Rather than easing tensions and facilitating political democracy, (this modernization type of) development aggravated economic, class, cultural and political polarization and conflict" (Sunkel, 1979:26).

From analyzing these problems in an attempt to find their causes and understand the mechanisms involved, dependency theory came into being. And it is this theory, which we will now present, that we will take as the framework for analyzing the Ivorian development experience from 1960 to 1983.

Dependency theory is a global, historical approach to the analysis of development, holding the assumption that any real understanding of a nation's development must be derived from its structural-historical dynamic operating in a global political-economic system (Valenzuela and Valenzuela, 1979:43-54). This is not to say that a nation's unique, domestic characteristics are unimportant. Indeed, both national and international considerations and the specific time-period under scrutiny are so important to the dependency perspective that it holds no claim to universal validity (Valenzuela and Valenzuela, 1979:47). Of primary importance, however, is the nation's parallel evolution in and interactions with the global system as the two develop historically (Valenzuela and Valenzuela, 1979:44).

Because of this global-historical-structural approach to development analysis, the dependency perspective traces the origins of today's world

situation back to the birth of the capitalist world economy in the sixteenth century (Valenzuelas, 1979:44). The development of this world system went through the successive stages of mercantilism from 1500 to 1770, developed capitalism from 1770 to 1870, and imperialism from 1870 to 1945, followed by neo-imperialism which continues today (Frank, 1978:8).

During the first two stages of capitalism the relatively advanced nations of Western Europe subjugated many less advanced nations in Asia, Africa and Latin America, either through actual military conquest or similar colonial-type domination, severely decapitalizing them as well as adjusting their productive and exchange structures, weakening their capacity for development to the advantage of the centre (Frank, 1978:10). These structures, which became firmly entrenched in the 18th and 19th centuries (Frank, 1978:11) established a clear-cut international division of labour. This division

refers to the specialization of economic functions by countries located within a single global capitalist system of production. This single system is vertically integrated, assigning to some countries the function of producing raw materials and agricultural goods, the surplus of which is exported to industrialized countries for their industries. Industrial countries then have the

function of transforming these raw materials into manufactured goods, the surplus of which is exported to raw material countries to meet their consumption needs. According to such a division of labour, no single country has necessarily a complete economy, yet the individual national economies complement one another to form a complete global economy (Alschuler, 1978:4).

Dependency theory explains that this world economy creates the structures for the underdevelopment of the periphery (Valenzuelas, 1979:44). The main mechanism working at the international level is the phenomenon of unequal exchange (Chilcote and Edelstein, 1974:29). Emmanuel Arrighi (in Munck, 1984:21) explains that the structural bias in world trade, based on different levels and rates of wages and exploitation between the advanced and the Third World, creates a situation in which exchange favors the more developed nations at the expense of the less developed ones. Thus it is that the economic dependence of the periphery on the core is a result of unequal integration into the world economy, continually reproducing the dichotomy between rich and poor nations (Michalet, Oct., 1979:44).

This dichotomy at the national level can best be summarized by the following two quotes.

Within each country, the pattern of metropolis-periphery relations is replicated; the

economic surplus is drained into the urban areas through the process of internal colonialism. (Chilcote and Edelstein, 1974:27).

If the market for agricultural (read primary) products is not in the cities but in a foreign nation, then commerce will strengthen the landowners and merchants of the agricultural nation bringing about dominance of an agro-commercial bourgeoisie ... the agricultural nation acquires a dual (read polarized) society. And it does not develop. (Szentes, 1983:33).

We will see whether these patterns were set in the Ivory Coast under French colonial rule (1893-1960) and whether they were perpetuated after independence to create the conditions for future, deeper, Ivorian dependence and underdevelopment.

The neo-imperialist stage of world capitalism marked by the end of the Second World War has seen the increasing dominance of multinational corporations. As the central institutions of the world economy, these increasingly large and powerful corporations have transformed the international economy into a world economic system (Bornschier in Makler, 1982:59). This distinction refers to the multinationals' organization of their own transnational production processes. In other words, multinationals have been broadening the horizontal integration and

deepening the vertical integration of their production processes on a transnational level, carrying out their business activities with decreasing concern for national boundaries (Michalet, 1979:44). In the last generation this tendency has

added a new element to the classical core-periphery division of labour in the world economy ... The new form of hierarchy, which is superimposed over the still active classical one, implies a core-periphery division within industrial and tertiary activities themselves. The core is specializing in control over technology and the innovation process, in control over capital throughout the world, and in the most advanced and technologically sophisticated industrial product cycles ... whereas the periphery is engaged in standardized and routinized production either for the domestic or world market (Bornschier in Makler, 1982:59-60).

What this would mean for countries like the Ivory Coast is that the integration of its economy into the transnational world market via the multinational corporation would perpetuate, on the one hand, the nation's role as a primary product exporter to the centre and, on the other hand, its role as an importer of more advanced products either for popular consumption or as a prerequisite for its own, partial industrialization. This type of industrialization, as made manifest by the multinationals, serves to deepen the structures of underdevelopment in that it creates a

dependent, disarticulated national productive structure in both import substituting and export substituting industrialization.

It is in explaining these causes of this dependence and underdevelopment in both stages of multinational corporation dominated industrialization that dependency theory makes its contribution to understanding today's Third World development difficulties. It is to these mechanisms that we now devote the most attention and detail because they are so important to our study of the Ivory Coast.

There are a number of reasons why multinational-dominated industrialization does not lead to Third World development. In the first industrialization strategy of import substitution, the nation seeks to industrialize by replacing imports with nationally produced goods. The host-country's government encourages multinationals to assist in this strategy by setting up their subsidiaries within its borders. The state may achieve this by providing incentives like tariff protection, free movement of capital, goods and labour and tax holidays (Salama and Tissier, 1982:81-82 and 106). The logic of this strategy is based on both growth and development: growth of native industry and initial development of the nation's productive forces including both capital and labour. This

developmental aspect of the strategy presupposes that the employment generated by industrialization will expand the domestic market for the consumer products it produces during the first stage of import substituting industrialization (Salama and Tisser, 1982:16-18)*and for intermediate and capital goods through upstream linkages during later phases of the strategy (Jacquemot, 1982:106). Unfortunately, this type of developmental growth soon ends in stagnation and/or a necessary switch to the strategy of export substituting industrialization (Jacquemot, 1982:106-107). We will see whether this was also the Ivory Coast's experience.

The reasons for this failure are explained, to a large extent, by the presence of multinational subsidiaries in the host economy. Because these subsidiaries are often full-scale implants from advanced nations, they embody large imports of capital goods and technology (Salama and Tisser, 1982:129) which weigh heavily against the host nation's foreign exchange earnings (gained mainly from primary product exports). The nation's balance of payments difficulties are aggravated further by multinationals' subsidiary-associated capital drain from repatriated profits, wages, royalties, licenses for technology, services (Blake and

Walters, 1976:94 and Salama and Tissier, 1982:133 and Bornschier, 1980:163-4), transfer pricing, overcharging, etc. (Green, 1975:109). The presence of these subsidiaries also increases the host nation's balance of payments problems by creating, through the demonstration effect, inappropriate consumer behaviour (Martinelli, 1979:13) which either increases imports of luxury goods from the core or through the high import content of these products when they are produced locally by subsidiaries. To these sources of income drain and foreign exchange losses is added the burden of increased trade dependency inasmuch as the host nation must export more and more of its primary products to counterbalance these drains (Jacquemot, 1982:107-8, 112). In addition, the state's finances can run into difficulty because of its lenient policies vis-à-vis the multinationals (e.g. tax holidays), the shrinking tax base from increasingly limited employment and, especially, its provision of infrastructure and services. As the public debt burden grows due to increases in spending in these areas at a time of falling revenues (or at least when revenues do not increase proportionately to expenditures), service payments on the external debt become another large source of capital and foreign exchange drain on the nation, worsening its balance of payments position even more.

We shall investigate these balance of payments and debt problems associated with the role of the state and multinational subsidiaries in the Ivorian industrialization effort because they may be important limiting factors on the nation's developmental efforts.

The branch-plant nature of multinational subsidiaries has other deleterious effects on the host economy. The most important of these is probably the complete industrial transfer which has been developed for and is only appropriate to the more advanced nation (Michalet in Makler, 1982:17). The inappropriateness of this transfer refers to more than the difficulties caused by equipment goods imports, etc., outlined above. The other problems stem from the subsidiaries' more sophisticated, technologically advanced and capital-intensive production methods. This superiority, coupled with the state's protectionist policies and the subsidiaries' resources for marketing their products can completely displace indigenous production of similar goods (Biersteker, 1978:17). This displacement destroys what little articulation may still be present in the host economy. Neo-colonial policies favor imports of finished goods from the mother nation and the labour-intensive employment of these indigenous producers is also displaced, creating unemployment page 24

(Bornschiefer, 1980:166). The élite versus mass marginalization process is best described by Biersteker:

...(T)he capital-intensive production of multinationals creates a restricted and upper-class market and society, favors skilled over unskilled labour and allows for growing incomes of a small, and in relative terms, constant or contracting section of the working population, ultimately giving rise to growth without development (Biersteker, 1981:14).

The outcomes of this stage of dependent industrialization (dependent on multinational capital and technology, on exports of primary products and imports of inputs and finished goods) are several. The very industrialization process which created the labour and managerial élites and agro-commerical bourgeoisie tends to perpetuate the (initial) growth without development nature of dependent industrialization because these dominant classes are tied to foreign interests and have little motivation to change the system which is underdeveloping their nation (Chilcote and Edelstein, 1974:27). Unfortunately for the increasingly marginalized masses, the state may then find it necessary to pass repressive legislation and become increasingly authoritarian to control popular unrest (Jacquemot, 1982:27).

Soon, however, even the growth which benefits the upper classes may

disappear. This stagnation has its origins in the capital-intensive mode of subsidiary production and the transfer of technology involved therein. The complete transfer of the technological package from the advanced to less-developed nations not only distorts the class nature of the state and disrupts the balance of payments etc. as mentioned above, it has two other deleterious effects on the host economy. The monopoly position created by the subsidiaries' more advanced production methods, backed up by multinational financial resources, restricts the demand for local research and development in its own sphere of activity and in other, related, upstream and downstream sectors of the economy which have been supplanted by the core. This creates a lasting, one-sided technological dependence, reproducing the host country's need for technological imports (Szentes, 1983:245). The advantages of research and development then remain under the multinationals' capital-based monopoly (Szentes, 1983:245) in the centre and the gap between developed and underdeveloped nations continues to widen.

The monopoly position enjoyed by the subsidiaries in the host economy (once their advanced production methods have bankrupted or absorbed their local competitors) allows them to raise their prices.

However, since the internal market has been limited by the capital-intensive production methods, this lower level of demand may cause stagnation (Niosi, 1982:26). The lack of an adequate national market is one of the reasons why export substituting industrialization may follow import substituting industrialization (Jacquemot, 1982:106-107). The transition may be thwarted, however, since industries may find it difficult to compete on the international market after having been protected by customs barriers and other advantages in the host economy: such advantages may have permitted inefficiencies to develop in those industries. The export industries are more likely, therefore, to be based on adding value to primary product exports (agro-industrialization). In any case, the point is that the motive for the switch to export-substituting or agro-industrialization comes from the limited domestic market, increasing debt and balance of payments deficits associated with import-substituting industrialization and declining terms of trade for the nation's primary product exports. To rectify these problems the state pursues policies favoring the replacement of these exports with secondary products to gain from trade through increased national value-added and employment.

In switching from the failed import-substituting to export-substituting or agro-industrialization, the state attempts to pursue growth by switching from a restricted to a free exchange perspective based on the efficient exploitation of national comparative advantages (Michalet, 1982:18). Such advantages may include an abundant, accessible, (urban) labour supply which can, for that reason, be hired out at very low salaries (Michalet, 1982:18) (e.g. South Korea) or rich agricultural resources (e.g. Ivory Coast) or other natural resources (e.g. oil in the Middle East). To encourage the exploitation of these resources for industrialization, the state adopts policies appropriate to the exploitation of its nation's particular resources. For a nation whose main resource is a cheap, unskilled labour supply, the state would encourage foreign investment with repressive legislation (Salama and Tissier, 1982:186) to keep the labour force docile and allow industrialization through the new transnational corporations' productive techniques which can efficiently exploit unskilled labour with segmented and delocalized (Jacquemot, 1982:108) labour-intensive technology (Salama and Tissier, 1982:148-149). The agricultural sector may also be transformed to free up labour for these industries (a modern-day "Enclosure Act") while the surplus from the newly capitalist

agricultural sector may be transferred to industry (Gallez et Troupin, 1981:535). This transfer may assist the state by financing direct state intervention in the economy to balance and diversify the economy with backward linkages to heavy industry (Gallez et Troupin, 1981:552-553) since the subsidiaries are vertically integrated into the transnational corporations' production structure, providing few linkages within the host economy.

Nevertheless, the state continues to adopt policies to attract foreign investment. These policies may include financial and monetary advantages (e.g. an undervalued currency to assist export-promotion), an attractive investment code permitting the free movement of capital and/or the provision of export zones where the exploitation of labour may be intense. The state may also adopt policies favoring the development of a national bourgeoisie (Szymanski, 1981:456-457), including an agro-industrial bourgeoisie (whose viability is brought about by the agricultural reforms (Gallez et Troupin, 1981:552-3), to assist in the industrialization process. The state itself may also receive loan capital made available by international agencies who favor the promotion of value-added exports (e.g. the IMF and World Bank) (Jacquemot, 1982:111). But, despite all

these sources of capital and an early promise of increased employment and a better balance of payments position for the host economy, export-substituting / agro-industrialization may also lead to growth without development.

The dependency associated with export-substituting/agro-industrialization has some subtle differences from those associated with import-substituting industrialization. Dependence on foreign (multinational) capital and technology remains; indeed, the participation of multinationals and their subsidiaries is particularly evident because of the nature of the segmented, delocalized mode of production (Jacquemot, 1982:105,109,116) that the parent firms have developed (and which has caused the new international division of labour that has permitted some peripheral nations to semi-industrialize (Caporaso, 1981:347 and Gallez et Troupin, 1981:556)). However, although this industrialization process has been able to (temporarily) break the 'blocked growth' situation associated with the contradictions of import-substituting industrialization, this dependent growth has limited developmental success and even the economic growth may also become blocked in the longer term.

The relative failure on the developmental side of the equation is

based on the host nation's 'modernizationist' belief that their people must go through a certain period of mass exploitation to successfully develop capitalism, much as the older industrial nations once did. The justification of this strategy is linked to the premise that economic growth must precede socio-economic development and that this growth is achieved through the super-exploitation of the working population (since, in this strategy, they are often not considered as a source of demand. (Gallez et Troupin, 1981:534)). This super-exploitation is possible because the high unemployment rate among unskilled workers in the Third World nations targeted for export-substituting industrialization assures that labour will work very cheaply and under almost any conditions (Gallez et Troupin, 1981:534). The manufactured goods produced are often those which can be easily segmented, standardized and produced by efficient, low-cost, labour-intensive technology to take advantage of these local labour market conditions (Salama and Tissier, 1982:141) such as textiles and electrical products (Jacquemot, 1982:108). The potential for human / social development is supposed to come in later phases of the strategy when, as full employment is reached, business attempts to maintain its rate of profit by increasing the capital intensity and quality of its

products, thus potentially allowing for an increase in the wage rate as well (from higher revenues). More often than not, however, this process is either painfully slow, sacrificing a generation or more, or does not translate into higher wages at all. The high rotation of labour (Salama and Tissier, 1982:142) and repressive state legislation (Salama and Tissier, 1982:186) limit labour's capacity to organize and, with that power, to bargain. Even as full employment is reached, capital intensive techniques e.g., automation (Jacquemot, 1982:108) are adopted and/or labour intensive modes of production relocate to nations where labour costs remain low. Since our concept of development includes improving the quality of life, surely this is growth without development.

Reviews on other aspects of the peripheral nation's overall development experience are mixed. For example, export-substituting industrialization requires imports of technology, intermediate and equipment goods and, sometimes, food. That these imports are offset by the export substitutes produced can be a tenuous justification at best since, during the first stages of the strategy, these products are often first or last-stage and/or low in local value added. This can limit the internal accumulation process, putting pressure on the national debt and

rendering diversification into higher value-added goods, inter-branch linkages (Jacquemot, 1982:119,121) and products aimed at the internal market more difficult (Jacquemot, 1982:123). Not least of the causes of these problems is the multinationals' vertically integrated, transnational production process mentioned above. Nevertheless, some economic development from export-substitution does seem possible (i.e. at least with initial, though not necessarily sustained, economic growth).

The possibility of achieving this type of partial industrialization in some peripheral nations is linked to the development of the strategy itself. The export markets for such nations are potentially very large, the targets usually being, at first, the industrialized nations, then moving to OPEC and other Third World nations (Salama and Tissier, 1982:147). This process supports the dependency notion that the structure of the world economy organizes societies into chain-like sequences of metropolises and satellites (Lutton, 1976:574) where, in this particular case, the newly industrializing nations would occupy the position of a relay state (see Ikonikoff and Sigal, 1983:683-706 for description). For the newly industrializing nation, the rapid rate of economic growth and profit can be an incentive to diversify the national productive base and increase the

local value-added, expanding the market to include the domestic demand created in the process.

This new demand and push toward economic diversification, especially upstream to heavy support industries, is often undertaken by the state (Jacquemot, 1982:118) and the national bourgeoisie which the state, by way of favorable policies, has helped to create. This does not mean that there is no national bourgeoisie connected to the interests of foreign capital (Syzmanski, 1981:459). Rather, export-substituting industrialization seems to be a strategy more easily diversified than import-substituting industrialization because of the larger world market. However, few nations have been able to even begin this process (e.g. the South Korean steel industry) and, as noted in our introduction, there is a fragility to this success: this relative economic development has not yet been extended enough to translate into the overall socio-economic development of the society where all would share in the success with a better standard of living and such political liberties as participation.

Compared to nations like South Korea, whose foreign investment capital does not mostly take the form of direct (subsidiary) multinational investment, like the Ivory Coast, even these relative economic successes

have not elsewhere been achieved. This means that trade dependence has not been reduced nor has an increase in the primary and secondary export sectors' capacities translated into capital or technological self-reliance since the capital and technology used in the export sector is under foreign control (Jacquemot, 1982:123). Capital dependence also increases as a result of state deficit financing of infrastructural projects and integrative industries, not to mention the familiar capital drains by the multinationals (as was true during import-substituting industrialization). In Chapter 3B we will test for the presence of these relationships in the Ivory Coast.

In conclusion, dependency theory seems to remain an appropriate framework for understanding Third World development difficulties. Having been applied mainly to Latin American, South East Asian and, to a lesser extent, African nations, the theory helps explain the underdevelopment associated with peripheral dependence in the old international division of labour in colonial times and the blocked growth/development phenomenon in the neo-colonial stages of import-substitution. Finally, it helps to explain the continuing 'growth without development' phenomenon during export-substituting strategies, especially in nations where multinational

investment is high. After describing our model, concepts and causal relationships below, we shall investigate the descriptive ability of some of dependency theory's hypotheses in the Ivory Coast.

III The Model

Definition of Concepts

Our model contains five of dependency theory's major concepts. (These concepts are represented by indicators in Chapter 3A.) The choice of these concepts is intended to reflect not only their importance to dependency theory but is also representative of some of the major actors and influences in Ivorian development. It must be mentioned here that the definitions in our model are restricted to these five variables because of data availability and reliability. Several of these omitted variables are, however, discussed in the historico-qualitative analysis in Chapter 2.

1) State Intervention

In the context of any nation's political economy, its state is no mere inanimate object; rather it acts upon and reacts to the environment both within and outside its sovereign domain. The state may, therefore, be the initiator of change and development (Ikonicoff, 1983:17), a multifaceted role which is directly linked to its own self-preservation. Such roles

include protecting private property, securing the legitimacy for dominant class institutions, facilitating the accumulation of capital, developing the formation and tempering the will of the capitalist class and funding itself (Syzmanski, 1981:444). All these activities, which can include policies to promote development (redistribution of wealth, health services, etc.), law-making, and direct state involvement in infrastructure laying, participation in business enterprises etc., may be labelled conceptually as state intervention.

ii) Direct Foreign Investment/Multinational Corporation Penetration

Direct Foreign Investment is defined as an investment in which the investor acquires a substantial controlling interest in a foreign firm or sets up a subsidiary in a foreign country. Direct foreign investment involves ownership and/or control of a business enterprise abroad..." (Markusen and Melvin, 1984:285) "...the large multinational corporation obviously being the investor.

In other words, direct investment is a mechanism used by the corporation to penetrate foreign markets and obtain their resources. (Hveem in Widstrand, ed., 1975:59).

iii) Dependency

Au niveau économique, un système est dépendent lorsque l'accumulation et l'expansion du capital ne peuvent trouver l'essentiel de leurs composantes dynamique à l'intérieur même du système...L'idée

de dépendance fait référence aux conditions d'existence du système politique et économique et à son fonctionnement au sein de la structure mondiale de production... La dépendance a aussi une 'expression' interne. Elle est également saisie dans sa véritable problématique dans la mesure où elle est une situation de relations structurelle avec l'extérieur: tout fait ayant lieu dans un pays dépendant ne peut être complètement expliqué si l'on ne tient pas compte des rapports entre groupes nationaux et étrangers... (Cardoso and Faletto, 1978: 21, 41, 45).

iv) Underdevelopment

Underdevelopment means that

(1) the development potential has been relatively unrealized, and (2) is uneven with regard to different social groups, regions, economic sectors and institutional arrangements. These structural conditions are reflected in the consciousness of the people as a perceived discrepancy between aspirations and the adequacy of the present social structures to fulfill these aspirations... The idea of 'development potential', which is used in the definition of underdevelopment, may be understood in terms of the total realizable potential for the development of economic production (given the existence of a certain level of technological invention) that could be achieved in the absence of socially created scarcities and inequalities. Underdevelopment as a constraint on the use of development potential, then, has a definite moral content which relates to the fulfillment of basic human needs in a situation where this would be possible, but where it has been prevented by the unequal development and unequal distribution of

the fruits of production (Bornschier and Chase-Dunn, 1985:8).

v) Economic Growth (development)

Economic growth means growth of the national economy. It is specified with development here because we later use it as a measure separate from other indicators of development despite the fact that economic growth is a component of development. Indeed,

(1) It is one of the assumptions underlying the issue that the actual historical development of the countries of the third world is multi-dimensional, that this development has political, social and economic dimensions, however these are defined (Baster, 1975:1).

One of the simplest and most common conceptions of development is in terms of progress towards any or all of a list of national goals or values in the economic and social fields (Baster, 1975:95). Development is here defined as enhancement of the capacity of a society to function for the well-being of its members over the long-run. This...not only embraces technological and educational capacity but structural and institutional capacities (Baster, 1975:97).

Development, then, is the opposite of underdevelopment defined above. The two are a dichotomy. Galtung embraces this idea and has more precisely defined what the above-mentioned 'enhancement of capacity...' may include. He terms these factors as 'goal dimensions for a collectivity'. In brief they

include:

- personal growth vs. alienation
- diversity vs. uniformity
- socioeconomic growth vs. poverty
- equality vs. inequality
- social justice vs. social injustice
- (Galtung, 1980: 433-434)

We omit equity vs. inequity, autonomy vs. penetration, solidarity vs. fragmentation and participation vs. marginalization in Galtung's list because these are really aspects of dependence, not development / underdevelopment (Alschuler, 1978:3).

We now present these concepts in the causal propositions (to be tested statistically in Chapter 3) with their theoretical justifications.

Causal Propositions and their Theoretical Justifications.

1) \ The greater the direct foreign investment, the greater the state intervention.

This is a proposition that can work 'both ways', depending on where the causal chain is cut. On the one hand, there are a number of areas in which Ivorian state intervention in Ivorian political economy should attract direct foreign investment there. These areas include heavy state spending on the provision of infrastructure (e.g. transportation and communications), and very liberal investment codes (e.g., tax holidays, tariff exemptions on equipment goods imports, free movement of capital

etc.). In addition, many state social policies are geared to favor the development of business including, for example, free migration of labour and the repression of working class rights (Salama and Tissier, 1982:141), both of which help keep the costs of business' variable capital down and have the intended opposite effect on profits. We could, therefore, expect a positive correlation between state intervention and direct foreign investment.

On the other hand, direct foreign investment could 'cause' increased state intervention in the sense of off-setting the deleterious effects of that investment. These measures could include action to counter the underdeveloping effects of the multinational presence: for example, the redistribution of wealth to compensate for the unequal distribution of investment benefits and the creation of economic linkages in an attempt to increase integration of the national productive structure.

**2) The greater the direct foreign investment,
the greater the dependence.**

According to dependency theory, direct foreign investment (mainly in the form of a multinational firm's controlling interest of a firm in the host nation, i.e. a subsidiary) causes financial dependence through decapitalization (Biersteker, 1978:6), lasting technological dependence

through importation of the centre's technology (Martineili, 1979:13) and trade dependence from the vertical integration of its subsidiaries into its transnational production process which destroys indigenous production (creating a lasting dependence on external production factors, goods, capital and technology) (Biersteker, 1978:7, 51).

**3) The greater the direct foreign investment,
the greater the underdevelopment.**

This dependency theory hypothesis is based on the effects of multinational penetration on the host economy described above. In brief, these include destruction of indigenous industrial production, the disintegration of the national economy (Biersteker, 1978:15) (destruction of national linkages because of its vertical integration into the parent company's transnational production process), and mass marginalization and polarization from its capital intensive mode of production which creates a restricted, upper class market and society) (Biersteker, 1978:14).

**4) The greater the direct foreign investment,
the greater the economic growth.**

Despite what the proposition directly above indicates, it may be true that the immediate effect of foreign direct investment is beneficial to economic development. For example, the inflow of capital may initially

foster economic growth and employment. It is only in the long term (after five to ten years) that the negative effects of direct foreign investment on economic growth may become apparent (Bornschier, Chase-Dunn and Robinson, 1978).

**5) The greater the state intervention,
the greater the dependence.**

We expect a positive correlation here because we believe the state's policies and expenditures (tax holidays, debt financing of infrastructural and other projects) can end in dependence. For example, the policies and expenditures required to attract the multinationals impose limits on the state's revenues while requiring the state to increase its own spending (e.g. on integrative industries). The results may be an increased debt burden, balance of payments crises and, therefore, increasing dependence on exports.

However, the state may also be able to lessen dependence under favourable world economic conditions. In the Ivory Coast, good world prices for its export products for fifteen years after national independence allowed the state to spend heavily on, for example, integrative industries and national energy programs. These actions, where successful, would of course lessen dependence. Nevertheless, dependency

theory predicts that the presence of multinational capital and changing world economic conditions will eventually result in increased dependence (through, for example, the state's inability to service its debts once revenues inevitably decline).

**6) The greater the state intervention,
the lesser the underdevelopment.**

We expect a negative correlation between state intervention and underdevelopment because, as will be shown in detail in chapter 2, the Ivorian state intervenes heavily in its nation's economy to promote, for example, agricultural product diversification, Ivorian ownership of national industry creating upstream and downstream linkages to both industry and agriculture.

**7) The greater the state intervention,
the greater the economic growth.**

State spending would, of course, be expected to promote economic growth, as would any infusion of capital into an economy.

**8) The greater the dependence,
the greater the underdevelopment.**

In the logic of dependency theory, dependency causes underdevelopment (and vice-versa in a causal chain). Dependence on foreign capital, markets, goods and technology increases foreign control of the host

economy (Chilcote and Edelstein, 1974:27) and increases domestic inequalities between the élite, who grow richer, and the masses, who become more impoverished (Bornschier, 1980:166) and dehumanized (Jacquemot, 1982:27). Thus it is that dependency creates the social and economic structural inequalities which define underdevelopment.

9) **The greater the dependence,
the lesser economic growth.**

Although an increase in dependence (e.g., on foreign inputs, capital and technology) may produce an initial impact on economic growth and may, therefore, appear to have a positive impact on the host nation's overall development, dependency theory explains that these seemingly beneficial effects are spurious. We therefore expect our quantitative analysis to confirm that there has been an indirectly proportionate relationship between dependency and economic development in the Ivory Coast.

10) **The greater the underdevelopment,
the lesser the economic growth.**

It is our contention here that the underdeveloping effects of direct foreign investment had a negative impact on economic development (growth). In other words, the lack of national economic integration, destruction of indigenous production, and decapitalization from profit repatriation, wage

and service transfers abroad, and royalty payments on technology must be expected to reduce economic growth.

Chapter Two: Historico-Qualitative Analysis

This chapter, a descriptive analysis of the Ivorian development experience, is included to provide a more complete picture of the forces leading up to and at work in the statistical analysis in the next chapter. Included are the roles of the major actors in the nation and our model, the state and foreign capital, and an evaluation of the development experience specified by our model. This discussion enhances the quantitative analysis in Chapter 3 which, it is hoped, will in turn lend precision to the qualitative analysis in this Chapter.

I Background: the pre-colonial era

In 1893 the French Empire brought an area of 322,500 square kilometers of sub-saharan West Africa under its administration. Included in this vast area were over 50 different ethnic-language groups (den Tuinder, 1978:11). Under the French policy of economic self-sufficiency for her colonies, and with a flourishing trade within the AOF (Afrique occidentale française), the Ivory Coast prospered (den Tuinder, 1978:11). However, the relatively enlightened rule of the French colonists, which condemned slavery and encouraged the extension of French customs and laws (den Tuinder, 1978:12) did not mean that the Ivory Coast reached some kind of happy colonial concurrence. Nor did such relative harmony last very long.

From the outset, the new colony resented its lack of autonomy, as is evidenced by its objection to its lack of control over the distribution of AOF funds (den Tuinder, 1978:12). The 1920s and 1930s expansion of cash crops (especially coffee and cocoa) gave rise to an African planter class in competition with the favored European planters (Zartman and Delgado, 1985:3). This competition and the use of forced labour by the European planters helped initiate the growing drive toward national self-determination (Campbell, 1978:69-70).

Felix Houphouet-Boigny became the leader of this movement. As a respected chief and holding several senior positions within the colonial administration and, finally, as a wealthy coffee planter himself (den Tuinder, 1978:12), the future president was well placed to organize a national movement to challenge the increasingly repressive policies of the French administration (Alschuler, 1980:5).

This movement was a native (both African planter and rural worker) response to the increasingly intolerable French policies of production quotas and intensified recruitment of forced labour to meet the growing post World War II demand for the nation's cash crops (Campbell, 1978:70 and Alschuler, 1980:6). Native animosity over such colonial policies consolidated the native planter-rural worker coalition which would endure

as the mainstay of Ivorian political stability after independence (Alschuler, 1980:5). Other French policies indirectly facilitated the drive toward independence. By creating an African Agricultural Syndicate in 1944 for the native administration of colonial policy, an organizational basis was constructed from which, only two years later, a nationalist party emerged to spearhead the independence movement (Alschuler 1980:6). Led by Houphouet-Boigny, this party (Parti démocratique de la Côte d'Ivoire) achieved the goal of independence fourteen years later and laid the foundations for the state's remarkably stable leadership/class support system which continues to the present-day (Zartman and Delgado, 1984:3-14).

The legacies of colonial rule made a lasting imprint on the nation. Among these are: a cash-crop economy (Alschuler, 1980:4), a stable, one-party political system headed by Houphouet-Boigny and a continuing, strong influence of mainly French European entrepreneurs (Bakary in Zartman and Delgado, 1984:26).

II Development Strategies Since 1960

The first development strategy set out by the newly independent Ivorian government sought to overcome the nation's extremely dependent and undeveloped economy. This economy then exhibited many of the typical

characteristics of a colony's traditional, vertically integrated position in the old international division of labour. Exports (in this case agricultural) were primary, unprocessed and undiversified (traditionally raw timber, coffee and cocoa beans); and they were sent only to a few trading partners - to the centre, especially to the 'mother' nation, France. In turn, imports from these nations were mainly finished (consumer and equipment) goods (Masini et al., 1979:29). To overcome this dependence and the economic instability associated with it (e.g., vulnerability to external price shifts), the Ivorian government formulated and implemented a very liberal investment code to encourage an inflow of foreign capital, diversification of trade commodities and of its economic structure. The import-substituting industries were to be financed, in large part, by the export of its traditional agricultural commodities (Alschuler, 1980:11-12). The choice of the classical, export-led growth model seemed rational enough, given the nature of the Ivorian economy and international trade conditions in 1960.

With little domestic capital available for industrialization, the government had to pursue virtually any and all sources for foreign capital and exchange: international aid, loans, and investment as well as earnings from primary product exports. Indeed, foreign capital, technology and

labour were needed to enhance export capacity as well as to develop import substituting industry. Foreign exchange would also assist in the pursuit of this goal. The expansion of the agricultural and industrial sectors were intended to generate the necessary demand in the domestic market (through employment) for goods produced by the new import-substituting industries.

Thanks to a favorable investment climate (liberal investment code, relatively cheap labour and a stable political climate) and good world prices for its exports, the Ivory Coast experienced very high growth rates and other successes in its development objectives during the 1960s. However, toward the end of the decade, the often, elsewhere experienced contradictions of first-stage import-substituting development began to manifest themselves. Amongst these, the chief block to further growth was limited domestic demand caused by a growing concentration in income/earnings (Masini, et al., 1979:8).

This lack of a sufficiently large domestic market, an inability to accomplish efficient economies of scale, and declining rates of foreign investment prevented any easy transition to second-stage import substitution (Alschuler, 1983:25-26). The Ivory Coast did not, therefore, at this time see the creation of a nationally articulated, vertically

integrated economy through an expansion into intermediate and heavy industries (this being necessary to overcome many early development blocks).

The 1970 Investment Code and the 1971-75 Development Plan sought to overcome the problems associated with increasing denationalization, industrial concentration, technological and financial dependence, unemployment and income inequality (Alschuler, 1980:22). Although the 1970 Investment Code was virtually as liberal toward foreign capital as its 1959 predecessor, its main thrust in the area of new initiatives was toward increased protection for import substituting production. Attempts at deepening industrial integration in both light and intermediate goods production continued to be blocked, however, by the extent of foreign controlled subsidiaries working in the Ivorian economy because these companies' productive structures were vertically integrated into their parent firms' transnational division of labour. At the same time, the export activities based on adding value to local raw materials (Masini et al., 1979:31) were hindered by declining investment in general and by the shift to first-stage primary goods processing or, in particular, last-stage processing of import substitution goods (Alschuler, 1980:25).

By 1976 the development strategy shifted to a more deliberate

promotion of export-led growth. Moving away from first-stage import-substitution, this form of export-led growth was to be different from its traditional fore-runner whose foreign-exchange earnings came from unprocessed primary products. The new exports were to come from industries which increased the value-added of those products: in other words, agro-industry and other such businesses whose purpose had been to service the (limited) domestic market. So although import-substitution and primary products continued to be fairly important, the advantages provided for these latter sectors were reduced to the benefit of encouraging export industries, especially agro-industry (Masini et. al., 1979:8). The plan targeted a decline in foodstuffs, cattle raising and other agricultural production to 9.1% of the gross national product by 1980 while the increase in the export of industrial agricultural products was targeted to increase from 5% per year to 6.8% (Campbell, 1978:96).

In addition to not replacing import-substitution entirely, this new strategy of agro-industrialization was never able to overcome the export-import imbalances typically associated with both strategies. The continuing problem of a fragmented national economic structure required an on-going importation of capital and intermediate goods which weighed heavily against the nation's balance of payments. The 1976-80 plan was

quite different from previous ones in other areas as well. The quality of public sector investments declined, shifting from the previous low-cost, high return investments in agriculture, for example, to high-cost, low return investments in, for example, overdesigned sugar complexes, western-style educational and medical facilities and transportation projects which amounted to a loss of 5% of the GDP in the early 1980s (Michel and Noel, 1984:88). State macro-economic and sectoral incentives also seemed to go awry, imposing constraints on growth and on the flexibility of the country which were needed to meet rapidly changing international economic conditions (Michel and Noel, 1984:88). For example, domestic inflation and terms of trade declines led the state to overvalue the franc, requiring the industrial sector to turn away from regional markets to sustain growth and generate foreign exchange earnings (Michel and Noel, 1984:88).

That development strategies were frustrated by vulnerability to changing world economic conditions is revealed by the impact of falling primary-crop export prices and higher oil prices and interest rates in the 1970s on the Ivorian balance of payments. The balance of payments deficit grew from -35.5 million U.S. in 1973 to -181 million in 1978 (U.N. 1983:238) to -755 million in 1983 (UNCTAD, 1984:274). The increase in

the debt service ratio during these years also made an impact here. The debt service ratio jumped from being consistently under 5% since independence to 7.4% in 1978, to 9.42% in 1980 and then, after the world recession, to 22.03% in 1983 (see variable Identification for X4 and X5 in appendix for sources). In the rest of West Africa, debt service ratios were higher in 1978 at 10.4% (average) and 1980 at 16.8% but, after the world recession, were lower than the Ivory Coast at an estimated 16.8% in 1985 (Ezenwe, 1983:152). Although all these debt service ratios are reasonable amounts for an economy to carry, they do reveal the economic impact of world economic fluctuations and the fact that the Ivorian economy may be more vulnerable than its neighbours.

The extent and severity of the state's financial situation and the following recession highlight the fragility of the so-called 'Ivorian miracle'. The economy, heavily reliant on public sector investments, dependent on imports for industry and requiring a steady flow of foreign exchange to pay for these inputs (Michel and Noel, 1984:79) received a nasty shock from this adverse turn of world economic events. The government was forced to borrow extensively (Michel and Noel, 1984:86) yet its assets were soon exhausted. In 1981, the government had to introduce a drastic financial stabilization program within an Extended

Facility Agreement of the IMF (Michel and Noel, 1984:86). Although these terms were met, continuing terms of trade declines forced an increasing state reliance on non-concessional loans to finance its public investment program and deficit at a time when interest rates soared. This surge in foreign borrowing to help ease the immediate balance of payments crisis of 1981-1982 only presaged rising debt service ratios and overall balance of payments deficits for years to come (Michel and Noel, 1984:87).

It is clear from the above that the Ivorian miracle of sustained growth since independence was based largely on high prices for its primary product exports and initial wise planning (infrastructure-laying, the development of hydro-electric projects, off-shore oil exploration, regional development, minimum wage legislation and so forth) because when world conditions and state policies and investments were altered, the economy suffered a deeper recession than most of the world. This reversal of the 'miracle' mainly reveals the nation's dependence on external factors and actors. To describe this situation and support our statement, we first present brief sections highlighting the role of the state and the multinationals in Ivorian development. With the ground thus prepared, we present, with the support of the data, our conclusions that the Ivory Coast fits well the pattern of dependent growth predicted by

dependency theory.

III The Role of the State

Where there is no national bourgeoisie, the peripheral state is the main instrument capable of pursuing capitalist oriented development...the state is in this situation the only institution able to accumulate funds which can be channelled into further productive investments... (Marcussen and Torp, 1982:69).

In 1960, the state's goal of economic development through import-substituting industrialization was premised on the inflow of large amounts of capital and foreign exchange. The first source of capital, as is traditionally the case for peripheral nations integrated into the old international division of labour, was foreign exchange gains made from the export of primary products. For the Ivory Coast, this meant transferring surpluses gained from the export of raw agricultural products, and, eventually, (and to a lesser extent), exports from agro-industry and light manufactured goods (Marcussen and Torp, 1982:69). The mechanism for the majority of the capital transfer from primary product exports was accomplished through la Caisse (La Caisse de Stabilisation et Soutien des Prix de Production Agricoles), a state institution responsible for agricultural product price stabilization (Marcussen and Torp, 1982:69). La Caisse pays a guaranteed price to producers of Ivorian cash-crops (coffee,

cocoa, cotton, bananas, palm oil products, copra, tobacco, and cashew nuts) and then sells these products on the world market. Thanks to higher than the minimum guaranteed price for these exports on the world market, la Caisse has traditionally been a main provider of state revenues (Marcussen and Torp, 1982:69) although we know from our previous remarks that price declines in the late-1970s had severe repercussions on the state's financial situation.

The second main source of capital for the Ivorian state has been international aid and loans. Between 1960 and 1972, 40% of public investments were financed by aid sources: between 1973 and 1974 this amount climbed to 50%, mainly due to the predominance of oil grants; from the mid 1970s through the early 1980s, loans have provided the majority share of public sector investment capital (Marcussen and Torp, 1982:97). Again, recalling our introductory paragraphs to this section, we are reminded that the increasing financial dependence of the state, partly represented here by the growing debt load, has meant a loss of national autonomy: witness the imposition of IMF controls.

The third source of capital for Ivorian development came from direct foreign investment. The high level of state intervention in the development process has not contradicted its pursuit of foreign capital (Masini et al.,

1979:25). The state's extremely liberal investment code has played an important role in the nation's development. This code, essentially unchanged vis-à-vis foreign capital since 1959 (Masini, 1979:13) included, for example, 25 year tax exemptions (Campbell, 1978:97), patents and property tax exemptions, ten year customs concessions on imports of industrial inputs, ten year, 50% export duty exemptions (Masini 1979: 13-15) and the availability of artificially low interest rates (Campbell, 1978:98). Customs exemptions on industrial inputs has not encouraged the development of nationally produced industrial inputs which would have worked positively for national economic integration (up- and downstream linkages within the Ivory Coast).

Other important considerations in attracting foreign capital have been the stable, convertible CFAf (Masini, 1979:18) [but which had to be overvalued, however, in 1980 (Michel and Noel, 1984:88)], and the stable political climate, including some suppression of working-class rights (Marcussen and Torp, 1982:135-6). Policies to attract foreign capital from new sources does seem to have reduced relative dependence on France (Marcussen and Torp, 1982:102) but, as we will see below, not on foreign capital.

IV State Institutions to Promote Economic Development

Over time, the role of the state in the economy has grown; this is especially true in the promotion of "the integration of the national productive apparatus, that is to say in the valorization of the country's raw materials" (Masini, 1979:69). The state seems to have become increasingly active in such areas to balance its growth process although perhaps its participation in agro-industrial production is simply a good investment. However, in other areas the state definitely acts to balance growth and to assist in the attainment of some of the qualitative aspects of development. For example, the state has moved into previously neglected areas like the northern regions, introducing cash crops there (e.g. cotton) to reduce regional inequalities and stem the flood of migration to overcrowded urban areas (Marcussen and Torp, 1982:129).

Another example of state intervention to promote development has been the creation of a National Financial Corporation (SONAFI). This corporation promotes the ivorianization of the economy by assisting national investments in small and medium-sized firms (Alschuler, 1980:25). Funding from SONAFI has the additional benefit to the national economy in that these new businesses provide linkages to larger industries (i.e. integration vs. disarticulation). Another state agency, le Fonds

national de financement (FNI) also assists in this nationalization effort by redirecting some of the multinationals' subsidiaries' profits to local enterprises (Ikonicoff and Sigal, 1978:698).

V The State and Classes

As mentioned at the beginning of this chapter, the African planters mobilized towards independence by forming the SAA in 1944 (Campbell in Dunn, 1978:71). After independence, this 'planter bourgeoisie' group and the European entrepreneurs, with whom they shared the similar interest of export-oriented growth, became the dominant classes, shaping the development orientation (Campbell in Dunn, 1978:72 and 111) and conservative nature of policies in the Ivory Coast (Campbell, 1978:300). This continuity of interests is especially strong in that the 'state bourgeoisie' developed out of the original planter bourgeoisie (Fauré et Médard, 1982:135). Apart from actual policy-level initiatives, it is often the well educated executive-level bureaucrats (Campbell, 1978:288) who use their individual power and influence to assist groups within their own ethnic, familial or village circles (de Miras, 1982:192). There is, therefore, a power coalition between the state and élites (Fauré et Médard, 1982:126). It is a symbiotic relationship. The élites depend on the state for their existence and continuation while the state needs their support for

its legitimacy. This support includes the role of the military who use the President's popularity (with the force of arms) to guarantee stability (Fauré et Médard, 1982:137).

State activities mentioned in the section above clearly reveal the pattern of state initiatives to develop national classes in order to offset the predominant dichotomy between the small planter class and élite tied to foreign interests and the rest of the working population. In a more direct attempt to create a rural bourgeoisie, the state has set targets to increase the number of family farms of 15 hectares each (Marcussen and Torp, 1982:73). Since 1968 the state has also assisted the development of a national middle class in the modern sector with financial aid and credit guarantees to Ivorian small and medium businesses through le Fonds spécial pour les petits et moyennes entreprises ivoiriennes (de Miras, 1982:198). However, the state tends to cooperate with foreign capital to such an extent that both middle class development and the ivoranization of industry has been quite limited (Marcussen and Torp, 1982:73, 101).

Apart from high wage earners (mainly Europeans who are an extension of the 'metropolitan class'), the majority of the population consists of peasants and wage earners who are excluded from political power and the benefits of Ivorian development (see under "Evaluation" below) unless they

have personal links with the members of the state apparatus.

VI The Role of Foreign Capital.

The participation of multinational capital in Ivorian development has been of central, determining importance to the extent and type of that development. This point can be illustrated immediately with the fact that the majority ownership of the Ivorian economy is held by the multinationals (Masini et al., 1979:60 and Mytelka, 1984:153). This dominance has remained true since independence despite an increase in levels of private Ivorian and state ownership. For example, the greatest extent of state ownership is in agro-industry yet the highest level attained was 30% in 1979 (Mytelka, 1984:158.) The extent of foreign, multinational control of the Ivorian economy is illustrated by a few more sets of figures. By 1980, 26 of the 34 largest firms, which account for 70% of the total industrial turnover, were foreign owned: that this ownership is very concentrated is revealed by the fact that only 19 of these firms accounted for 57% of the total industrial turnover in 1980-81 (Mytelka, 1984:159).

Another important fact to include here is that this majority foreign ownership of Ivorian industry has not meant correspondingly large inflows of new capital. Rather, little new capital has been brought into the Ivory Coast. For example, between 1973-79, 80% of new foreign investments

came from re-invested profits (Mytelka, 1984:157). (Note that these figures were taken from IMF's capital account tables: of course the figures read exactly the opposite on the current account ledger. Between 1976 and 1981 decapitalization from direct investment income alone in relation to new direct investment capital amounted to -8.4% per year (IMF, Balance of Payments Yearbook, 1984:298-299). In addition, minority state and private Ivorian capital share-holdings, state loans, loan guarantees and interests in subsidiaries have been the largest source of capital for these foreign-owned businesses (Mytelka, 1984:153). So foreign domination of the host economy has been, to a large extent, paid for with Ivorian capital. And this foreign domination, coupled with the fact that there has been little Ivorian participation in the managerial, executive or technical operations of these companies (Mytelka, 1984:156), means that Ivorian influence on business practices has also been very limited.

There are other indications that this foreign domination of the Ivorian economy has created dependence. Direct decapitalization is evident from the fact that profit, and, especially, wage and service transfers abroad have continually exceeded new capital inflows (Masini et al., 1979:54) (verified in UNCTAD, 1984:238). The modernization argument that these remittances are worth the cost in spin-off effects does not hold true in the

Ivorian case. The low level of domestic value-added and high import content of foreign-owned production goods reveals the weak inter-sectoral linkages (Mytelka, 1984:153) and dependence on the centre associated with multinational corporation penetration (Masini et al., 1979:50). Furthermore, the increasingly capital-intensive mode of production of foreign-owned businesses has meant that the rapid rate of economic growth has not been accompanied by a parallel rate of increased employment (Mytelka, 1984:163). Small wonder that it was necessary to move away from first-stage import-substituting industrialization and change the focus to agro-industry: no new national market was created thanks to this highly capital intensive mode of production. The percentage difference between the increase in investment (measured in constant figures) and employment is a startling 165% (Mytelka, 1984:163). Finally the marginalization associated with multinational corporation domination also holds true for the Ivory Coast. Income has become increasingly concentrated since independence. The poorest 60% of the population received only 22% of the national income by 1977, a 12% decline since 1960 (Mytelka, 1984:153). We must point out, however, that income in the Ivory Coast has been more evenly distributed than many other African nations (Lecaillon and Germidis, 1977:153).

VII Case studies of some Multinational Firms

Case studies of particular multinationals' subsidiaries in the Ivory Coast support the observations made immediately above. One such study is Masini, Ikonicoff, Jedlicki and Lanzarotti's 1979 work, Multinationals and Development in Black Africa. The purpose of the authors' research was to evaluate the impact of three multinationals' subsidiaries on Ivorian development. These are Nestlé, Air Liquide and Carnaud; their respective subsidiaries in the Ivory Coast are Capral, Sivoa and Siem. The effects of these firms on employment and income, the trade balance, total domestic value added and dependent circumstances associated with these were scrutinized in this study.

The authors found that whereas many of the goals of rapid industrialization have been achieved in the Ivory Coast (inflow of foreign capital, technology, increased employment in industry, industrial market expansion to reinforce the accumulation process for the promotion of the production of capital and intermediate consumption goods (p.164-5), certain distortions have also been effected within the national economy which, the authors believe, are inherent in a liberal development model (p.165-6).

The distortions the authors identify operate at several levels and are

strongly reminiscent of the dependency critique of the liberal development model. Firstly, at the accumulation of capital level, the authors offer the familiar critique that direct foreign investment involves a

transfer of income, either in the form of repatriation of profits, or in the form of payment of license fees, or in the form of repatriation of part of the earnings of expatriate staff. This transfer of part of the surplus thus escapes the process of capital accumulation within the system and in the long run largely exceeds the contributions to initial investments by foreign investors (p.165).

Secondly, the authors indicate distortions at the distribution of earnings level.

The utilization of capital intensive techniques favors the remuneration of the capital factor in relation to the work factor, which is reflected in a modest participation in the increase in wage and salary aggregate (p.165).

Masini and his collaborators show how state incentives were responsible for a modest number of jobs in the secondary sector while declining levels of employment and remuneration in the rural sector was insufficient to permit the sufficient purchasing power from the final consumption goods that the import-substituting industries produced. The authors thus show that the concentration of incomes associated with multinational penetration works at cross-purposes to the import-substituting

Industrialization.

Thirdly, the authors indicate certain distortions in the Ivorian economy at the innovation level.

The subsidiaries utilize imported production goods and processes incorporating innovations. But these are not disseminated and remain the exclusive property of the firms. Outside the subsidiaries, there is no national block capable of introducing innovations under integrated research and development systems. Development thus cannot rely on a continued process for the creation and dissemination of innovation (p.165).

In their final conclusions, the authors argue that the liberal development model, "leaves no room for the distortions to be avoided" (p.166), because the (distorted) structural features of the Ivorian economy caused by liberal economic development do not permit integrated development (p.167). The authors argue that the three distortions presented above prevent the automation of the market (in other words, free market forces do not allow sufficient capital accumulation for sustained growth) (p.165), requiring, therefore, direct intervention by the state in the area of capital accumulation (p.165). This accumulation, garnished from surpluses achieved through export promotion and from foreign borrowing, make the Ivorian economy vulnerable to external demand and the availability of loan sources. This dependence on external

capital is exacerbated by the capital drain resulting from the flow of earnings etc., of direct investments leaving the country and could, the authors say, leave the Ivorian economy with some difficult capital-flow problems. Our own research bears out only too well the conclusions and predictions of Masini et al.

The other major case study of multinationals' subsidiaries in the Ivory Coast we find important to include here is, Internationalization of Capital: Prospects for the Third World, by Marcussen and Torp (1982). These authors saw a need to re-evaluate dependency theory in view of the new ways peripheral nations have become integrated into the international economic system, particularly in the reproduction of the centre's capital (p.9). Because their research analyzes this recent trend, the authors limit their study to the post-1970 internationalization of capital. And since their focus is the Ivory Coast, they also limit their investigation to the effects of European, particularly French, capital.

The authors' argument is that this new internationalization of capital, prompted by overproduction and declining rates of profit at the centre has increased, relatively speaking, the rate and changed the type of investment flows to developing countries (p.25-6). This 'new form' of investment (i.e. non-equity arrangements, licensing and management

contracts) and the greater role of periphery governments' control over investments and development strategies has precipitated new opportunities and challenges for peripheral development involving new production and reproduction of capital (p.29).

Marcussen and Torp realize this process extends to relatively few Third World nations where tendencies are, they surmise, appearing toward the establishment of advanced capitalist production and reproduction processes. They believe one of these countries is the Ivory Coast. Their central question in studying the Ivory Coast is, therefore,

(w)hether the additional build-up of an export-oriented industrialization in any way reflects the establishment of broader capitalist development processes transcending the so-called blocked development situation... (p.29).

(In a way we are investigating the same question: is dependency theory correct in predicting that capitalist development in the periphery inevitably becomes blocked because of dependent distortions and what is the scenario for the Ivory Coast?) What the authors do seem sure of is that the new global process of the internationalization of capital is restructuring and differentiating the international division of labour and that this may see, due to capital's basic tendency to uneven development, some currently peripheral nations breaking out of their blocked

development situation to over-take some of the currently industrialized nations at the centre (p.29-30).

In their study of the Ivory Coast, Marcussen and Torp did indeed find that the changing historical conditions for capital accumulation in the centre (here, Western Europe) in the 1970s has led to new ways in which peripheral capital (here, the Ivory Coast) is reproduced (p.116). In more concrete terms, this means that the Ivory Coast, with an attractive resource base and investment incentives, not to mention relative political stability, transcended, in the 1970s, the blocked accumulation phenomenon and its attendant stagnation pattern, replacing it with the extended reproduction of capital (i.e., economic growth) (their Chapter 4 describes this process in detail). The authors conclude that the transnationally integrated production processes associated with multinational subsidiaries operating in the Third World offers some peripheral nations, e.g. the Ivory Coast, the opportunity to industrialize and to achieve a higher level of overall development from this economic growth than has been previously possible. Our own research shows that this growth has become 'blocked' and that the spin-off effects of development have been severely limited.

In contrast to Marcussen and Torp's contention that the new internationalization of capital has (is) permitting the rapid

Industrialization of the Ivory Coast is Lynn K. Mytelka's argument that the Ivory Coast is returning to its traditional role of a primary agricultural product exporting nation. She bases this argument on the fact that the value of primary exports increased from 1975 to 1980 while the value of industrial exports fell during the same period (p.162). We find this conclusion erroneous because Mytelka uses value as a measure while we prefer to draw upon the measure of value as a per centage of the gross domestic product. This measure indicates that agricultural exports decreased (from 28.3% in 1975 to 25.3% in 1980) while manufactured goods exported grew (from 10.9% in 1975 to 11.28% in 1980) (World Bank, World Tables, 1976, 1980, 1983). It would seem, therefore, that the Ivory Coast continued to increase its exports of industrial products. Nevertheless, total agricultural production (as a per cent of GDP) did fall by a greater amount from 1975 to 1981 (from 28.3% to 26.9%) than did industry (from 10.9% to 10.7% (World Bank, World Tables, 1980, 1983), perhaps revealing lower world prices for primary commodities and the increasing importance of or ability to measure the Ivorian tertiary sector.

Our own evaluation of the Ivorian development experience relies mainly on our interpretation of raw data.

VIII Evaluation

In examining the export-import structure of the Ivorian economy since independence, we find that the Ivory Coast is still primarily integrated into the old international division of labour. For example, although manufactured exports increased by 80% from 1965 to 1981, they still only accounted for 9.5% of total exports. Food crops maintained a 65% share of the total while other agricultural crops (e.g. cotton and timber) declined by 16.5% over the same period, accounting for 25% of total exports in 1981 (UNCTAD, 1983:158 and for all the following figures). Taken together, primary product exports accounted for 70% of the export total; of these, 60% were made up of three commodities (coffee, cocoa, cotton) (Gbetibouo and Delgado, 1984:117). These figures reveal the Ivory Coast's on-going role as a primary product exporter and of its dependence on these exports, particularly evident by the trade commodity concentration.

As to the import structure (UNCTAD, 1983:182), manufactured and equipment goods imports did decline by 28% from 1965 to 1981 but this still represented over 50% of the total import bill in 1981, revealing a continuing high, though lessened, level of dependence. External dependence increased in the area of necessary food and fuel imports, increasing by 2% and 29% of the total respectively. (These figures can, however, also be

regarded as indications of increased industrialization.) Perhaps more revealing is their proportion to the total import bill: fuel rose from 5.6% to 22.04% and food rose from 18.23% to 20.3% from 1975 to 1981. It must be noted here that while increased food imports are partly the result of state incentives to farmers to produce export crops, increased fuel bills reflect both the rapid rate of industrialization and inflation. Nevertheless, the Ivory Coast's continuing dependence on and integration into the old international division of labour is evident.

Ivorian dependence on her primary product exports for growth did not have any deleterious effects on the economy for the first 17 years after independence because high world prices allowed considerable surplus transfers to other areas of the economy to stimulate overall, especially agro-industrial, growth. However, after 1977 world prices fell sharply and so, consequently, did the nation's financial position. From 1977-1982 the purchasing power of Ivorian exports fell 42.4% (U.N. National Accounts Statistics, 1982:455). That the primary cause of this drop was the bottom falling out of the world cocoa market is a well known lesson in the dangers of trade commodity concentration. The Ivorian state had actively promoted national cocoa production (Gbetibouo and Delgado, 1984:124-5), resulting in a 440% increase in cocoa exports from 1960-1981 (Gbetibouo and Delgado,

1984:122). World overproduction and the failure of the Ivorian government's attempt to support cocoa prices by stockpiling and providing subsidies to other cocoa producing nations so that they could also afford to stockpile (Gbetibouo and Delgado, 1984:143-6) meant huge losses for the Ivorian state. From 1978 to 1982 the national deficit rose by 456% (UNCTAD, 1983:238). From 1978 to 1982 the national public debt rose by 61% (World Bank, World Debt Tables, 1982-1983:58).

To deal with these financial catastrophes, IMF austerity measures were imposed (Michel and Noel, 1984:112-3), and the state overvalued its currency by 107% from 1979 to 1983 (IMF, International Financial Statistics Yearbook, 1984:355.). This latter measure served only to increase Ivorian dependence on primary product exports to the centre because the overvalued currency could only be withstood by the major agricultural crops, in which the nation has a comparative advantage, but not by its industrial products (Michel and Noel, 1984:123-4) which were protected from international competition by the state. Trade figures reveal that between 1962 and 1980 Ivorian manufactured / processed goods exports to the centre (mainly France) declined from 61 to 35% of the total while those to the periphery (mainly other African nations) increased from 39 to 65% over the same period (World Bank, World Development Report,

1983:172), reducing trade partner concentration. At the same time, however, unprocessed primary exports to the centre increased (Vellas, 1981:125-129). The trend may be toward the Ivory Coast adopting the position of a 'relay-state' (defined by the type of duality in its export structure described above - primary product exports to the centre, manufactures to the periphery (Vellas, 1981:123). But, as overall markets for Ivorian industrial products decline, the immediate and longer term effects on the economic structure, not to mention on employment and other 'development factors', could be quite harmful.

The extent of Ivorian dependence can also be illustrated quite well by making a few international comparisons of economic performance from 1960 to 1982. From 1960 to 1980 the Ivory Coast out-performed developed market nations, developing countries and socialist countries (hence the label "Ivorian miracle"). Growth of Ivorian total real product over the twenty year period averaged 4% for the developed market economies, 6.2% for developing countries, 6% for socialist countries and 7.3% for the Ivory Coast (UNCTAD, 1983:386). However, with the onslaught of the world economic recession in 1980, the tables turned completely. Figures for the Ivory Coast reveal its dependence on the external economic environment.

From 1980 to 1982 the developed market economies' total real product grew by .7%, developing countries by 1%, socialist countries by 2.5% while the Ivory Coast's real product declined by 1% (UNCTAD, 1983:386). International comparisons of public debt figures reveal a similar tendency. While the world's public debt increased by 412% from 1972 to 1981, the Ivory Coast's public debt increased 1125% over the same period, an astounding difference of 714% (World Bank, World Debt Tables, 1982-1983:58). However, a debt service ratio of 22.03% in 1983 (see variable identification sheets for X4 and X5 in appendix 1) was relatively manageable. It is the rate of increase which is alarming.

Turning to social indicators, it seems fairly certain that Ivorian growth has not spun off on many other developmental effects for its people. The one party state permits few political liberties. Attempts to form labour organizations separate from the government and even student demonstrations can result in mass arrests and imprisonment in military camps (Gbagbo, 1983:102,109. This whole work documents repression, imprisonment, uprisings and massacres...). We have already mentioned that the poorest 60% (Mytelka, 1984:153) of the people have received a declining share of the national income since independence even though the Ivory Coast is the wealthiest in West Africa, according to 1980 gross national

product per capita figures (Onyemeluke, 1984:54). In addition, participation in employment has fallen from 53.7% to 49.6% of the total work force (World Bank, World Tables, 1980:49). Most of this change can be explained by a 10% decrease in real employment and an annual average population increase of 4% (the highest in West Africa (Onyemelukwe, 1984:2). Despite the high rate of industrial growth (14% per year), industrial employment has only increased by 2% of the the total employment from 1960-1981 (World Tables, 1980:49) in part because of the highly capital intensive methods of multinational production and associated low national inter-industry integration.

Other indicators reveal the extent of poverty in the Ivory Coast since independence. For example, although the average life expectancy at birth has increased by 10 years since 1960, an enormous success, the combined male/female life expectancy is still only 46 years (U.N., Demographic Yearbook, 1982:472). There is only one physician per 20,903 citizens (the state has spent heavily on medical care but chose high-cost, low service western-type care such that there is an ultra-modern medical facility in the affluent sector of Abidjan but little low-cost, mass care for the ordinary citizen) and only 1.3 phones per 100 population (U.N., Demographic Yearbook, 1981:544). Although there has been massive state spending on

education, combined primary and secondary enrollment is 49% and the overall illiteracy rate is 65% (U.N., Demographic Yearbook, 1981:472). That 3% of total enrollment is represented by university students reveals that state spending on education benefits a select few (U.N., Demographic Yearbook, 1981:472) and reveals to us once more the élitist style of the government's development efforts. The state does, however, need to educate a future cadre of leaders and, by African standards, the above figures do demonstrate relative success.

For these reasons and the ones outlined above, Ivorian growth appears to be limited ('blocked') by dependence and underdevelopment and has not been accompanied by commensurate benefits to the majority. Some initial social development has indeed occurred but that this development tends to benefit some more than others simply reflects the government's priorities of capitalist development. In all fairness, it must be said that Western style liberal social programs are hardly affordable in such a relatively poor country. That said, let us recall the massive spending on expensive Western-style hospitals while only 25% of the population has access to clean water (Gosh, 1978:27). In the long run the nation's dependence may hinder further growth which could have served to enhance the other aspects of development.

IX Summary

Our research has found that, although industry accounts for only 10.7% of the GDP in 1981, only 2.3% more than in 1960 while agriculture has fallen from 41% to 26.9% (World Bank, World Tables, 1976, 1980, 1983), the export-cash crop nature of the Ivorian economy at independence still characterizes it in 1983. A few primary commodities are still exported to the centre, revealing an on-going, albeit somewhat lessened, trade partner and trade commodity concentration. World events and their repercussions on the Ivorian economy have revealed the danger of such trade dependence. We have found that rapid first stage import substituting industrialization in the 1960s met the traditional blocks to further expansion - a limited domestic market and the multinationals' subsidiaries vertical integration into the parents' transnational production process. These forces were evident from the high import content of these firms' products, few national linkages and an increasingly higher capital intensive mode of production. The relatively few jobs created (employment in industry fell from 6.8% in 1960 to 2% in 1980 compared to an average of 4% in all West Africa (Onyemeluke, 1984:52) and small levels of capital inflow were more than offset by unemployment in traditional sectors and capital drain, especially in the form of expatriate wages, services, licenses and royalties. State

efforts to diversify the national productive structure, especially by its own participation in agro-industries based on the valorization of the country's agricultural products met with quite limited success. Toward the end of the 1970s until the early 1980s falling world prices for Ivorian primary product exports revealed how vulnerable and dependent the nation continued to be despite massive state participation in the national economy to achieve balanced growth. Finally, we found that even after years of sustained economic growth, few benefits accrued to the nation's majority politically, socially or economically. Our research conclusions should be supported by the quantitative (statistical) analysis in the next chapter.

Chapter Three: The Quantitative Analysis

Part A: Research Design

I Objectives and Strategy

As mentioned in the Introduction, we have chosen to do a case study of the Ivory Coast since its independence in 1960 in order to test the explanatory power of dependency theory. The motive for this inquiry originates in the question of dependency theory's adaptability to changing world economic forces and to nations outside the Latin American area, the area to which dependency theory originally applied. The choice of the Ivory Coast allows us to assess the phenomenon of rapid economic growth and to examine whether or not this case constitutes a case of growth without development (we are distinguishing here between components of development).

Because we are testing dependency theory hypotheses in a case study of the Ivory Coast, a diachronic analysis is most appropriate to our research. The reason for this is that a diachronic analysis allows us to analyze a group of variables in any unit (e.g. a nation) over a period of time where each unit of time is considered a case (Galtung, 1980:435) (e.g. a year). In other words, this method allows us to test the effects of, for example, dependence on development in the Ivory Coast over time (since independence).

Comparing years in this fashion is based on the logic of the 'most similar' research design (Przeworski and Teune, 1970:31). Usually this strategy takes similar social systems as the point of departure for the inquiry. One seeks the maximum number of common characteristics in these systems and then assumes that the differences found in these systems explains certain social phenomena, for example, found therein (Przeworski and Teune, 1970:33). Our inquiry takes a set of years in the Ivory Coast as the system (each case in each variable is a year). However, we still assume that our system is as homogeneous as possible and that, therefore,

if some important differences are found among these otherwise similar (years), then the number of factors attributable to these differences will be sufficiently small to warrant explanation in terms of those differences alone (Przeworski and Teune, 1970:31).

- The value of this strategy to our research is that it allows us to analyze sub-groups of different years (years which contradict the overall relationship between two variables), in order to examine unique factors which might explain the difference (e.g. did prices for export crops fall dramatically in certain years, causing a decline in the rate of economic growth?).

II Indicators

To translate the concepts in our model into groups of measurable variables we must provide each concept with an operational definition. This translation links a concept with available data and is, therefore, essential to testing a hypothesis (Buchanan, 1980:26). In operationalizing a conceptual definition, care must be taken that the indicator does represent the concept (i.e. is it valid) and that reliable data are available (Buchanan, 1980:27 and Galtung, 1980:434-437).

1) Multinational Investment/ Direct Foreign Investment(X_1)

Our measure of this foreign control of the host economy is the total amount of direct foreign investment (X_1) in the Ivory Coast per year (flow). Despite Bornschier's warning that it is the cumulated investment of the MNCs in relation to the total stock of capital and population that has a deleterious effect on economic growth even though the short term effect may increase the rate of economic growth (Bornschier in Makler, 1982:64), we have chosen to use the measure of MNC flow because total capital stock figures were not available to us over the course of our data gathering efforts. However, since the simple measure of MNC capital flow is not

necessarily a valid measure of foreign control of the host economy, especially since much MNC investment capital is raised from local sources, we have used another measure, concurrent with the flow measure, as a kind of validity precaution. This second measure is constructed by taking the MNC capital flow per year as a percentage of total domestic investment for the same year (X_{1a}). Since the correlation between the two measures was extremely high and statistically significant, we chose X_{1a} to indicate direct foreign investment. All data used are in constant 1977 values. Again, part of the reliability of these indicators rests on the assumption that the data reporting agency, the IMF's Balance of Payments Yearbooks, uses reliable data.

2) State Intervention (X_2, X_3)

Our indicator for state intervention is represented by the total amount of central government expenditures per year at constant 1977 values. Simple correlations between this measure and similar measures constructed by dividing these yearly values by the nation's population and another by its gross national product are extremely high, both at $r = 0.97$, $p = .000$ so we felt using the former, simpler measure would be valid. Although this

measure does not include state activity in the areas of policies and regulation, for example, state spending should be a valid indicator of state intervention because it represents the amount of the state's direct participation including, for example, expenditures on infrastructure, business investments and social projects and programs. This measure should also be reliable because no data are estimated (by us) and measurement should never fluctuate: any other researcher should find the same figures on file. In addition, we assume that our source for these figures, the IMF's National Accounts Statistics, is also reliable.

3) Dependence (X_4 , X_5)

Our measure of (economic and financial) dependence is the Ivory Coast's debt service ratio per year (the percentage of export earnings required to pay the interest on the nation's external public debt). This measure was invented by the World Bank as a measure of economic/financial dependence [a high debt service ratio contributes to the stabilization and perpetuation of dependence (Alschuler, 1976:46-48)] and captures the combined effects of the various forms of dependence (trade, capital, financial and technological). The debt service ratio measure should, therefore, be valid. This measure should also be reliable, assuming reliable data reporting,

since its construction is standardized and requires only simple mathematical operations. It should, for these two reasons, be easily repeatable and not vary from one source to another.

4) Underdevelopment

As was discussed in Chapter 1, dependency theory views underdevelopment as a dynamic condition of the world system and is expressed in a nation's political economy as an inability to realize its development potential (Bornschieer and Chase-Dunn, 1985:8). Specifically, it is in the structure of the peripheral nation's economy that this weakness is manifested as, "uneven with regard to different social groups, regions, economic sectors and institutional arrangements" (Bornschieer and Chase-Dunn, 1985:8).

Because economic indicators are the most straightforward measures for which data are available, we have chosen two economic measures of underdevelopment, namely those of uneven growth between economic sectors and the articulation of the nation's economic structure.

1) Sectoral Inequality (sectoral equality): (X6 to X9):

the absolute difference of growth rates between the agricultural and industrial sectors of the economy (Brewster, 1973:91) expressed in constant 1977 Cfa franc billions.

ii) Disarticulation: (X_{10} to X_{14}):

the inability to nationally integrate the production structure as expressed by the proportion of imported industrial inputs to industrial production in constant 1977 Cfa franc billions.

We expect that since these measures of underdevelopment are in accordance with two of its aspects they are valid indicators of the concept of underdevelopment. In addition, these measures are constructed using simple mathematics so, assuming that the reporting agencies used accurate data, the measures should be reliable and, therefore, easily repeatable.

iii) Economic Growth (Y_1 to Y_4)

Of the many aspects of development, economic growth is only one (Galtung, 1990:433). Indeed, "from a long-term point of view, economic growth is, for a poor country, a necessary condition for reducing poverty. But it is not a sufficient condition. To release the development potential of a high rate of economic growth depends on policy" (Dudley Seers, 1964:35). Because reliable, year by year data for other traditional developmental indicators were unavailable (infant mortality rate, number of physicians per capita, electrical consumption, and so on), we have had to rely solely on the one

aspect of development (economic growth) for which we could feel the data were sufficiently reliable: gross national product. This indicator was chosen with the full realization that it is only valid as a partial measure of development and that, therefore, the quantitative analysis must be tempered with a careful qualitative analysis in order to interpret Ivorian development properly (see previous chapter).

This measure of development (economic growth) should be reliable, however, since we have used gross national product per capita in constant 1977 CFAf billions.

III Choice and description of Statistical Tests **and Causal Modeling.**

We have chosen partial correlation as the statistic to measure the relationships between the variables in our model because it provides the researcher with a single statistic to measure the association between two variables while adjusting for the effects of other variables included in the overall relationship (Nie, et. al., 1975:302). This allows us to measure, for example, the true effect of state intervention on development without interference from the effect of dependence on that relationship. Partial correlation achieves this feat through statistical manipulation of the data

and does not, therefore, rely on the physical manipulation of variables. A benefit of this technique to our quantitative analysis is that the number of cases does not have to be as high as, for example, Chi Square, to achieve significance. We found this characteristic helpful since our number of cases (years since political independence) was quite low.

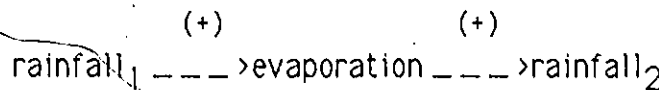
In calculating partial correlation, the relationship of the variables to one another is assumed to be linear. The linear relationship of the independent, control and dependent variables is used to construct the partial correlation coefficient by predicting the relationship of the independent variable to the dependent variable through the control variable's effect on each of them. This is done by taking the difference between the original value of X and its values as predicted by the control variable. The difference is uncorrelated, therefore, with the control. The same procedure is followed for Y; and the simple correlation between the adjusted values of X and Y is then the partial correlation of X and Y. However, only the linear effect of the control variable has been removed from the relationship between X and Y. If there are other, non-linear, effects of the control variable on this relationship such effects will remain in the partial correlation of X and Y.

Partial correlations are used in causal modeling because the researcher

is interested in the unique effect of each independent variable on the other intervening or dependent variables; that is, with the effects of the other variables removed. This notion is tied in with some of the assumptions of causal modeling. One such assumption is that the system represented by the model is 'closed'. This means that the researcher assumes that there are no other variables outside the model influencing the variables in the model or that their combined effect on the model is null. There is no way to be certain that such assumptions are true but analysis proceeds as if they were true (Asher, 1976:16). Causal modeling thus allows the use of partial correlations as evidence that the variance of one variable causes the variance of another.

That partial correlations imply causation is really only another assumption of causal modeling. Since there is never any way to prove that the correlation between two variables is a causal one (Blalock, 1964:10 and Asher, 1975:15), one must simply infer that, given appropriate factors such as time lags and theoretical and conceptual knowledge of the subject matter, significant partial correlations support causal inference. As a side note on time-lags, it must be mentioned that there can be no feedback in the Simon-Blalock type causal model. Such feedback would have to be

presented as another variable later on in time. The following example would mean that increased rainfall causes increased evaporation which causes increased rainfall.



The causal model is presented, therefore, as a number of independent and intervening variables which predict or 'cause' the dependent variable. An intervening variable can be the result of an independent variable and the cause of the dependent variable. Of course, the predictions are indicated by directive arrows with a positive or negative sign to indicate whether the relationship between the two variables is directly or inversely proportionate. The predictions are compared to the partial correlations obtained and the comparison between the predictions and results leads the researcher to accept or reject the causal hypothesis. The model may include arrows which would indicate spurious causal relations between variables since such relations can be tested.

Examples

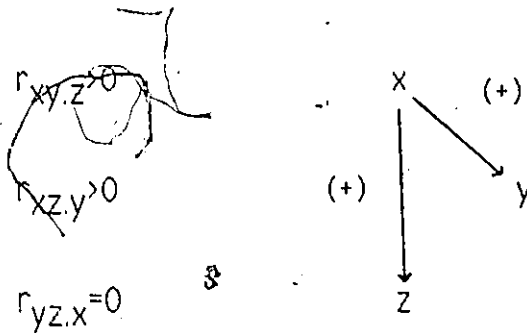
(+) (-)

1) Test of a Causal Sequence. $x \text{ --- } y \text{ --- } z$

$$r_{xz} = r_{xy}r_{yz}$$

$$r_{xz.y} = 0$$

2) Test of Alternative Causes and of Spurious Correlation between y and z



Since partial correlation assumes the relationship between variables is linear, it is important to do a univariate analysis of the data before proceeding to the statistical testing of the hypotheses. In univariate analysis the important thing to look for is shape (dispersion and distribution) (Erickson and Nosanchuck, 1977:43). There are a number of important reasons for looking at shape. The first reason is that data should assume a 'standard' shape. This shape is close to being a 'normal' shape

(single peaked and symmetrical) (Erickson and Nosanchuck, 1977:86-87). Data must more or less conform to this shape because it makes comparisons of batches of data easier, saves time in transformation procedures by having a specific goal to work towards and shows outliers more clearly (skewness).

The importance of these factors in correlation analysis is illustrated by the fact that it can take only one outlier to completely change the relationship between two variables. For example, a partial correlation coefficient might 'actually' be positive except that one extreme left outlier causes the whole correlation between the two variables to be negative. This happens because extreme cases (outliers) have a disproportionate weight since all cases in the correlation are weighted by their squared distance from the mean.

The term skewness (Norusis, 1982:18) refers to the data distribution that has a tail off to one side or the other. A skewed tail is the appearance given to the shape of the data caused by outlier(s) at the extreme values of the variable. If the tail tends toward the righthand side of the graph its values are larger (higher) than normal and the distribution is said to be positively skewed. At the opposite end, the lefthand side, values are said

to be negatively skewed. Skewness is commonly accepted as representing values disparate from a normally distributed variable.

Another term reflecting the shape of distribution is kurtosis (Norusis, 1982:18). Whereas skewness refers to left and right outliers, kurtosis refers to the "extent to which, for a given standard deviation, observations cluster around a central point" (Norusis, 1982:18). The kurtosis for a normal curve should equal zero. The higher the positive value for kurtosis, the more peaked the curve; this is called leptokurtosis. The greater the negative kurtosis values, the flatter the curve; this is called platykurtosis.

Once any necessary transformations are made and the statistical tests are carried out, inferences may be made from the results. Inferences based on correlation coefficients depend on the sample being random (a representative sample of the population). Significance tests are done to find out what the chances are that the correlation between two variables in the sample is not a true representation of the relationship in the population. In other words, a significance test gives the probability that a sample correlation will differ from zero when the correlation in the universe is zero. This probability is the confidence level for rejecting the

null hypothesis (that there is no relationship) and, when multiplied by 100, gives the percentage chance that the inference made to the population from the sample correlation is incorrect. The standard confidence level for rejecting the null hypothesis in social science is 5% or $p = < .05$.

The difference between usual hypothesis testing and our research project is that our sample is the universe. The inference generalization is, therefore, the probability of the correlation being due to random data choice. We could also say that our end of year data is a sample from a universe of every day data. The direction of the relationship between variables (negative or positive) is predicted in our model so a one-tailed significance test will be calculated for each correlation.

Part B: Statistical Analysis and Results

I: Variable Index

N=15 for each variable

X1	DFIP2	Direct Foreign Investment as per cent Total Domestic Investment 1963 - 1977.
X2	CGE2	Central Government Expenditure 1963-1977
X3	CGE3	Central Government Expenditure 1964-1978
X4	DBTS1	Debt Service Ratio 1964-1978
X5	DBTS2	Debt Service Ratio 1965-1979
X6	SEC11	Sectoral Inequality 1963/64-1977/78
X7	SEC12	Sectoral Inequality 1964/65-1978/79
X8	SEC13	Sectoral Inequality 1965/66-1979/80
X9	SEC14	Sectoral Inequality 1966/67-1980/81
X10	DIS12	Disarticulation 1963-1977
X11	DIS13	Disarticulation 1964-1978
X12	DIS14	Disarticulation 1965-1979
X13	DIS15	Disarticulation 1966-1980
X14	DIS16	Disarticulation 1967-1981
Y1	GNPCAP2	Gross National Product Per Capita 1964-1978
Y2	GNPCAP3	Gross National Product Per Capita 1965-1979
Y3	GNPCAP4	Gross National Product Per Capita 1966-1980
Y4	GNPCAP5	Gross National Product Per Capita 1967-1981

II: The Results

One of our main concerns in constructing a model to test dependency theory's hypotheses in the Ivory Coast was the effect of time on the correlations between variables in the model. Because of this concern we decided to introduce the maximum number of time lags. Since the number of years being studied and data availability is so limited (the maximum

potential number of cases being 19 when the data were collected), we decided to construct groups of variables representing the same indicator measured over different but successive years (and the number of cases would then always equal 15. See the variable list directly above). Because we tested every possible, logical, combination of these variables, we then ended up with over eighty different models. Of these, some fifty-eight models did yield results supporting some of dependency theory's hypotheses. When all the models are combined, 7 out of a total of 10 dependency hypotheses are confirmed.

Dependency Theory's Predictions Tested

1. The greater the direct foreign investment, (X1) the greater the state intervention. (X2 and X3)

We tested this hypothesis using a simple correlation between X1 and X2 (no time lag) and X1 and X3 (one year time lag). The null hypothesis was confirmed.

2. The greater the direct foreign investment, (X1) the greater the dependence. (X4 and X5)

Here we were able to use partial correlations between the variables. We tested the relationship between X1 and X4 (one year lag) controlling for X2 and between X1 and X4 controlling for X3. The null hypothesis was

confirmed. Next we tested the relationship between X1 and X5 (two year lag), controlling again for X2 and X3 in two separate tests. Again the null hypothesis was confirmed.

3. The greater the direct foreign investment, (X1) the greater the underdevelopment. (X6 to X14)

Here we tested for a correlation between direct foreign investment and underdevelopment controlling for any alternate effect of central government expenditure, dependence and our other measure of underdevelopment. We found the dependency hypotheses confirmed with all the time lags used (one, two, three and four year time lags).

$r_{X1X6.X2X10} > 0$ one year lag
 $r_{X1X7.X2X4X10} > 0$ two year lag
 $r_{X1X7.X3X4X10} > 0$ two year lag
 $r_{X1X13.X2X4X8} > 0$ three year lag
 $r_{X1X13.X3X4X8} > 0$ three year lag
 $r_{X1X13.X2X5X8} > 0$ three year lag
 $r_{X1X13.X3X5X8} > 0$ three year lag
 $r_{X1X14.X2X4X8} > 0$ four year lag
 $r_{X1X14.X2X5X8} > 0$ four year lag
 $r_{X1X14.X3X5X8} > 0$ four year lag
 $r_{X1X14.X2X4X9} > 0$ four year lag
 $r_{X1X14.X3X4X9} > 0$ four year lag
 $r_{X1X14.X2X5X9} > 0$ four year lag
 $r_{X1X14.X3X5X9} > 0$ four year lag

4. The greater the direct foreign investment, (X1) the greater the economic growth. (Y1 to Y4)

The positive relationship between direct foreign investment and economic

growth was confirmed when the possible alternate/intervening causes of central government expenditure, dependence and underdevelopment were controlled in the partial correlations. However, this relationship was confirmed only when using one and four year time lags.

$r_{X1Y1.X3X4X6X10} > 0$ one year lag
 $r_{X1Y1.X3X4X6X11} > 0$ one year lag
 $r_{X1Y4.X2X4X8X10} > 0$ four year lag
 $r_{X1Y4.X2X4X9X10} > 0$ four year lag
 $r_{X1Y4.X2X5X8X10} > 0$ four year lag
 $r_{X1Y4.X2X5X9X10} > 0$ four year lag
 $r_{X1Y4.X3X5X9X10} > 0$ four year lag
 $r_{X1Y4.X2X4X9X10} > 0$ four year lag
 $r_{X1Y4.X3X4X9X10} > 0$ four year lag
 $r_{X1Y4.X2X4X8X11} > 0$ four year lag
 $r_{X1Y4.X2X5X8X11} > 0$ four year lag
 $r_{X1Y4.X2X4X9X11} > 0$ four year lag
 $r_{X1Y4.X3X5X9X11} > 0$ four year lag

**5. The greater the state intervention, (X2, X3)
the greater the dependence. (X4,X5).**

There were only zero correlations found between the indicators representing state intervention and dependence.

**6. The greater the state intervention, (X2, X3)
the lesser the underdevelopment. (X6 to X14)**

When controlling for the previous and intervening variables in the model (direct foreign investment, dependence and other variables indicating underdevelopment), the negative relationship between state intervention

and underdevelopment was confirmed for zero, one and three year lags.

$r_{X2X6.X1X10} < 0$ one year lag

$r_{X3X7.X1X4X10} < 0$ one year lag

$r_{X3X7.X1X5X10} < 0$ one year lag

$r_{X3X7.X1X4X11} < 0$ one year lag

$r_{X3X7.X1X5X11} < 0$ one year lag

$r_{X3X11.X1X4X6} < 0$ no lag

$r_{X3X14.X1X4X8} < 0$ three year lag

7. The greater the state intervention, (X2, X3) the greater the economic growth. (Y1 to Y4)

When controlling for the previous and intervening variables in the model

(direct foreign investment, dependence and underdevelopment), the positive

relationship between state intervention and economic growth was

confirmed for one, two, three and four year lags.

$r_{X2Y1.X1X10} > 0$ one year lag

$r_{X2Y2.X1X4X6X10} > 0$ two year lag

$r_{X2Y2.X1X5X6X10} > 0$ two year lag

$r_{X2Y2.X1X4X7X10} > 0$ two year lag

$r_{X2Y2.X1X5X7X10} > 0$ two year lag

$r_{X2Y2.X1X4X7X11} > 0$ two year lag

$r_{X2Y2.X1X5X7X11} > 0$ two year lag

$r_{X2Y2.X1X4X7X12} > 0$ two year lag

$r_{X2Y3.X1X4X8X10} > 0$ three year lag

$r_{X2Y4.X1X4X6X10} > 0$ four year lag

$r_{X2Y4.X1X4X7X10} > 0$ four year lag

$r_{X2Y4.X1X5X6X10} > 0$ four year lag

$r_{X2Y4.X1X4X8X10} > 0$ four year lag

$r_{X2Y4.X1X5X8X10} > 0$ four year lag

$r_{X2Y4.X1X4X7X11} > 0$ four year lag

$r_{X2Y4.X1X4X8X11} > 0$ four year lag

$r_{X3Y2.X1X4X6X11} > 0$ one year lag

$r_{X3Y2.X1X5X6X11} > 0$ one year lag
 $r_{X3Y2.X1X5X7X11} > 0$ one year lag
 $r_{X3Y2.X1X4X7X11} > 0$ one year lag
 $r_{X3Y2.X1X4X6X12} > 0$ one year lag
 $r_{X3Y2.X1X5X6X12} > 0$ one year lag
 $r_{X3Y2.X1X4X7X12} > 0$ one year lag
 $r_{X3Y3.X1X4X8X12} > 0$ two year lag
 $r_{X3Y3.X1X5X8X12} > 0$ two year lag
 $r_{X3Y4.X1X4X7X11} > 0$ two year lag
 $r_{X3Y4.X1X5X7X11} > 0$ two year lag

**8. The greater the dependence, (X4, X5)
the greater the underdevelopment. (X6 to X14)**

When controlling for the previous and intervening variables in the model (direct foreign investment, central government expenditure and underdevelopment), the positive relationship between dependence and underdevelopment was confirmed with two year time lags only.

$r_{X4X8.X1X2X12} > 0$ two year lag
 $r_{X4X8.X1X3X12} > 0$ two year lag

**9. The greater the dependence, (X4, X5)
the lesser the economic growth. (Y1 to Y4)**

When controlling for the previous and intervening variables in the model (direct foreign investment, central government expenditure and underdevelopment), the negative relationship between dependence and economic growth was confirmed for zero and three year time lags.

$r_{X4Y4.X1X2X6X10} < 0$ three year lag
 $r_{X4Y4.X1X2X7X10} < 0$ three year lag

$r_{X5Y2.X1X3X6X12} < 0$ no lag

**10. The greater the underdevelopment, (X6 to X14)
the lesser the economic growth. (Y1 to Y4)**

Controlling for the previous and intervening variables of direct foreign investment, central government expenditure, dependence and other variables representing underdevelopment, the negative relationship between underdevelopment and economic growth was confirmed using one, three, and four year time lags.

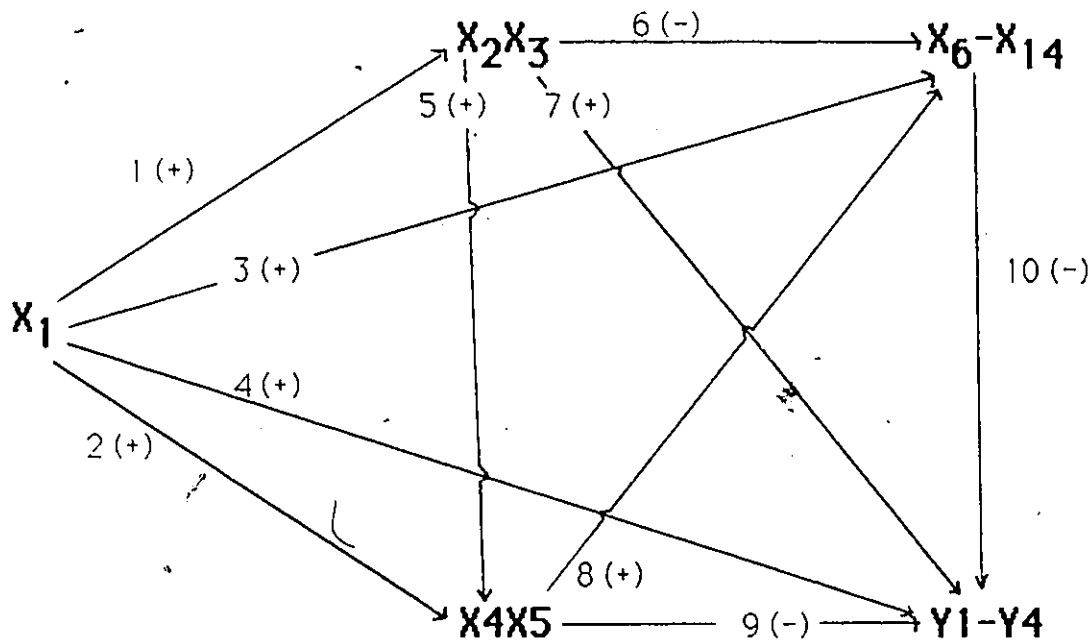
$r_{X6Y2.X1X2X5X11} < 0$ one year lag
 $r_{X6Y2.X1X3X4X12} < 0$ one year lag
 $r_{X6Y2.X1X3X5X12} < 0$ one year lag
 $r_{X10Y3.X1X2X4X6} < 0$ three year lag
 $r_{X10Y3.X1X2X5X6} < 0$ three year lag
 $r_{X10Y3.X1X3X5X6} < 0$ three year lag
 $r_{X10Y3.X1X2X4X7} < 0$ three year lag
 $r_{X10Y3.X1X2X5X7} < 0$ three year lag
 $r_{X10Y4.X1X2X4X6} < 0$ four year lag

Graphic Representations of the Causal Model

<u>Variable Identification</u>	<u>Label</u>
X1	foreign direct investment
X2, X3	state intervention
X4, X5	dependence
X6-X9	sectoral inequality (underdevelopment)
X10-X14	disarticulation (underdevelopment)
Y1-Y4	economic growth (development)

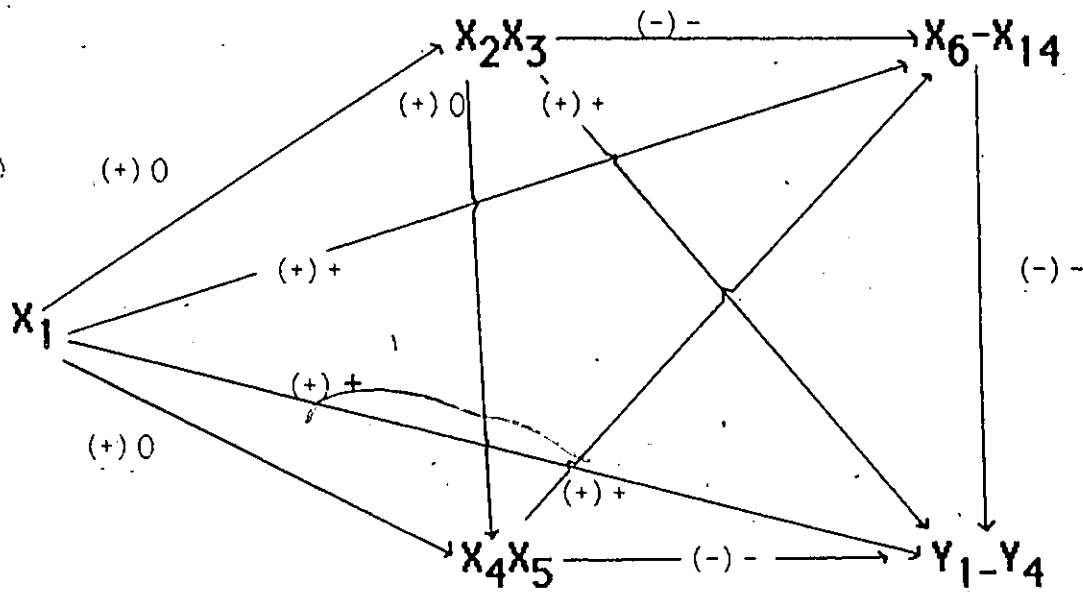
Model Predictions

numbered paths correspond to numbered hypotheses as in Chapter One

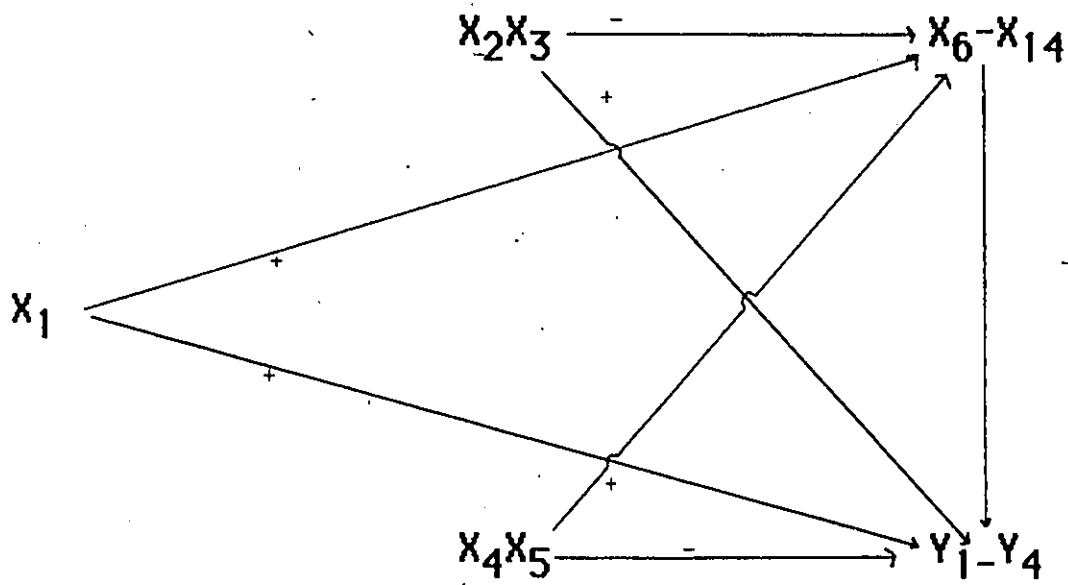


Model Predictions Compared to Empirical Results

predictions in parentheses (+/-)
results without parentheses +/-



Revised Model with only the Confirmed Propositions



III: Summary Analysis of Results

As mentioned at the beginning of this section, seven out of the ten dependency hypotheses we tested in our model were confirmed. In sum, the results indicate that direct foreign investment increases underdevelopment (sectoral inequality and disarticulation) and at least one aspect of development (economic growth). We found no correlation between direct foreign investment and central government expenditure although, as we know from Chapter 2, the state intervenes heavily in the national economy to offset some of the deleterious effects of direct foreign investment. Neither was the predicted relationship between ~~direct~~ foreign investment and dependence confirmed, a fact which may be explained by the measure chosen to represent the concept during the model's time frame: the debt service ratio for the Ivory Coast was low because of high primary product export prices until the late 1970s. Thus an alternate cause outside the model could have affected the results.

State intervention worked largely _ to offset the underdeveloping effects of foreign direct investment. Here too there was no correlation between state

intervention and dependence, perhaps for the same reasons as mentioned immediately above: a manageable debt service ratio.

As dependency theory predicts, dependence did correlate positively with underdevelopment and negatively with economic growth. Underdevelopment also had the expected negative effect on economic growth.

Overall, dependency theory's hypotheses were confirmed in our model. It must be said here that it would be next to impossible for all the results in such a model to work out perfectly. There are so many forces at work to throw correlations awry. While we are meant to conduct our research in a 'closed' model, there are innumerable outside forces working on the model which can change relationships between variables year by year. And these forces would by no means be consistent nor, therefore, easily identifiable for recognition and analysis.

Many other factors hinder quantitative analysis. In a case study such as this the number of variables and cases per variable are low. Because of the time frame under scrutiny, sufficient time-lags are inadequate. Ten years from now a more valid test of dependency theory's predictions vis-à-vis the Ivory Coast could be possible. With an additional twenty

years, the results would be even more meaningful and so on. In addition, a low number of cases makes it difficult to achieve statistical significance. Data availability and reliability is another barrier to conducting a satisfying analysis of a Third World nation.

Finally, we must mention that statistical analysis is only intended to support inferred causation based on the researcher's conceptual knowledge of the subject matter. At best, quantitative analysis may only indicate a relationship between variables, not the causal mechanisms at work in that relationship. (We do not criticize the statistics: multiple regression analysis yielded basically the same results as the partial correlations above. However, curvilinear analysis might produce even better results). The qualitative analysis is necessary to understand these mechanisms and to provide a background of information to explain the quantitative results whether the hypotheses are confirmed statistically or not. In this chapter we have recalled some of these mechanisms from our qualitative analysis. These linkages between the qualitative and quantitative analyses are recalled more fully in the following conclusions.

Chapter IV Conclusion

As recalled from our introduction, this thesis has sought to respond to the challenge to dependency theory: that the theory of the internationalization of capital suggests that "capital's tendency to broaden its sphere of operation has permitted several less-developed nations to achieve successful capitalist development by defying dependency theory's prediction of blocked capital accumulation" (Marcussen and Torp, 1982: 116). We did not doubt the possibility that new capital movements do and will permit at least the partial industrialization of some Third World nations as the developed nations move into the post-industrial sectors associated with services and high technology but a principal dependency theory hypothesis is that "Peripheral industrialization is not independent or self-sustaining, but rather a 'distorted', incomplete and dependent form of development" (Weaver and Berger, 1984:54). We contended that dependency theory is a powerful and flexible analytical tool that continues to explain Third World development difficulties. To test the theory we chose to do a case study of the Ivory Coast because it is a nation that has been considered to have achieved successful capitalist development.

We found that under French colonial rule the Ivory Coast became a

typical peripheral nation. The structures for dependence were wrought from the outset. The rapid emergence of a dominant European planter class witnessed a seemingly perpetual dependence through the export of primary goods to and import of finished goods from the centre (mainly France). We found that despite political independence and the emergence of a native planter class as well as rapid rates of industrialization and agricultural diversification, the economic dependence associated with trade partner and trade commodity concentration remains today.

It must be said, however, that despite these continuing indicators of dependence, much has changed in the Ivory Coast since political independence in 1960. To build national industry the government transferred foreign exchange gained from its traditional primary exports to augment aid, loans and direct foreign investment. However, the high rates of industrialization and economic growth achieved were thwarted before the end of the 1960s by the 'blocks' dependency theory predicts. These limits on economic growth were due to the lack of a sufficiently large domestic market, an inability to achieve efficient economies of scale, a fragmented national productive structure, declining terms of trade and rates of foreign investment and capital drain.

By 1970 the government attempted to overcome this stagnation through increased protection for import substituting industries. Incentives were also provided to increase national industrial articulation but most industries continued to be characterized by high levels of imported inputs and little deepening in industrial integration in light and intermediate goods because of the domination of subsidiary production. Financial, technological and trade dependence remained high. The transition to second-stage import-substitution was thus generally stymied by the dependency associated and underdeveloping effects of multinational-led industrialization. These continuing blocks precipitated a switch in the government's economic planning.

Although import substitution continued to be important in the 1970s, by the mid 70s the government concentrated its development strategy on the promotion of agro-industry. Initially, high rates of economic growth and some national integration was achieved but this strategy was again unable to overcome the export-import imbalances characteristic of multinational corporation dominated production. At the same time the quality of public sector investments and planning declined so that by the onset of the world recession the Ivory Coast was left exceptionally

vulnerable to the ravages of world economic conditions.

Our qualitative research and analysis showed that the underdeveloping effects and dependency associated limitations of multinational dominated peripheral industrialization confirms, in the Ivory Coast, the hypotheses of dependency theory. We found that although direct foreign investment does foster economic growth in the short term, it also generates the dependency and underdevelopment which blocks further growth and development. These blocks include: the drain of capital from the national accumulation process through, especially, wage and service transfers abroad, and royalty payments on technology use. In addition, the availability of low interest loans, tax holidays and import concessions diverts potential capital out of the nation. The multinational production processes also contribute little to the national productive structure since their technology, input goods and equipment are largely imported. This, in turn, means locally produced goods are often low in national value-added and the national market for those goods is restricted through the creation of a small labour élite. When the attempt is made to market these products outside the Ivory Coast, it is often found that protectionism has rendered them uncompetitive.

These positive quantitative relationships between direct foreign investment and both underdevelopment and short term economic growth were confirmed statistically in our model in Chapter Three. However, no statistical relationship was discovered between direct foreign investment and dependence. Nevertheless, it would appear clear from our qualitative analysis in Chapter Two that the Ivory Coast is quite dependent (on capital, trade, and technology) and that this is abetted by the presence of multinationals' subsidiaries. We can only surmise that the statistical relationship was not confirmed because the debt service was quite low (although increasing at an alarming rate after the mid 1970s) and servicable until the onset of the world recession when primary export prices fell and interest rates rose. If the time frame of our study had allowed us to measure the debt service ratio during those years (the data year for this variable could only extend to 1979 since it was placed in our model as an intervening variable) or perhaps if we had used the percentage rate of change of the debt service ratio during the years of our study, the statistical results may have been supportive of this hypothesis.

As expected, the role of the government to promote economic growth and to offset the underdeveloping effects and dependency characteristics

multinational investment in the Ivory Coast was confirmed in our study. Unexpectedly, though, the correlation between government spending and foreign capital was not confirmed statistically although, as we know from Chapter Two, the government spends heavily to offset the underdeveloping effects of multinational investment (on, for example, the diversification and integration of the national productive structure). Perhaps underdevelopment should have been placed as an intervening variable between foreign investment and government spending in the model or perhaps the latter variable should have been placed before the former since, as we recall from Chapter Two, the government spends heavily on, for example, infrastructure, to encourage foreign investment. Neither was the relationship between dependency and government spending confirmed. Again, perhaps the relatively low debt service ratio influenced our results. Government efforts to reduce underdevelopment were, on the other hand, confirmed statistically. As described in Chapter 2, government ownership of industry, especially agro-industry, and its policies to promote the integration and ivorianization the the national economy and schemes to develop hinterland regions and diversify agriculture did meet with some success. We also discovered that some success was achieved on the social

side of the development dichotomy. Although socio-economic conditions remain low for the vast majority of Ivorians and although the poorest segment of society appears to be even worse off in terms of national income share than they were at political independence, some improvements have been attained. Many Ivorians can expect to receive an education, live longer lives, and enjoy more political liberties than either in the past or than many other Africans do today. None of this is to say that standards of living are anywhere near what Westerners could find acceptable nor that the mass marginalization created by capitalist development is an acceptable trade-off for these limited benefits either. Indeed, that the masses must sacrifice for the benefit of the few on condition of a future promise of improvements may never be realized, threatening the stability of the entire system. But that is the risk of capitalist development in the Third World today. Finally, the entirely predictable hypothesis that government spending would create economic growth was also confirmed statistically.

The dependency hypotheses that dependence would exacerbate underdevelopment and reduce economic growth and that underdevelopment would also directly reduce economic growth were also confirmed in our

thesis. We know from Chapter One that the dependency-underdevelopment relationship is a self-reinforcing one that continues forward in time in a causal chain. The dependency-underdevelopment cut in this chain that we examined in the Ivory Coast was supported in Chapter Three, revealing that Ivorian development is neither self-reliant nor self-sustaining and that, therefore, the limits on future growth and development are indeed present in the Ivory Coast as dependency theory predicts.

Appendix I: Variable Identification and Data Sources

Variable No.: X₁A.

Abbreviation: DFIP2A.

Variable Name: Direct Foreign Investment.

Variable Definition: Total flow of direct foreign investment into the Ivory Coast per year, constant (1977) billions of CFAf, 1963-1977.

Source 1

Author: International Monetary Fund.
Title: Balance of Payments Yearbook, Vol. 21
Place:
Press:
Year: 1970
Pages: 1, Item 11
Table: 1
Comments:
Data Year: 1963-1968
Cases: 6
Reliability:

Source 2

Author: International Monetary Fund.
Title: Balance of Payments Yearbook, Vol. 29
Place:
Press:
Year: 1978
Pages: 320
Table: 3
Comments: see below
Data Year: 1969-1976
Cases: 8.
Reliability:

Source 3

Author: International Monetary Fund.
Title: Balance of Payments Yearbook, Vol. 33, Part 1.
Place:
Press:
Year: 1982.
Pages: 277.
Table: 2.
Comments: see below.
Data year: 1977-1979.
Cases: 3.
Reliability:

Source 4

Author: International Monetary Fund.
 Title: Balance of Payments Yearbook, Vol. 34, Part 1.
 Place:
 Press:
 Year: 1983.
 Pages: 72.
 Comments: see below
 Data Year: 1980
 Cases: 1.
 Reliability:

Comments: Data for the years 1969-1980 were converted from SDRs to CFAf using series aa (end of period) exchange rates as indicated in International Financial Statistics, (IMF), 1984 Yearbook, Vol. XXXVII, p. 356-357.

Cases Estimated: 1961 and 1962.

Estimation Procedures: based on annual average rates of change of cases 1963-1965

Variable No.: X₁B.

Abbreviation: DOMINV.

Variable Name: **Gross Domestic Investment.**

Variable Definition: Total value of domestic investment in the Ivory Coast, measured in constant (1977) billions of CFAf, 1963-1977.

Source 1

Author: World Bank.
 Title: World Tables, 2nd ed.
 Place: Baltimore and Washington.
 Press: Johns Hopkins University Press.
 Year: 1980.
 Pages: 112-113.
 Table: Economic Data Sheet 1.
 Comments:
 Data Year: 1960-1977
 Cases: 19
 Reliability:

Cases Estimated: 4 (1961-1964)

Estimation Procedures: based on reported average annual rates of change.

Source 2

Author: World Bank.
 Title: World Tables, 3rd ed.
 Place: Baltimore and Washington.
 Press: Johns Hopkins University Press.

Year: 1983.
 Pages: 94-95.
 Table: Economic Data Sheet 1.
 Comments:
 Data Year: 1977-1981.
 Cases: 5.
 Reliability:

Cases Estimated: 0
Estimation Procedures: N/A.

Variable No.: X₁. Abbreviation: DFIP2

Variable Name: Direct Foreign Investment as Percentage of Total Domestic Investment.

Variable Definition: as per above: $X_1 = DFI(100)/DOMINV$

Sources: see variables X₁A and X₁B.

Variable Number: X₂, X₃. Abbreviation: CGE2, CGE3.

Variable Name: Central Government Expenditure.

Variable Definition: Total Ivorian national government expenditure per year, constant (1977) billions CFAf.

X2 = CGE2 = 1963-1977

X3 = CGE3 = 1964-1978

Source 1:

Author: World Bank
 Title: World Tables, 2nd edition
 Place: Baltimore and Washington
 Press: Johns Hopkins University Press
 Year: 1980
 Pages: 112-3.
 Tables: Economic Data Sheet I
 Comments:
 Data Year: 1960-1977
 Cases: 18
 Reliability:

Cases Estimated: 4: 1961-1964

Estimation Procedures: based on reported average annual rates of change of 11%.

Source 2:

Author: World Bank
 Title: World Tables, 3rd edition
 Place: Baltimore and Washington
 Press: Johns Hopkins University Press
 Year: 1983
 Pages: 94-95
 Tables: Economic Data Sheet 1
 Comments:
 Data Year: 1978-1981
 Cases: 4
 Reliability:

Cases Estimated: 0.

Estimation Procedures: N/A.

Variable No.: X_{4A}

Abbreviation: INTPAY.

Variable Name: **Interest Payments.**

Variable Definition: Interest payments required to service the external public debt, per year, measured in millions of U.S. dollars, 1964-1979.

Source 1

Author: den Tuinder, B.A.A.
 Title: Ivory Coast: The Challenge of Success.
 Place: Baltimore and Washington
 Press: Johns Hopkins University Press
 Year: 1978
 Pages: 332
 Table: SA13
 Comments:
 Data Year: 1964-1965
 Cases: 2
 Reliability:

Source 2

Author: den Tuinder, B.A.A.
 Title: Ivory Coast: The Challenge of Success.
 Place: Baltimore and Washington
 Press: Johns Hopkins University Press
 Year: 1978
 Pages: 351
 Table: SA23
 Comments:
 Data Year: 1966-1975.
 Cases: 9
 Reliability:

Source 3

Author: World Bank.
 Title: World Debt Tables.
 Place: Washington.
 Press: Johns Hopkins University Press
 Year: 1982-1983.
 Pages: 58.
 Table: "External Debt of Developing Countries".
 Comments:
 Data Year: 1976-1981.
 Cases: 6.
 Reliability:

Cases Estimated: 1 (1963)

Estimation Procedures: Based on annual average rates of change as reported in World Bank, World Debt Tables, 1984-1985 ed., p. 68.

Variable no.: X₄B.

Abbreviation: EX

Variable Name: **Exports.**

Variable Definition: Total exports from the Ivory Coast, measured in millions of U.S. dollars, 1964-1979.

Source 1

Author: International Monetary Fund.
 Title: Direction of Trade Statistics, Vol. 3.
 Place:
 Press:
 Year: 1961-1965 Annual
 Pages: 159.
 Table:
 Comments:
 Data Year: 1961-1965.
 Cases: 5
 Reliability:

Source 2

Author: International Monetary Fund.
 Title: Direction of Trade Statistics, Vol. 7.
 Place:
 Press:
 Year: 1965-1970 Annual
 Pages: 320.
 Table:
 Comments:
 Data Year: 1965-1970.
 Cases: 6.

Reliability:

Source 3

Author: International Monetary Fund.
Title: Direction of Trade Statistics, Vol. 10.
Place:
Press: International Bank for Reconstruction and Development
Year: 1974 Annual
Pages: 180.
Table:
Comments:
Data Year: 1970-1973.
Cases: 4.

Source 4

Author: International Monetary Fund.
Title: Direction of Trade Statistics, Vol. 16.
Place:
Press:
Year: 1981 Yearbook
Pages: 221.
Table:
Comments:
Data Year: 1974-1979.
Cases: 6.

Source 5

Author: International Monetary Fund.
Title: Direction of Trade Statistics, 1983 Yearbook.
Place:
Press:
Year: 1983 Yearbook
Pages: 229.
Table:
Comments:
Data Year: 1980-1981.
Cases: 2.
Reliability:

Source 6

Author: U.N. Department of International Economic and Social Affairs
Title: U.N. Bulletin of Monthly Statistics.
Place:
Press:
Year: February, 1986.
Pages: 80.
Table:
Comments:
Data Year: 1982-1983.
Cases: 2.

Reliability:

Cases Estimated: 0

Estimation Procedures: N/A.

Variable No. X₄

Abbreviation: DBTS₁

Variable Name: **Debt Service Ratio 1.**

Variable Definition: Percentage of export earnings (X₄B) required to service the external public debt (X₄A) 1964-1978;
=service payments/value of exports.

Sources: See X₄A and X₄B.

Variable No. X₅

Abbreviation: DBTS₂

Variable Name: **Debt Service Ratio 2.**

Variable Definition: Percentage of export earnings (X₅B) required to service the external public debt (X₅A) 1965-1987.

Sources: See X₅A and X₅B.

Variable No.: X₆ to X₉

Abbreviation: SECI1 to SECI4

Variable Name: **Sectoral Inequality.**

Variable Definition: The absolute value of the average annual per centage rate of growth of industry (year to year change) minus the absolute value of the average annual per centage rate of growth of agriculture (year to year change); based on gross domestic product by industrial origin (manufacturing versus agricultural sectors) measured in constant (1977) billions of CFAf.

X₆ = SECI1 = 1963/64-1977/78

X₇ = SECI2 = 1964/65-1978/79

X₈ = SECI3 = 1965/66-1979/80

X₉ = SECI4 = 1966/67-1980/81

Source 1

Author: World Bank.

Title: World Tables, 3rd ed., Vol. 1.

Place: Baltimore and Washington.

Press: Johns Hopkins University Press.

Year: 1983.
 Pages: 94-95.
 Table: Economic Data Sheet 1.
 Comments:
 Data Year: 1960, 1965, 1970-1981
 Cases: 14
 Reliability:

Source 2

Author: World Bank.
 Title: World Tables, 2nd ed.
 Place: Baltimore and Washington.
 Press: Johns Hopkins University Press.
 Year: 1980.
 Pages: 112.
 Table: Economic Data Sheet 1.
 Comments:
 Data Year: 1966-1969.
 Cases: 4
 Reliability:

Source 3

Author: World Bank.
 Title: World Tables.
 Place: Baltimore and Washington.
 Press: Johns Hopkins University Press.
 Year: 1976.
 Pages: 132.
 Table:
 Comments: inflated as per indications.
 Data Year: 1961-1964
 Cases: 4
 Reliability:

Cases Estimated: 0

Estimation Procedures: N/A.

Variable No.: X₁₀ to X₁₄.-

Abbreviation: DISI2 to DISI6.

Variable Name: **Disintegration.**

Variable Definition: Machinery and equipment goods imports as per centage of total domestic industrial output (X_{10B} as% X_{10A}).

X10 = DISI2 = 1963-1977
 X11 = DISI3 = 1964-1978
 X12 = DISI4 = 1965-1979
 X13 = DISI5 = 1966-1980
 X14 = DISI6 = 1967-1981

Sources: see X 10A and X 10B.

Cases Estimated: 1980

Estimation Procedures: based on average annual rate of change of the three years immediately preceding and following 1980.

Variable No: X 10A.

Abbreviation: INDOUT.

Variable Name: **Industrial Output.**

Variable Definition: Value of the Ivorian manufacturing sector's Industrial output in constant (1977) CFAf, 1963-1981.

Source 1

Author: World Bank.
Title: World Tables, 3rd ed., Vol. 1.
Place: Baltimore and Washington.
Press: Johns Hopkins University Press.
Year: 1983.
Pages: 94-95.
Table: Economic Data Sheet 1.
Comments:
Data Year: 1960, 1965, 1970-1981.
Cases: 14.
Reliability:

Source 2

Author: World Bank.
Title: World Tables, 2nd ed.
Place: Baltimore and Washington.
Press: Johns Hopkins University Press.
Year: 1980.
Pages: 112.
Table: Economic Data Sheet 1.
Comments:
Data Year: 1966-1969
Cases: 4
Reliability:

Source 3

Author: World Bank.
Title: World Tables.
Place: Baltimore and Washington.
Press: Johns Hopkins University Press.
Year: 1976.
Pages: 132.
Table:
Comments: inflated as per indications.
Data Year: 1961-1964.
Cases: 4
Reliability:

Cases Estimated: 0
Estimation Procedures: N/A.

Variable No.: X_{10B}. Abbreviation: IMPS.

Variable Name: **Import Structure.**

Variable Definition: Value of machinery and equipment good imports in billions of (1977 constant) CFAf, 1963-1981.

Source 1

Author: den Tuinder, B.A.A.
Title: Ivory Coast: The Challenge of Success.
Place: Baltimore and Washinton.
Press: Johns Hopkins University Press.
Year: 1978.
Pages: 340-341.
Tables: SA17.
Comments:
Data Year: 1960-1964, 1966, 1979, 1971.
Cases: 7.
Reliability:

Source 2

Author: United Nations.
Title: UN Monthly Bulletin of Statistics, Vol. XXXIX, No. 12.
Place: New York.
Press: UN.
Year: December, 1976.
Pages: 114.
Tables: 52.
Comments:
Data Year: 1969, 1971.
Cases: 2.
Reliability:

Source 3

Author: United Nations.
Title: UN Monthly Bulletin of Statistics, Vol. XXII, No. 12.
Place: New York.
Press: UN.
Year: December, 1968.
Pages: 104.
Tables: 52.
Comments:
Data Year: 1960-1964, 1966.
Cases: 6.
Reliability:

Source 4

Author: UNCTAD.
Title: Handbook of International Trade and Development Statistics.
Place: New York.
Press: United Nations.
Year: 1976 Supplement.
Pages: 154.
Tables: 4.1.
Comments:
Data Year: 1967, 1972, 1976.
Cases: 3.
Reliability:

Source 5

Author: UNCTAD
Title: Handbook of International Trade and Development Statistics.
Place: New York.
Press: United Nations.
Year: 1985.
Pages: 171.
Tables: 4.2.
Comments:
Data Year: 1970, 1975, 1978-1982.
Cases: 7.
Reliability:

Source 6

Author: UNCTAD.
Title: Handbook of International Trade and Development Statistics.
Place: New York.
Press: UN.
Year: 1979 Supplement.
Pages: 183.
Tables: 4.2
Comments:
Data Year: 1973, 1977.
Cases: 2
Reliability:

Source 7

Author: UNCTAD.
Title: Handbook of International Trade and Development Statistics.
Place: New York
Press: UN
Year: 1976 Supplement
Pages: 154
Tables: 4.1
Comments:
Data Year: 1968, 1974, 1976

Cases: 3
Reliability:

Source 8

Author: UNCTAD.
Title: Handbook of International Trade and Development Statistics.
Place: New York.
Press: UN.
Year: 1983 Supplement.
Pages: 182.
Tables: 4.2.
Comments:
Data Year: 1965.
Cases: 1.
Reliability:
Cases Estimated: 0.
Estimation Procedures: N/A.

Variable No.: Y₂ Abbreviation: POP.

Variable Name: Population.

Variable Definition: Total, mid-year population in the Ivory Coast, 1965-1983.

Source 1

Author: World Bank.
Title: World Tables, 2nd ed.
Place: Baltimore and Washington.
Press: Johns Hopkins University Press.
Year: 1980.
Pages: 112-113.
Tables: Economic Data Sheet 1.
Comments:
Data Year: 1965-1977.
Cases: 13.
Reliability:

Source 2

Author: World Bank
Title: World Tables, 3rd ed.
Place: Baltimore and Washington.
Press: Johns Hopkins University Press.
Year: 1983.
Pages: 47.
Tables: Social Data Sheet 1.
Comments:
Data Year: 1978-1981

Cases: 4
Reliability:

Cases Estimated: 2 (1982, 1983).

Estimation Procedures: based on annual average rates of population change in UNCTAD, Handbook of International Trade and Development Statistics: 1984 Supplement. New York: U.N., 1984. Table S.1a, p. 238.

Variable No.: Y_p

Abbreviation: GNP.

Variable Name: **Gross National Product.**

Variable Definition: Gross national product measured in constant (1977) billions of CFA per year, 1963-1983.

Source 1

Author: World Bank.
Title: World Tables, 2nd ed.
Place: Baltimore and Washington.
Press: Johns Hopkins University Press.
Year: 1980.
Pages: 112-113.
Tables: Economic Data Sheet 1.
Comments:
Data Year: 1960-1974.
Cases: 15
Reliability:

Source 2

Author: World Bank.
Title: World Tables, 3rd ed.
Place: Baltimore and Washington.
Press: Johns Hopkins University Press.
Year: 1983.
Pages: 94-95.
Tables: Economic Data Sheet 1.
Comments:
Data Year: 1975-1981.
Cases: 7
Reliability:

Cases Estimated: 2 (1982, 1983).

Estimation Procedures: Computed on the basis of annual average rates of change of the GNP over the previous five years.

Variable No.: Y1-Y4.

Abbreviation: GNPCAP2-5

Variable Name: Gross National Product Per Capita.

Variable Definition: Gross National Product measured in constant(1977) billions of CFA per year (Y_B) / population of same year (Y_A), 1964-1981.

Y1 = GNPCAP2 = 1964-1978

Y2 = GNPCAP3 = 1965-1979

Y3 = GNPCAP4 = 1966-1980

Y4 = GNPCAP5 = 1967-1981

Sources: see variables Y_A and Y_B .

Appendix 2: Statistical Results

Variable Index

(N=15 for each variable because each year is a case)

X1	DFIP2	Direct Foreign Investment as per cent Total Domestic Investment 1963-1977
X2	CGE2	Central Government Expenditure 1963-1977
X3	CGE3	Central Government Expenditure 1964-1978
X4	DBTS1	Debt Service Ratio 1964-1978
X5	DBTS2	Debt Service Ratio 1965-1979
X6	SEC11	Sectoral Inequality 1963/64-1977/78
X7	SEC12	Sectoral Inequality 1964/65-1978/79
X8	SEC13	Sectoral Inequality 1965/66-1979/80
X9	SEC14	Sectoral Inequality 1966/67-1980/81
X10	DIS12	Disarticulation 1963-1977
X11	DIS13	Disarticulation 1964-1978
X12	DIS14	Disarticulation 1965-1979
X13	DIS15	Disarticulation 1966-1980
X14	DIS16	Disarticulation 1967-1981
Y1	GNPCAP2	Gross National Product Per Capita 1964-1978
Y2	GNPCAP3	Gross National Product Per Capita 1965-1979
Y3	GNPCAP4	Gross National Product Per Capita 1966-1980
Y4	GNPCAP5	Gross National Product Per Capita 1967-1981

Data Transformations

<u>Variable Name</u>	<u>Before</u>		<u>Transformation</u>	<u>After</u>	
	Kurtosis	Skewness		Kurtosis	Skewness
DFIP2	4.040	2.300	SQRT	-0.925	-0.278
SEC14	4.289	2.385	SQRT	-0.350	0.920
DIS12	14.862	3.849	SQRT	-1.490	0.508
DIS13	14.062	3.709	SQRT	-1.459	-0.206
DIS15	14.345	2.403	SQRT	-1.315	0.495
DIS16	14.948	-3.863	SQRT	-0.497	0.724
GNPCAP2	15.00	3.870	SQRT	-0.724	1.178
GNPCAP3	4.300	2.400	SQRT	-2.295	0.155

Tables of Correlations

H_1	r expected	r obtained	one-tailed significance	H_0 rejected
			$p =$	
r_{X1X2}	>0	-0.6083	0.000	
r_{X1X3}	>0	-0.7059	0.000	
r_{X1X4}	>0	0.0720	0.399	

H ₁	r expected	r obtained	one-tailed significance p =	H ₀ rejected
rX1X4.X2X6X10	>0	-0.0450	0.223	
rX1X4.X3X6X10	>0	0.1217	0.089	
rX1X4.X2X6X11	>0	-0.0450	0.112	
rX1X4.X3X6X11	>0	-0.0880	0.197	
rX1X5	>0	-0.0370	0.449	
rX1X5.X2X6X10	>0	0.3785	0.057	
rX1X5.X3X6X10	>0	0.1880	0.140	
rX1X5.X2X7X10	>0	0.1285	0.172	
rX1X5.X3X7X10	>0	0.1874	0.140	
rX1X5.X2X6X11	>0	0.3402	0.070	
rX1X5.X3X6X11	>0	0.0171	0.240	
rX1X5.X2X7X11	>0	0.1261	0.174	
rX1X5.X3X7X11	>0	0.0839	0.199	
rX1X6	>0	0.8929	0.000	yes
rX1X6.X2X10	>0	0.8965	0.000	yes
rX1X7	>0	0.9060	0.000	yes
rX1X7.X2X4X10	>0	0.8534	0.000	yes
rX1X7.X3X4X10	>0	0.7508	0.000	yes
rX1X8	>0	0.1470	0.301	
rX1X8.X2X4X10	>0	0.0754	0.204	
rX1X8.X3X4X10	>0	-0.1509	0.151	
rX1X8.X2X5X10	>0	0.1260	0.174	
rX1X8.X3X5X10	>0	-0.1422	0.162	
rX1X8.X2X4X11	>0	0.3246	0.076	
rX1X8.X3X4X11	>0	0.1798	0.144	
rX1X8.X2X5X11	>0	0.2841	0.092	
rX1X8.X3X5X11	>0	0.1288	0.172	
rX1X9	>0	0.1790	0.262	
rX1X9.X2X4X10	>0	0.2375	0.115	
rX1X9.X3X4X10	>0	0.3644	0.061	
rX1X9.X2X5X10	>0	0.2542	0.107	
rX1X9.X3X5X10	>0	0.3718	0.059	
rX1X9.X2X4X11	>0	0.0656	0.210	
rX1X9.X3X4X11	>0	0.0773	0.230	
rX1X9.X2X5X11	>0	0.0728	0.206	
rX1X9.X3X5X11	>0	0.0860	0.198	
rX1X9.X2X4X12	>0	0.3297	0.073	
rX1X9.X3X4X12	>0	0.2673	0.100	
rX1X9.X2X5X12	>0	0.3303	0.074	
rX1X9.X3X5X12	>0	0.2721	0.098	
rX1X10	>0	-0.5097	0.013	
rX1X10.X2	>0	0.0245	0.234	
rX1X11	>0	-0.8730	0.000	
rX1X11.X2X4X6	>0	-0.5051	0.024	

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rx1x11.x3x4x6	>0	-0.4165	0.045	
rx1x12	>0	0.7200	0.001	yes
rx1x12.x2x4x6	>0	-0.1765	0.146	
rx1x12.x3x4x6	>0	0.1907	0.138	
rx1x12.x2x4x7	>0	0.0806	0.201	
rx1x12.x2x5x6	>0	-0.1572	0.157	
rx1x12.x3x5x6	>0	0.1907	0.138	
rx1x12.x2x5x7	>0	0.1136	0.182	
rx1x12.x3x5x7	>0	0.0936	0.193	
rx1x13	>0	0.0779	0.000	yes
rx1x13.x2x4x6	>0	-0.2870	0.233	
rx1x13.x3x4x6	>0	0.2662	0.101	
rx1x13.x2x5x6	>0	0.0380	0.267	
rx1x13.x3x5x6	>0	0.3540	0.084	
rx1x13.x2x4x7	>0	0.2858	0.092	
rx1x13.x3x4x7	>0	0.2558	0.106	
rx1x13.x2x5x7	>0	0.3414	0.070	
rx1x13.x3x5x7	>0	0.3106	0.084	
rx1x13.x2x4x8	>0	0.7698	0.000	yes
rx1x13.x3x4x8	>0	0.7381	0.000	yes
rx1x13.x2x5x8	>0	0.7747	0.000	yes
rx1x13.x3x5x8	>0	0.7396	0.000	yes
rx1x14	>0	0.7460	0.000	yes
rx1x14.x2x4x6	>0	-0.2876	0.091	
rx1x14.x3x4x6	>0	0.1236	0.176	
rx1x14.x2x5x6	>0	-0.3420	0.009	
rx1x14.x3x5x6	>0	0.1412	0.331	
rx1x14.x2x4x7	>0	-0.1268	0.174	
rx1x14.x3x4x7	>0	-0.1892	0.114	
rx1x14.x2x5x7	>0	-0.1079	0.185	
rx1x14.x3x5x7	>0	-0.1505	0.160	
rx1x14.x2x4x8	>0	0.7090	0.003	yes
rx1x14.x3x4x8	>0	0.5207	0.160	
rx1x14.x2x5x8	>0	0.7078	0.023	yes
rx1x14.x3x5x8	>0	0.5170	0.022	yes
rx1x14.x2x4x9	>0	0.6684	0.005	yes
rx1x14.x3x4x9	>0	0.4874	0.027	yes
rx1x14.x2x5x9	>0	0.6650	0.005	yes
rx1x14.x3x5x9	>0	0.4794	0.029	yes
rx1y1	>0	-0.6390	0.005	
rx1y1.x2x4x6x10	>0	0.0895	0.199	
rx1y1.x2x4x6x11	>0	0.0724	0.208	
rx1y1.x3x4x6x10	>0	0.5431	0.021	yes
rx1y1.x3x4x6x11	>0	0.4259	0.048	yes

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX1Y2	>0	-0.8440	0.000	
rX1Y2.X2X4X6X10	>0	-0.3269	0.082	
rX1Y2.X3X4X6X10	>0	-0.6025	0.013	
rX1Y2.X2X5X6X10	>0	-0.5905	0.014	
rX1Y2.X2X4X7X10	>0	-0.0864	0.200	
rX1Y2.X3X4X7X10	>0	-0.5410	0.022	
rX1Y2.X2X5X7X10	>0	-0.0206	0.234	
rX1Y2.X3X5X7X10	>0	-0.5207	0.050	
rX1Y2.X2X4X6X11	>0	-0.3805	0.062	
rX1Y2.X3X4X6X11	>0	-0.3879	0.060	
rX1Y2.X2X5X6X11	>0	-0.2622	0.109	
rX1Y2.X3X5X6X11	>0	-0.3906	0.059	
rX1Y2.X2X4X7X11	>0	-0.3068	0.090	
rX1Y2.X3X4X7X11	>0	-0.4111	0.053	
rX1Y2.X2X5X7X11	>0	-0.2594	0.112	
rX1Y2.X3X5X7X11	>0	-0.4083	0.053	
rX1Y2.X2X4X6X12	>0	-0.2476	0.116	
rX1Y2.X3X4X6X12	>0	-0.5959	0.014	
rX1Y2.X3X5X6X12	>0	-0.1278	0.117	
rX1Y2.X3X5X6X12	>0	-0.5851	0.029	
rX1Y2.X2X4X7X12	>0	-0.4950	0.442	
rX1Y2.X3X4X7X12	>0	-0.5834	0.030	
rX1Y2.X2X5X7X12	>0	0.0091	0.489	
rX1Y2.X3X5X7X12	>0	-0.5487	0.040	
rX1Y3	>0	-0.0230	0.470	
rX1Y2.X2X4X6X10	>0	-0.3600	0.069	
rX1Y3.X3X4X6X10	>0	0.1130	0.185	
rX1Y3.X2X5X6X10	>0	-0.2495	0.116	
rX1Y3.X3X5X6X10	>0	0.2489	0.115	
rX1Y3.X2X4X7X10	>0	-0.1138	0.185	
rX1Y3.X3X4X7X10	>0	-0.1135	0.185	
rX1Y3.X2X5X7X10	>0	-0.0947	0.196	
rX1Y3.X3X5X7X10	>0	-0.0833	0.202	
rX1Y3.X2X4X8X10	>0	0.0349	0.230	
rX1Y3.X3X4X8X10	>0	0.0158	0.241	
rX1Y3.X2X5X8X10	>0	0.0457	0.224	
rX1Y3.X3X5X8X10	>0	-0.0471	0.223	
rX1Y3.X2X4X6X11	>0	-0.3280	0.231	
rX1Y3.X3X4X6X11	>0	-0.3230	0.231	
rX1Y3.X2X5X6X11	>0	-0.0954	0.195	
rX1Y3.X3X5X6X11	>0	-0.0734	0.208	
rX1Y3.X2X4X7X11	>0	-0.1044	0.190	
rX1Y3.X3X4X7X11	>0	-0.0615	0.215	
rX1Y3.X2X5X7X11	>0	-0.1201	0.182	
rX1Y3.X3X5X7X11	>0	-0.1502	0.165	
rX1Y3.X2X4X8X11	>0	-0.2068	0.136	
rX1Y3.X3X5X8X11	>0	-0.0137	0.242	
rX1Y3.X2X5X8X11	>0	-0.2969	0.094	
rX1Y3.X3X5X8X11	>0	0.0264	0.235	

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX1Y3.X2X4X6X12	>0	-0.0215	0.238	
rX1Y3.X2X5X6X12	>0	0.0757	0.206	
rX1Y3.X3X5X6X12	>0	-0.0505	0.221	
rX1Y3.X2X4X7X12	>0	0.0014	0.249	
rX1Y3.X3X4X7X12	>0	-0.0618	0.214	
rX1Y3.X2X5X7X12	>0	0.0152	0.424	
rX1Y3.X3X5X7X12	>0	-0.1684	0.155	
rX1Y3.X2X4X8X12	>0	-0.2577	0.111	
rX1Y3.X2X5X8X12	>0	-0.2755	0.103	
rX1Y3.X3X5X8X12	>0	-0.2168	0.131	
rX1Y3.X2X4X6X13	>0	-0.0786	0.205	
rX1Y3.X3X4X6X13	>0	0.0435	0.225	
rX1Y3.X2X5X6X13	>0	0.0303	0.233	
rX1Y3.X3X5X6X12	>0	0.1076	0.188	
rX1Y3.X2X4X7X13	>0	-0.0183	0.240	
rX1Y3.X3X4X7X13	>0	-0.0214	0.238	
rX1Y3.X2X5X7X13	>0	0.0628	0.214	
rX1Y3.X2X4X7X13	>0	0.0157	0.241	
rX1Y3.X2X4X8X13	>0	0.0035	0.248	
rX1Y3.X3X4X8X13	>0	0.1413	0.200	
rX1Y3.X2X5X8X13	>0	-0.0161	0.241	
rX1Y3.X3X5X8X13	>0	0.0830	0.202	
rX1Y4	>0	0.7070	0.002	yes
rX1Y4.X2X4X6X10	>0	-0.2439	0.118	
rX1Y3.X3X4X6X10	>0	0.1523	0.164	
rX1Y4.X2X5X6X10	>0	0.2267	0.126	
rX1Y4.X3X5X6X10	>0	0.1217	0.181	
rX1Y4.X2X4X7X10	>0	-0.0811	0.203	
rX1Y4.X3X4X7X10	>0	-0.0872	0.200	
rX1Y4.X2X5X7X10	>0	-0.0265	0.235	
rX1Y4.X3X5X7X10	>0	-0.0658	0.212	
rX1Y4.X2X4X8X10	>0	0.6401	0.009	yes
rX1Y4.X3X4X8X10	>0	0.3930	0.058	
rX1Y4.X2X5X8X10	>0	0.6055	0.012	
rX1Y4.X3X5X8X10	>0	0.3735	0.065	
rX1Y4.X2X4X9X10	>0	0.6637	0.007	yes
rX1Y4.X3X4X9X10	>0	0.4768	0.035	yes
rX1Y4.X2X5X9X10	>0	0.6242	0.010	yes
rX1Y4.X3X5X9X10	>0	0.4544	0.040	yes
rX1Y4.X2X4X6X11	>0	0.2302	0.124	
rX1Y4.X2X5X6X11	>0	-0.0292	0.233	
rX1Y4.X3X5X6X11	>0	0.2435	0.117	
rX1Y4.X2X4X7X11	>0	0.0976	0.194	
rX1Y4.X3X4X7X11	>0	0.1756	0.152	
rX1Y4.X2X5X7X11	>0	0.1274	0.178	
rX1Y4.X3X5X7X11	>0	0.1923	0.143	
rX1Y4.X2X4X8X11	>0	0.5082	0.028	yes
rX1Y4.X3X4X8X11	>0	0.3721	0.065	
rX1Y4.X2X5X8X11	>0	0.5265	0.024	yes

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX1Y4.X3X5X8X11	>0	0.4025	0.055	
rX1Y4.X2X4X9X11	>0	0.5223	0.025	yes
rX1Y4.X3X4X9X11	>0	0.3905	0.059	
rX1Y4.X2X5X9X11	>0	0.5216	0.025	yes
rX1Y4.X3X5X9X11	>0	0.4125	0.052	
rX1Y4.X2X4X6X12	>0	-0.0454	0.224	
rX1Y4.X3X4X6X12	>0	0.0883	0.119	
rX1Y4.X2X5X6X12	>0	-0.1041	0.190	
rX1Y4.X3X5X6X12	>0	0.0564	0.218	
rX1Y4.X2X4X7X12	>0	-0.0214	0.238	
rX1Y4.X3X4X7X12	>0	-0.0561	0.218	
rX1Y4.X2X5X7X12	>0	-0.0217	0.238	
rX1Y4.X3X5X7X12	>0	-0.0750	0.207	
rX1Y4.X2X4X8X12	>0	0.2067	0.136	
rX1Y4.X3X4X8X12	>0	0.2828	0.100	
rX1Y4.X2X5X8X12	>0	0.2360	0.121	
rX1Y4.X3X5X8X12	>0	0.3158	0.086	
rX1Y4.X2X4X9X12	>0	0.3944	0.058	
rX1Y4.X3X4X9X12	>0	0.4056	0.054	
rX1Y4.X2X5X9X12	>0	0.3516	0.074	
rX1Y4.X3X5X9X12	>0	0.4056	0.054	
rX1Y4.X2X4X6X13	>0	-0.0817	0.203	
rX1Y4.X3X4X6X13	>0	0.0658	0.210	
rX1Y4.X2X5X6X13	>0	-0.1439	0.169	
rX1Y4.X3X5X6X13	>0	0.0380	0.228	
rX1Y4.X2X4X7X13	>0	-0.0789	0.206	
rX1Y4.X3X4X7X13	>0	-0.0995	0.193	
rX1Y4.X2X5X7X13	>0	-0.0894	0.199	
rX1Y4.X3X5X7X13	>0	-0.1239	0.179	
rX1Y4.X2X4X8X13	>0	0.2392	0.200	
rX1Y4.X3X4X8X13	>0	0.1924	0.143	
rX1Y4.X2X5X8X13	>0	0.2533	0.112	
rX1Y4.X3X5X8X13	>0	0.2176	0.130	
rX1Y4.X2X4X9X13	>0	0.4011	0.056	
rX1Y4.X3X4X9X13	>0	0.3038	0.091	
rX1Y4.X2X5X9X13	>0	0.3482	0.074	
rX1Y4.X3X5X9X13	>0	0.2765	0.103	
rX1Y4.X2X4X6X14	>0	0.0293	0.233	
rX1Y4.X3X4X6X14	>0	0.0881	0.199	
rX1Y4.X2X5X6X14	>0	0.0032	0.248	
rX1Y4.X3X5X6X14	>0	0.0539	0.219	
rX1Y4.X2X4X7X14	>0	0.0587	0.216	
rX1Y4.X3X4X7X14	>0	0.0271	0.235	
rX1Y4.X2X5X7X14	>0	0.0657	0.212	
rX1Y4.X3X5X7X14	>0	0.0183	0.239	
rX1Y4.X2X4X8X14	>0	0.1731	0.153	
rX1Y4.X3X4X8X14	>0	0.3071	0.095	
rX1Y4.X2X5X8X14	>0	0.1540	0.163	
rX1Y4.X3X5X8X14	>0	0.2944	0.095	
rX1Y4.X2X4X9X14	>0	0.2961	0.094	
rX1Y4.X3X4X9X14	>0	0.4217	0.049	yes

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX1Y4.X2X5X9X14	>0	0.2414	0.119	
rX1Y4.X3X5X9X14	>0	0.3909	0.059	
rX2X4	<0	0.0399	0.222	
rX2X4.X1X10	<0	0.3377	0.065	
rX2X5	<0	0.3238	0.073	
rX2X5.X1X6X10	<0	0.3192	0.078	
rX2X5.X1X6X11	<0	0.0809	0.201	
rX2X6	<0	-0.8420	0.000	yes
rX2X6.X1X10	<0	-0.7714	0.000	yes
rX2X7	<0			
rX2X7.X1X4X10	<0	-0.2923	0.089	
rX2X7.X1X4X11	<0	-0.1236	0.176	
rX2X8.X1X4X10	<0	0.0459	0.222	
rX2X8.X1X5X10	<0	0.1369	0.168	
rX2X8.X1X4X11	<0	-0.1717	0.147	
rX2X8.X1X5X11	<0	-0.0829	0.200	
rX2X8.X1X4X12	<0	0.0510	0.218	
rX2X8.X1X5X12	<0	-0.0010	0.250	
rX2X9	<0			
rX2X9.X1X4X10	<0	-0.2453	0.111	
rX2X9.X1X5X10	<0	-0.2356	0.115	
rX2X9.X1X4X11	<0	0.1937	0.137	
rX2X9.X1X5X11	<0	0.1829	0.143	
rX2X9.X1X4X12	<0	0.1785	0.145	
rX2X9.X1X5X12	<0	0.1682	0.155	
rX2X9.X1X4X13	<0	0.1764	0.146	
rX2X9.X1X5X13	<0	0.1753	0.157	
rX2X10	<0	0.8546	0.000	
rX2X10.X1	<0	0.7975	0.000	
rX2X11	<0			
rX2X11.X1X4X6	<0	0.0400	0.226	
rX2X12.X1X4X6	<0	0.5393	0.018	
rX2X12.X1X5X6	<0	0.4964	0.035	
rX1X12.X1X4X7	<0	0.1110	0.183	
rX2X12.X1X5X7	<0	0.0849	0.199	
rX2X13.X1X4X6	<0	0.3832	0.055	
rX2X13.X1X5X6	<0	0.2886	0.091	
rX2X13.X1X4X7	<0	-0.0780	0.203	
rX2X13.X1X5X7	<0	-0.1298	0.172	
rX2X13.X1X4X8	<0	-0.1868	0.140	

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX2X13.X1X5X8	<0	-0.1933	0.137	
rX2X14.X1X4X6	<0	0.6736	0.004	
rX2X14.X1X5X6	<0	0.6724	0.004	
rX2X14.X1X4X7	<0	0.2337	0.116	
rX2X14.X1X5X7	<0	0.1967	0.135	
rX2X14.X1X4X8	<0	0.0451	0.223	
rX2X14.X1X5X8	<0	0.3550	0.228	
rX2X14.X1X4X9	<0	0.0598	0.214	
rX2X14.X1X5X9	<0	0.3220	0.230	
rX2Y1	>0	0.9880	0.000	yes
rX2Y1.X1X10	>0	0.9496	0.000	yes
rX2Y2	>0	0.5850	0.011	yes
rX2Y2.X1X4X6X10	>0	0.8597	0.000	yes
rX2Y2.X1X5X6X10	>0	0.8596	0.000	yes
rX2Y2.X1X4X7X10	>0	0.9409	0.000	yes
rX2Y2.X1X5X7X10	>0	0.9477	0.000	yes
rX2Y2.X1X4X7X11	>0	0.9808	0.000	yes
rX2Y2.X1X5X7X11	>0	0.9803	0.000	yes
rX2Y2.X1X4X7X12	>0	0.9829	0.000	yes
rX2Y3	>0	0.9650	0.006	yes
rX2Y3.X1X4X6X10	>0	0.1123	0.186	
rX2Y3.X1X4X7X10	>0	0.2887	0.098	
rX2Y3.X1X4X8X10	>0	0.4302	0.047	yes
rX2Y3.X1X5X6X10	>0	-0.0683	0.211	
rX2Y3.X1X5X7X10	>0	0.2621	0.109	
rX2Y3.X1X5X8X10	>0	0.4063	0.054	
rX2Y3.X1X4X7X11	>0	0.2582	0.111	
rX2Y3.X1X5X7X11	>0	0.1990	0.140	
rX2Y3.X1X4X8X11	>0	0.2346	0.122	
rX2Y3.X1X5X8X11	>0	0.2145	0.132	
rX2Y3.X1X4X8X12	>0	0.1874	0.146	
rX2Y3.X1X5X8X12	>0	0.1860	0.146	
rX2Y3.X1X4X8X13	>0	0.1632	0.158	
rX2Y3.X1X5X8X13	>0	0.1495	0.165	
rX2Y4	>0	-0.5080	0.009	
rX2Y4.X1X4X6X10	>0	0.6382	0.009	yes
rX2Y4.X1X4X7X10	>0	0.5832	0.015	yes
rX2Y4.X1X5X6X10	>0	0.6362	0.009	yes
rX2Y4.X1X4X8X10	>0	0.5832	0.015	yes
rX2Y4.X1X5X8X10	>0	0.5834	0.015	yes
rX2Y4.X1X4X9X10	>0	0.0880	0.199	
rX2Y4.X1X4X7X11	>0	0.6956	0.005	yes
rX2Y4.X1X4X8X11	>0	0.5834	0.015	yes
rX2Y4.X1X5X8X11	>0	0.1306	0.176	

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX2Y4.X1X4X9X11	>0	-0.0792	0.204	
rX2Y4.X1X5X9X11	>0	-0.1355	0.173	
rX2Y4.X1X5X8X12	>0	-0.0160	0.241	
rX2Y4.X1X4X9X12	>0	-0.1271	0.178	
rX2Y4.X1X5X8X13	>0	-0.1000	0.193	
rX2Y4.X1X5X9X13	>0	-0.0387	0.228	
rX2Y4.X1X4X9X14	>0	-0.1223	0.180	
rX2Y4.X1X5X9X14	>0	-0.1513	0.164	
rX3X4	<0	-0.1130	0.172	
rX3X4.X1	<0	-0.0877	0.192	
rX3X5	<0	-0.0440	0.220	
rX3X5.X1	<0	-0.0987	0.185	
rX3X7	<0	-0.8310	0.000	yes
rX3X7.X1X4X10	<0	-0.6493	0.001	yes
rX3X7.X1X5X10	<0	-0.6989	0.003	yes
rX3X7.X1X4X11	<0	-0.7378	0.002	yes
rX3X7.X1X5X11	<0	-0.7773	0.000	yes
rX3X8	<0	-0.2859	0.072	
rX3X8.X1X4X10	<0	-0.2737	0.082	
rX3X8.X1X5X10	<0	-0.2770	0.096	
rX3X8.X1X4X11	<0	-0.1589	0.156	
rX3X8.X1X5X11	<0	-0.0828	0.200	
rX3X8.X1X4X12	<0	-0.0510	0.219	
rX3X8.X1X5X12	<0	-0.0010	0.250	
rX3X9	<0	-0.0650	0.410	
rX3X9.X1X4X10	<0	-0.2453	0.111	
rX3X9.X1X5X10	<0	-0.2356	0.115	
rX3X9.X1X4X11	<0	0.1740	0.147	
rX3X9.X1X5X11	<0	0.1826	0.143	
rX3X9.X1X4X12	<0	0.0711	0.207	
rX3X9.X1X5X12	<0	0.0785	0.202	
rX3X9.X1X4X13	<0	0.0409	0.225	
rX3X9.X1X5X13	<0	0.0329	0.230	
rX3X11	<0	0.5103	0.013	
rX3X11.X1X4X6	<0	-0.4263	0.042	yes
rX3X12	<0	0.7200	0.002	
rX3X12.X1X4X6	<0	-0.1589	0.156	
rX3X12.X1X5X6	<0	-0.2067	0.130	
rX3X12.X1X4X7	<0	0.0839	0.199	
rX3X12.X1X5X7	<0	0.0165	0.240	
rX3X13	<0	-0.5230	0.023	yes
rX3X13.X1X4X6	<0	0.1478	0.162	

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX3X13.X1X5X6	<0	0.1110	0.183	
rX3X13.X1X4X7	<0	0.2852	0.092	
rX3X13.X1X5X6	<0	0.2125	0.127	
rX3X13.X1X4X8	<0	-0.1125	0.182	
rX3X13.X1X5X8	<0	-0.1325	0.171	
rX3X14	<0	-0.6980	0.002	yes
rX3X14.X1X4X6	<0	-0.3310	0.074	yes
rX3X14.X1X5X6	<0	-0.3524	0.066	
rX3X14.X1X4X7	<0	0.2337	0.166	
rX3X14.X1X5X7	<0	0.1967	0.135	
rX3X14.X1X4X8	<0	-0.4984	0.025	
rX3X14.X1X5X8	<0	0.0355	0.228	
rX3X14.X1X4X9	<0	0.0598	0.214	
rX3X14.X1X5X9	<0	0.0322	0.230	
rX3Y1	>0	0.4480	0.047	yes
rX3Y1.X1X4X6X10	>0	0.0045	0.248	
rX3Y2	>0	0.9612	0.000	yes
rX3Y2.X1X4X6X11	>0	0.9644	0.000	yes
rX3Y2.X1X5X6X11	>0	0.9657	0.000	yes
rX3Y2.X1X4X7X11	>0	0.9251	0.000	yes
rX3Y2.X1X5X7X11	>0	0.9141	0.000	yes
rX3Y2.X1X4X6X12	>0	0.9696	0.000	yes
rX3Y2.X1X5X6X12	>0	0.9696	0.000	yes
rX3Y2.X1X4X7X12	>0	0.9351	0.000	yes
rX3Y2.X1X5X7X12	>0	0.9351	0.000	yes
rX3Y3	>0	0.1480	0.300	
rX3Y3.X1X4X6X10	>0	0.2873	0.098	
rX3Y3.X1X5X6X10	>0	0.2873	0.098	
rX3Y3.X1X5X7X10	>0	0.3165	0.086	
rX3Y3.X1X4X8X10	>0	0.2526	0.134	
rX3Y3.X1X5X8X10	>0	0.1834	0.150	
rX3Y3.X1X4X6X11	>0	0.3039	0.100	
rX3Y3.X1X4X7X11	>0	0.3028	0.092	
rX3Y3.X1X4X8X11	>0	0.2762	0.103	
rX3Y3.X1X5X8X11	>0	0.1950	0.142	
rX3Y3.X1X4X6X12	>0	0.1419	0.270	
rX3Y3.X1X5X6X12	>0	0.2969	0.095	
rX3Y3.X1X4X7X12	>0	0.2521	0.109	
rX3Y3.X1X5X7X12	>0	0.2621	0.109	
rX3Y3.X1X4X8X12	>0	0.5525	0.020	yes
rX3Y3.X1X5X8X12	>0	0.5298	0.034	yes
rX3Y3.X1X4X6X13	>0	0.2346	0.122	
rX3Y3.X1X5X6X13	>0	0.2262	0.126	
rX3Y3.X1X4X7X13	>0	0.2766	0.103	
rX3Y3.X1X5X7X13	>0	0.2766	0.103	
rX3Y3.X1X4X8X13	>0	0.3206	0.084	

H_1	r expected	r obtained	one-tailed significance $p_1 =$	H_0 rejected
rX3Y3.X1X5X8X13	>0	0.2710	0.205	
rX3Y4	>0	-0.5510	0.017	
rX3Y4.X1X4X6X10	>0	-0.9120	0.200	
rX3Y4.X1X5X6X10	>0	0.0466	0.223	
rX3Y4.X1X4X7X10	>0	0.1999	0.139	
rX3Y4.X1X5X7X10	>0	0.2134	0.132	
rX3Y4.X1X4X8X10	>0	-0.2432	0.118	
rX3Y4.X1X5X8X10	>0	0.2385	0.120	
rX3Y4.X1X4X9X10	>0	-0.1494	0.166	
rX3Y4.X1X5X9X10	>0	-0.1245	0.179	
rX3Y4.X1X4X6X11	>0	-0.0071	0.246	
rX3Y4.X1X5X6X11	>0	0.0682	0.211	
rX3Y4.X1X4X7X11	>0	0.4294	0.047	yes
rX3Y4.X1X5X7X11	>0	0.4854	0.033	yes
rX3Y4.X1X4X8X11	>0	-0.1445	0.168	
rX3Y4.X1X5X8X11	>0	-0.1309	0.178	
rX3Y4.X1X4X9X11	>0	-0.1003	0.193	
rX3Y4.X1X5X9X11	>0	-0.0661	0.213	
rX3Y4.X1X4X6X12	>0	-0.0071	0.248	
rX3Y4.X1X5X6X12	>0	0.0329	0.231	
rX3Y4.X1X4X7X12	>0	0.2452	0.117	
rX3Y4.X1X5X7X12	>0	0.2752	0.103	
rX3Y4.X1X4X8X12	>0	0.0558	0.218	
rX3Y4.X1X5X8X12	>0	0.0110	0.244	
rX3Y4.X1X4X9X12	>0	-0.0358	0.193	
rX3Y4.X1X5X9X12	>0	-0.0059	0.212	
rX3Y4.X1X4X6X13	>0	-0.1082	0.188	
rX3Y4.X1X5X6X13	>0	-0.0718	0.209	
rX3Y4.X1X4X7X13	>0	0.1935	0.142	
rX3Y4.X1X5X7X13	>0	0.2205	0.129	
rX3Y4.X1X4X8X13	>0	-0.1364	0.173	
rX3Y4.X1X5X8X13	>0	0.1327	0.175	
rX3Y4.X1X4X9X13	>0	-0.1447	0.168	
rX3Y4.X1X5X9X13	>0	-0.1082	0.188	
rX3Y4.X1X4X6X14	>0	0.1245	0.179	
rX3Y4.X1X5X6X14	>0	0.1680	0.156	
rX3Y4.X1X4X7X14	>0	0.2447	0.117	
rX3Y4.X1X5X7X14	>0	0.2656	0.108	
rX3Y4.X1X4X8X14	>0	0.1589	0.160	
rX3Y4.X1X5X8X14	>0	0.1554	0.162	
rX3Y4.X1X4X9X14	>0	0.1646	0.157	
rX3Y4.X1X5X9X14	>0	0.2032	0.137	
rX4X7	>0	0.0990	0.364	
rX4X7.X1X2X10	>0	0.0835	0.199	
rX4X7.X1X3X10	>0	0.0055	0.247	
rX4X7.X1X2X11	>0	0.7290	0.206	
rX4X7.X1X3X11	>0	-0.7740	0.203	

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX4X8.X1X2X10	>0	0.2731	0.096	
rX4X8.X1X3X10	>0	0.2838	0.093	
rX4X8.X1X2X11	>0	0.3909	0.052	
rX4X8.X1X3X11	>0	0.3506	0.066	
rX4X8.X1X2X12	>0	0.4005	0.050	yes
rX4X8.X1X3X12	>0	0.4066	0.048	yes
rX4X9.X1X2X10	>0	0.0161	0.240	
rX4X9.X1X3X10	>0	0.0814	0.200	
rX4X9.X1X2X11	>0	-0.0452	0.223	
rX4X9.X1X3X11	>0	-0.0870	0.197	
rX4X9.X1X2X12	>0	-0.0384	0.227	
rX4X9.X1X3X12	>0	-0.0613	0.213	
rX4X9.X1X2X13	>0	-0.3880	0.226	
rX4X9.X1X3X13	>0	-0.0647	0.211	
rX4X11	>0	-0.1380	0.313	
rX4X11.X1X2X6	>0	-0.1914	0.138	
rX4X11.X1X3X6	>0	-0.2225	0.122	
rX4X11.X1X2X6	>0	-0.1914	0.138	
rX4X11.X1X3X6	>0	-0.2255	0.112	
rX4X12.X1X2X6	>0	0.0218	0.219	
rX4X12.X1X3X6	>0	0.0233	0.236	
rX4X12.X1X2X6	>0	0.0218	0.237	
rX4X12.X1X3X6	>0	0.0230	0.238	
rX4X12.X1X2X7	>0	-0.0152	0.239	
rX4X12.X1X3X7	>0	0.0233	0.236	
rX4X13.X1X2X6	>0	-0.0308	0.231	
rX4X13.X1X3X6	>0	-0.0122	0.232	
rX4X13.X1X2X7	>0	0.0447	0.214	
rX4X13.X1X3X7	>0	-0.0400	0.224	
rX4X13.X1X2X8	>0	0.2154	0.126	
rX4X13.X1X3X8	>0	0.1927	0.142	
rX4X14.X1X2X6	>0	-0.1400	0.163	
rX4X14.X1X2X7	>0	0.0226	0.232	
rX4X14.X1X3X7	>0	0.1733	0.123	
rX4X14.X1X2X8	>0	0.0226	0.236	
rX4X14.X1X3X8	>0	0.0286	0.234	
rX4X14.X1X2X9	>0	-0.0874	0.197	
rX4X14.X1X3X9	>0	-0.1206	0.177	
rX4Y1	<0	0.0610	0.414	
rX4Y1.X1X2X6X10	<0	0.2918	0.081	
rX4Y1.X1X3X6X10	<0	0.4073	0.054	
rX4Y1.X1X2X6X11	<0	0.0222	0.128	
rX4Y1.X1X3X6X11	<0	0.0951	0.080	
rX4Y2	<0	-0.1140	0.343	

H ₁	r expected	r obtained	one-tailed significance p =	H ₀ rejected
rX4Y2.X1X2X6X10	<0	-0.2238	0.128	
rX4Y2.X1X3X6X10	<0	-0.0316	0.232	
rX4Y2.X1X2X7X10	<0	-0.1773	0.151	
rX4Y2.X1X3X7X10	<0	0.0266	0.235	
rX4Y2.X1X2X6X11	<0	-0.1940	0.142	
rX4Y2.X1X3X6X11	<0	-0.0464	0.223	
rX4Y2.X1X2X7X11	<0	-0.1830	0.151	
rX4Y2.X1X3X7X11	<0	0.0115	0.244	
rX4Y2.X1X2X6X12	<0	-0.1193	0.182	
rX4Y2.X1X3X6X12	<0	-0.1293	0.176	
rX4Y2.X1X2X7X12	<0	-0.0712	0.209	
rX4Y2.X1X3X7X12	<0	0.0478	0.444	
rX4Y3	<0	0.5270	0.022	
rX4Y3.X1X2X6X10	<0	0.4122	0.052	
rX4Y3.X1X3X6X10	<0	0.5300	0.073	
rX4Y3.X1X2X7X10	<0	0.4064	0.054	
rX4Y3.X1X3X7X10	<0	0.5623	0.018	
rX4Y3.X1X2X8X10	<0	0.4574	0.040	
rX4Y3.X1X3X8X10	<0	0.5504	0.020	
rX4Y3.X1X2X6X11	<0	0.5009	0.029	
rX4Y3.X1X2X6X11	<0	0.5483	0.020	
rX4Y3.X1X3X7X11	<0	0.5050	0.029	
rX4Y3.X1X3X7X11	<0	0.5566	0.017	
rX4Y3.X1X3X8X11	<0	0.4661	0.037	
rX4Y3.X1X3X8X11	<0	0.5092	0.028	
rX4Y3.X1X2X6X12	<0	0.5431	0.021	
rX4Y3.X1X3X6X12	<0	0.5946	0.014	
rX4Y3.X1X2X7X12	<0	0.5584	0.019	
rX4Y3.X1X3X7X12	<0	0.5946	0.019	
rX4Y3.X1X2X8X12	<0	0.4732	0.026	
rX4Y3.X1X3X8X12	<0	0.4867	0.033	
rX4Y3.X1X2X6X13	<0	0.5258	0.024	
rX4Y3.X1X3X6X13	<0	0.5744	0.016	
rX4Y3.X1X2X7X13	<0	0.5293	0.029	
rX4Y3.X1X3X7X13	<0	0.5689	0.017	
rX4Y3.X1X2X8X13	<0	0.5166	0.026	
rX4Y3.X1X3X8X13	<0	0.5350	0.028	
rX4Y4.X1X2X6X10	<0	-0.4856	0.033	yes
rX4Y4.X1X3X6X10	<0	-0.2727	0.105	
rX4Y4.X1X2X7X10	<0	-0.4803	0.029	yes
rX4Y4.X1X3X7X10	<0	-0.3680	0.077	
rX4Y4.X1X2X8X10	<0	-0.2871	0.089	
rX4Y4.X1X3X8X10	<0	-0.2630	0.109	
rX4Y4.X1X2X9X10	<0	-0.3227	0.084	
rX4Y4.X1X3X9X10	<0	-0.3290	0.081	
rX4Y4.X1X2X6X11	<0	-0.2635	0.081	
rX4Y4.X1X3X6X11	<0	-0.2111	0.134	
rX4Y4.X1X2X7X11	<0	-0.3026	0.091	

H ₁	r expected	r obtained	one-tailed significance p =	H ₀ rejected
rX4Y4.X1X3X7X11	<0	-0.2826	0.100	
rX4Y4.X1X2X8X11	<0	-0.1557	0.162	
rX4Y4.X1X3X8X11	<0	-0.2035	0.135	
rX4Y4.X1X2X9X11	<0	-0.2749	0.102	
rX4Y4.X1X3X9X11	<0	-0.3010	0.092	
rX4Y4.X1X2X6X12	<0	-0.3102	0.097	
rX4Y4.X1X3X6X12	<0	-0.2944	0.095	
rX4Y4.X1X2X7X12	<0	-0.3419	0.076	
rX4Y4.X1X3X7X12	<0	-0.3501	0.073	
rX4Y4.X1X2X8X12	<0	-0.3469	0.074	
rX4Y4.X1X3X8X12	<0	-0.3628	0.068	
rX4Y4.X1X2X9X12	<0	-0.3215	0.083	
rX4Y4.X1X3X9X12	<0	-0.3330	0.075	
rX4Y4.X1X2X6X13	<0	-0.2973	0.094	
rX4Y4.X1X3X6X13	<0	-0.2748	0.103	
rX4Y4.X1X2X7X13	<0	-0.3329	0.080	
rX4Y4.X1X3X7X13	<0	-0.3365	0.078	
rX4Y4.X1X2X8X13	<0	-0.2896	0.082	
rX4Y4.X1X3X8X13	<0	-0.3012	0.062	
rX4Y4.X1X2X9X13	<0	-0.3112	0.083	
rX4Y4.X1X3X9X13	<0	-0.3262	0.082	
rX4Y4.X1X2X6X14	<0	-0.2655	0.108	
rX4Y4.X1X3X6X14	<0	-0.2483	0.116	
rX4Y4.X1X2X7X14	<0	-0.2739	0.104	
rX4Y4.X1X3X7X14	<0	-0.2963	0.094	
rX4Y4.X1X2X8X14	<0	-0.2668	0.107	
rX4Y4.X1X3X8X14	<0	-0.2880	0.098	
rX4Y4.X1X2X9X14	<0	-0.3024	0.091	
rX4Y4.X1X3X9X14	<0	-0.3001	0.093	
rX5X8	>0	0.1880	0.251	
rX5X8.X1X2X10	>0	0.1742	0.147	
rX5X8.X1X3X10	>0	0.1488	0.161	
rX5X8.X1X2X11	>0	0.1930	0.137	
rX5X8.X1X3X11	>0	0.1849	0.142	
rX5X8.X1X2X12	>0	0.0462	0.217	
rX5X8.X1X3X12	>0	-0.0370	0.228	
rX5X9	>0	-0.008	0.488	
rX5X9.X1X2X10	>0	0.0700	0.207	
rX5X9.X1X3X10	>0	0.0810	0.201	
rX5X9.X1X2X11	>0	0.0157	0.241	
rX5X9.X1X3X11	>0	0.0065	0.246	
rX5X9.X1X2X12	>0	-0.0568	0.215	
rX5X9.X1X3X12	>0	-0.0623	0.211	
rX5X9.X1X2X13	>0	0.0468	0.222	
rX5X9.X1X3X13	>0	0.0294	0.232	
rX5X12	>0	-0.2260	0.209	
rX5X12.X1X2X6	>0	-0.1634	0.153	

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX5X12.X1X3X6	>0	-0.2552	0.106	
rX5X12.X1X2X7	>0	-0.2181	0.124	
rX5X12.X1X3X7	>0	-0.2140	0.126	
rX5X13	>0	-0.2470	0.189	
rX5X13.X1X2X6	>0	-0.2222	0.122	
rX5X13.X1X3X6	>0	-0.2324	0.117	
rX5X13.X1X2X7	>0	-0.3293	0.074	
rX1X13.X1X3X7	>0	-0.2509	0.108	
rX5X13.X1X2X8	>0	-0.3120	0.081	
rX5X13.X1X3X8	>0	-0.3013	0.086	
rX5X14	>0	-0.1670	0.276	
rX5X14.X1X2X6	>0	0.2081	0.129	
rX5X14.X1X3X6	>0	-0.0643	0.211	
rX5X14.X1X2X7	>0	-0.0832	0.200	
rX5X14.X1X3X7	>0	-0.0823	0.200	
rX5X14.X1X2X8	>0	-0.1516	0.160	
rX1X14.X1X3X8	>0	-0.2080	0.129	
rX5X14.X1X2X9	>0	-0.2061	0.130	
rX5X14.X1X3X9	>0	-0.2656	0.101	
rX5Y2	<0	-0.0370	0.449	
rX5Y2.X1X2X6X10	<0	-0.3132	0.087	
rX5Y2.X1X3X6X10	<0	-0.1347	0.173	
rX5Y2.X1X2X7X10	<0	-0.4027	0.055	
rX5Y2.X1X3X7X10	<0	-0.1879	0.145	
rX5Y2.X1X2X6X11	<0	-0.3419	0.076	
rX5Y2.X1X3X6X11	<0	-0.2186	0.130	
rX5Y2.X1X2X7X11	<0	-0.4166	0.051	
rX5Y2.X1X3X7X11	<0	-0.2286	0.110	
rX5Y2.X1X2X6X12	<0	-0.1753	0.152	
rX5Y2.X1X3X6X12	<0	-0.4333	0.046	yes
rX5Y2.X1X2X7X12	<0	-0.0553	0.218	
rX5Y2.X1X3X7X12	<0	-0.1521	0.164	
rX5Y3	<0	-0.1960	0.242	
rX5Y3.X1X2X6X10	<0	-0.2669	0.107	
rX5Y3.X1X3X6X10	<0	-0.4065	0.054	
rX5Y3.X1X2X7X10	<0	-0.3979	0.063	
rX5Y3.X1X3X7X10	<0	-0.2280	0.126	
rX5Y3.X1X2X8X10	<0	-0.4037	0.055	
rX5Y3.X1X3X8X10	<0	-0.2863	0.096	
rX5Y3.X1X2X6X11	<0	-0.2040	0.136	
rX5Y3.X1X3X6X11	<0	-0.2040	0.137	
rX5Y3.X1X2X7X11	<0	-0.2061	0.136	
rX5Y3.X1X3X7X11	<0	-0.1647	0.157	
rX5Y3.X1X2X8X11	<0	-0.2423	0.172	
rX5Y3.X1X3X8X11	<0	-0.2424	0.172	
rX5Y3.X1X2X6X12	<0	-0.1847	0.147	

H_1	r expected	r obtained	one-tailed significance $p_1 =$	H_0 rejected
rX5Y3.X1X3X6X12	<0	-0.0851	0.201	
rX5Y3.X1X2X7X12	<0	-0.1417	0.170	
rX5Y3.X1X3X7X12	<0	-0.0625	0.214	
rX5Y3.X1X2X8X12	<0	-0.1484	0.166	
rX5Y3.X1X3X8X12	<0	-0.0712	0.209	
rX5Y3.X1X2X6X13	<0	-0.1889	0.145	
rX5Y3.X1X3X6X13	<0	-0.1884	0.145	
rX5Y3.X1X2X7X13	<0	-0.2053	0.136	
rX5Y3.X1X3X7X13	<0	-0.1473	0.167	
rX5Y3.X1X2X8X13	<0	-0.2023	0.138	
rX5Y3.X1X3X8X13	<0	-0.1907	0.144	
rX5Y4	<0	-0.0950	0.368	
rX5Y4.X1X2X6X10	<0	-0.1427	0.169	
rX5Y4.X1X3X6X10	<0	-0.0457	0.224	
rX5Y4.X1X2X7X10	<0	-0.0467	0.223	
rX5Y4.X1X3X7X10	<0	0.0332	0.231	
rX5Y4.X1X2X8X10	<0	-0.0980	0.194	
rX5Y4.X1X3X8X10	<0	-0.1184	0.182	
rX5Y4.X1X2X9X10	<0	-0.1194	0.182	
rX5Y4.X1X3X9X10	<0	-0.1382	0.172	
rX5Y4.X1X2X6X11	<0	0.1476	0.167	
rX5Y4.X1X3X6X11	<0	0.0097	0.245	
rX5Y4.X1X2X7X11	<0	-0.0221	0.237	
rX5Y4.X1X3X7X11	<0	-0.2003	0.277	
rX5Y4.X1X2X8X11	<0	-0.0774	0.207	
rX5Y4.X1X3X8X11	<0	-0.0662	0.212	
rX5Y4.X1X2X9X11	<0	-0.1188	0.182	
rX5Y4.X1X3X9X11	<0	-0.1119	0.186	
rX5Y4.X1X2X6X12	<0	0.1357	0.173	
rX5Y4.X1X3X6X12	<0	0.0605	0.215	
rX5Y4.X1X2X7X12	<0	0.0458	0.224	
rX5Y4.X1X3X7X12	<0	0.1382	0.172	
rX5Y4.X1X2X8X12	<0	0.0083	0.245	
rX5Y4.X1X3X8X12	<0	0.0234	0.237	
rX5Y4.X1X2X9X12	<0	-0.0033	0.248	
rX5Y4.X1X3X9X12	<0	0.0047	0.248	
rX5Y4.X1X2X6X13	<0	0.1573	0.161	
rX5Y4.X1X3X6X13	<0	0.0378	0.228	
rX5Y4.X1X2X7X13	<0	0.0779	0.205	
rX5Y4.X1X3X7X13	<0	0.0137	0.172	
rX5Y4.X1X2X8X13	<0	0.0136	0.242	
rX5Y4.X1X3X8X13	<0	0.0162	0.241	
rX5Y4.X1X2X9X13	<0	0.0330	0.231	
rX5Y4.X1X3X9X13	<0	0.0689	0.210	
rX5Y4.X1X2X6X14	<0	0.0556	0.218	
rX5Y4.X1X3X6X14	<0	0.0865	0.200	
rX5Y4.X1X2X7X14	<0	0.0170	0.240	
rX5Y4.X1X3X7X14	<0	0.1151	0.184	
rX5Y4.X1X2X8X14	<0	0.0088	0.245	

H_1	r expected	r obtained	one-tailed significance $p_i =$	H_0 rejected
rX5Y4.X1X3X8X14	<0	0.0480	0.240	
rX5Y4.X1X2X9X14	<0	0.0168	0.240	
rX5Y4.X1X3X9X14	<0	0.0689	0.210	
rX6X12	>0			
rX6X12.X1X2X4	>0	0.2957	0.086	
rX6X12.X1X3X4	>0	0.2252	0.121	
rX6X12.X1X2X5	>0	0.1819	0.143	
rX6X12.X1X3X5	>0	0.1141	0.181	
rX6X13.X1X2X4	>0	0.3596	0.063	
rX6X13.X1X3X4	>0	0.3690	0.060	
rX6X13.X1X2X5	>0	0.2166	0.125	
rX6X13.X1X3X5	>0	0.2712	0.099	
rX6X14.X1X2X4	>0	0.6678	0.005	yes
rX6X14.X1X3X4	>0	0.5457	0.016	yes
rX6X14.X1X2X5	>0	0.6632	0.005	yes
rX6X14.X1X3X5	>0	0.4985	0.025	yes
rX6Y2	<0	-0.8610	0.000	yes
rX6Y2.X1X2X4X10	<0	-0.2224	0.128	
rX6Y2.X1X3X4X10	<0	-0.2221	0.127	
rX6Y2.X1X2X5X10	<0	-0.3617	0.069	
rX6Y2.X1X3X5X10	<0	-0.2555	0.112	
rX6Y2.X1X2X4X11	<0	-0.3810	0.062	
rX6Y2.X1X3X4X11	<0	-0.3647	0.068	
rX6Y2.X1X2X5X11	<0	-0.4803	0.033	yes
rX6Y2.X1X3X5X11	<0	-0.4033	0.055	
rX6Y2.X1X2X4X12	<0	-0.2656	0.108	
rX6Y2.X1X3X4X12	<0	-0.5344	0.023	yes
rX6Y2.X1X2X5X12	<0	-0.3624	0.069	
rX6Y2.X1X3X5X12	<0	-0.5416	0.022	yes
rX6Y3	<0	0.0260	0.464	
rX6Y3.X1X2X4X10	<0	0.4046	0.066	
rX6Y3.X1X3X4X10	<0	-0.1323	0.175	
rX6Y3.X1X2X5X10	<0	0.2929	0.096	
rX6Y3.X1X3X5X10	<0	-0.3931	0.058	
rX6Y3.X1X2X4X11	<0	0.0339	0.231	
rX6Y3.X1X3X4X11	<0	0.0824	0.203	
rX6Y3.X1X2X5X11	<0	-0.0760	0.206	
rX6Y3.X1X3X5X11	<0	-0.0866	0.200	
rX6Y3.X1X2X4X12	<0	-0.1405	0.170	
rX6Y3.X1X3X4X12	<0	0.0338	0.231	
rX6Y3.X1X2X5X12	<0	-0.1789	0.150	
rX6Y3.X1X3X5X12	<0	-0.0460	0.223	
rX6Y3.X1X2X4X13	<0	0.0693	0.210	
rX6Y3.X1X3X4X13	<0	0.1475	0.167	
rX6Y3.X1X2X5X13	<0	0.0069	0.246	
rX6Y3.X1X3X5X13	<0	0.0540	0.219	

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX6Y4	<0	0.7490	0.000	
rX6Y4.X1X2X4X10	<0	0.6255	0.010	
rX6Y4.X1X3X4X10	<0	0.2232	0.128	
rX6Y4.X1X2X5X10	<0	0.5409	0.022	
rX6Y4.X1X3X5X10	<0	0.2435	0.118	
rX6Y4.X1X2X4X11	<0	0.5106	0.027	
rX6Y4.X1X3X4X11	<0	0.3933	0.058	
rX6Y4.X1X2X5X11	<0	0.5052	0.028	
rX6Y4.X1X3X5X11	<0	0.4126	0.052	
rX6Y4.X1X2X4X12	<0	0.3034	0.091	
rX6Y4.X1X3X4X12	<0	0.2618	0.109	
rX6Y4.X1X2X5X12	<0	0.3166	0.086	
rX6Y4.X1X3X5X12	<0	0.2852	0.099	
rX6Y4.X1X2X4X13	<0	0.3810	0.062	
rX6Y4.X1X3X4X13	<0	0.2331	0.123	
rX6Y4.X1X2X5X13	<0	0.3868	0.060	
rX6Y4.X1X3X5X13	<0	0.2516	0.114	
rX6Y4.X1X2X4X14	<0	0.3034	0.091	
rX6Y4.X1X3X4X14	<0	0.1475	0.166	
rX6Y4.X1X2X5X14	<0	0.0069	0.246	
rX6Y4.X1X3X5X14	<0	0.0540	0.219	
rX7Y3	<0	0.0200	0.472	
rX7Y3.X1X2X4X10	<0	0.4046	0.055	
rX7Y3.X1X3X4X10	<0	0.1711	0.155	
rX7Y3.X1X2X5X10	<0	0.1397	0.171	
rX7Y3.X1X3X5X10	<0	0.0494	0.221	
rX7Y3.X1X2X4X11	<0	-0.0874	0.200	
rX7Y3.X1X3X4X11	<0	0.1661	0.156	
rX7Y3.X1X2X5X11	<0	-0.0839	0.201	
rX7Y3.X1X3X5X11	<0	0.0211	0.238	
rX7Y3.X1X2X4X12	<0	-0.2159	0.131	
rX7Y3.X1X3X4X12	<0	0.767	0.205	
rX7Y3.X1X2X5X12	<0	-0.1460	0.172	
rX7Y3.X1X3X5X12	<0	0.0592	0.216	
rX7Y3.X1X2X4X13	<0	0.0623	0.214	
rX7Y3.X1X3X4X13	<0	0.2305	0.124	
rX7Y3.X1X2X5X13	<0	0.0069	0.246	
rX7Y3.X1X3X5X13	<0	0.0540	0.219	
rX7Y4	<0	0.7740	0.000	
rX7Y4.X1X2X4X10	<0	0.5752	0.016	
rX7Y4.X1X3X4X10	<0	0.5010	0.029	
rX7Y4.X1X2X5X10	<0	0.4619	0.038	
rX7Y4.X1X3X5X10	<0	0.4531	0.041	
rX7Y4.X1X2X4X11	<0	0.4922	0.031	
rX7Y4.X1X3X4X11	<0	0.6169	0.011	
rX7Y4.X1X2X5X11	<0	0.4484	0.041	
rX7Y4.X1X3X5X11	<0	0.6276	0.010	
rX7Y4.X1X2X4X12	<0	0.3499	0.074	

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX7Y4.X1X3X4X12	<0	0.4288	0.047	
rX7Y4.X1X2X5X12	<0	0.3049	0.090	
rX7Y4.X1X3X5X12	<0	0.4185	0.050	
rX7Y4.X1X2X4X13	<0	0.4319	0.046	
rX7Y4.X1X3X4X13	<0	0.4470	0.042	
rX7Y4.X1X2X5X13	<0	0.3930	0.058	
rX7Y4.X1X3X5X13	<0	0.4335	0.045	
rX7Y4.X1X2X4X14	<0	-0.0705	0.209	
rX7Y4.X1X3X4X14	<0	0.2796	0.102	
rX7Y4.X1X2X5X14	<0	0.1295	0.176	
rX7Y4.X1X3X5X14	<0	0.2559	0.112	
rX8X14.X1X2X4	>0	-0.3302	0.074	
rX8X14.X1X3X4	>0	-0.4721	0.031	
rX8X14.X1X2X5	>0	-0.3123	0.081	
rX8X14.X1X3X5	>0	-0.4603	0.022	
rX8Y3	<0	0.1090	0.335	
rX8Y3.X1X2X4X10	<0	-0.1838	0.147	
rX8Y3.X1X3X4X10	<0	-0.0530	0.219	
rX8Y3.X1X2X5X10	<0	0.0305	0.232	
rX8Y3.X1X2X4X11	<0	0.1627	0.158	
rX8Y3.X1X3X4X11	<0	0.1234	0.242	
rX8Y3.X1X2X5X11	<0	0.0504	0.221	
rX8Y3.X1X2X4X12	<0	0.2550	0.113	
rX8Y3.X1X2X4X13	<0	0.2752	0.103	
rX8Y3.X1X2X4X14	<0	0.1352	0.173	
rX8Y3.X1X3X4X12	<0	0.4159	0.051	
rX8Y3.X1X2X5X12	<0	0.3290	0.081	
rX8Y3.X1X2X4X13	<0	0.5465	0.021	
rX8Y3.X1X2X4X14	<0	-0.0745	0.207	
rX8Y3.X1X3X4X13	<0	0.0177	0.240	
rX8Y3.X1X2X5X13	<0	0.1380	0.171	
rX8Y3.X1X2X4X15	<0	0.2113	0.133	
rX8Y4	<0	-0.0280	0.461	
rX8Y4.X1X2X4X10	<0	-0.1534	0.163	
rX8Y4.X1X3X4X10	<0	-0.2086	0.135	
rX8Y4.X1X2X5X10	<0	-0.2116	0.133	
rX8Y4.X1X3X5X10	<0	-0.2638	0.109	
rX8Y4.X1X2X4X11	<0	-0.1706	0.154	
rX8Y4.X1X3X4X11	<0	-0.1643	0.158	
rX8Y4.X1X2X5X11	<0	-0.2274	0.126	
rX8Y4.X1X3X5X11	<0	-0.2281	0.125	
rX8Y4.X1X2X4X12	<0	0.1965	0.141	
rX8Y4.X1X3X4X12	<0	0.2038	0.137	
rX8Y4.X1X2X5X12	<0	0.0530	0.220	
rX8Y4.X1X3X5X12	<0	0.0516	0.222	
rX8Y4.X1X2X4X13	<0	0.1207	0.181	
rX8Y4.X1X3X4X13	<0	0.0929	0.197	

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX8Y4.X1X2X5X13	<0	0.0026	0.197	
rX8Y4.X1X3X5X13	<0	0.0079	0.246	
rX8Y4.X1X2X4X14	<0	0.0184	0.249	
rX8Y4.X1X3X4X14	<0	0.0184	0.249	
rX8Y4.X1X2X5X14	<0	0.0894	0.199	
rX8Y4.X1X3X5X14	<0	0.0034	0.248	
rX9X14	<0	0.1477	0.150	
rX9X14.X1X2X4	<0	0.0740	0.250	
rX9X14.X1X3X4	<0	0.0535	0.216	
rX9X14.X1X2X5	<0	0.0161	0.240	
rX9X14.X1X3X5	<0	0.0621	0.212	
rX9Y4	>0	-0.1020	0.359	
rX10Y1	<0	0.8530	0.000	
rX10Y1.X1X2X4	<0	0.2044	0.131	
rX10Y1.X1X3X4	<0	0.8271	0.000	
rX10Y1.X1X2X5	<0	0.1312	0.161	
rX10Y1.X1X3X5	<0	0.8118	0.000	
rx10Y2	<0	0.4090	0.065	
rX10Y2.X1X2X4X6	<0	-0.2952	0.095	
rX10Y2.X1X3X4X6	<0	0.3016	0.092	
rX10Y2.X1X2X5X6	<0	-0.2372	0.121	
rX10Y2.X1X3X5X6	<0	0.2509	0.114	
rX10Y3	<0	-0.3550	0.097	yes
rX10Y3.X1X2X4X6	<0	-0.7240	0.003	yes
rX10Y3.X1X3X4X6	<0	-0.3564	0.221	
rX10Y3.X1X2X5X6	<0	-0.7759	0.001	yes
rX10Y3.X1X3X5X6	<0	-0.5477	0.021	yes
rX10Y3.X1X2X4X7	<0	-0.6665	0.007	yes
rX10Y3.X1X3X4X7	<0	-0.3347	0.079	
rX10Y3.X1X2X5X7	<0	-0.7568	0.002	yes
rX10Y3.X1X3X5X7	<0	-0.1528	0.164	
rX10Y4	<0	-0.4830	0.034	yes
rX10Y4.X1X2X4X6	<0	-0.5100	0.028	yes
rX10Y4.X1X3X4X6	<0	-0.0775	0.205	
rX10Y4.X1X2X5X6	<0	-0.3485	0.074	
rX10Y4.X1X3X5X6	<0	-0.0216	0.238	
rX10Y4.X1X2X4X7	<0	-0.4441	0.043	yes
rX10Y4.X1X3X4X7	<0	-0.2272	0.251	
rX10Y4.X1X2X5X7	<0	-0.2697	0.111	
rX10Y4.X1X3X5X7	<0	-0.1528	0.164	
rX10Y4.X1X2X4X8	<0	-0.2786	0.102	
rX10Y4.X1X3X4X8	<0	-0.3111	0.088	
rX10Y4.X1X2X5X8	<0	-0.2055	0.136	
rX10Y4.X1X3X5X8	<0	-0.2960	0.094	

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX11Y2	<0	0.6870	0.003	
rX11Y2.X1X2X4X6	<0	-0.2918	0.096	
rX11Y2.X1X3X4X6	<0	0.3732	0.065	
rX11Y2.X1X2X5X6	<0	-0.2817	0.101	
rX11Y2.X1X3X5X6	<0	0.3496	0.073	
rX11Y3	<0	-0.1580	0.287	
rX11Y3.X1X2X4X6	<0	-0.2065	0.136	
rX11Y3.X1X3X4X6	<0	-0.0699	0.210	
rX11Y3.X1X2X5X6	<0	-0.2891	0.097	
rX11Y3.X1X3X5X6	<0	-0.2168	0.081	
rX11Y3.X1X2X4X7	<0	-0.2532	0.113	
rX11Y3.X1X3X4X7	<0	-0.0485	0.222	
rX11Y3.X1X2X5X7	<0	-0.3128	0.087	
rX11Y3.X1X3X5X7	<0	-0.1907	0.144	
rX11Y4	<0	-0.5820	0.012	yes
rX11Y4.X1X2X4X6	<0	0.2245	0.127	
rX11Y4.X1X3X4X6	<0	0.2130	0.134	
rX11Y4.X1X2X5X6	<0	0.2245	0.127	
rX11Y4.X1X3X5X6	<0	0.2130	0.133	
rX11Y4.X1X2X4X7	<0	0.2309	0.124	
rX11Y4.X1X3X4X7	<0	0.4579	0.039	
rX11Y4.X1X2X5X7	<0	0.1829	0.147	
rX11Y4.X1X3X5X7	<0	0.3874	0.060	
rX11Y4.X1X2X4X8	<0	0.2105	0.134	
rX11Y4.X1X3X4X8	<0	0.1169	0.283	
rX11Y4.X1X2X5X8	<0	0.1588	0.160	
rX11Y4.X1X3X5X8	<0	0.0651	0.213	
rX12Y3	<0	0.2050	0.232	
rX12Y3.X1X2X4X6	<0	0.2575	0.111	
rX12Y3.X1X3X4X6	<0	0.3678	0.067	
rX12Y3.X1X1X5X6	<0	0.2152	0.132	
rX12Y3.X1X3X5X6	<0	0.2929	0.096	
rX12Y3.X1X2X4X7	<0	0.3613	0.069	
rX12Y3.X1X3X4X7	<0	0.3507	0.073	
rX12Y3.X1X1X5X7	<0	0.2673	0.107	
rX12Y3.X1X3X5X7	<0	0.2720	0.105	
rX12Y4	<0	0.7130	0.002	
rX12Y4.X1X2X4X6	<0	0.3734	0.065	
rX12Y4.X1X3X4X6	<0	0.3750	0.064	
rX12Y4.X1X1X5X6	<0	0.3762	0.064	
rX12Y4.X1X3X5X6	<0	0.3095	0.063	
rX12Y4.X1X2X4X7	<0	0.3035	0.091	
rX12Y4.X1X3X4X7	<0	0.2859	0.085	
rX12Y4.X1X1X5X7	<0	0.2940	0.095	
rX12Y4.X1X3X5X7	<0	0.2915	0.096	
rX12Y4.X1X2X4X8	<0	0.4672	0.037	

H_1	r expected	r obtained	one-tailed significance $p =$	H_0 rejected
rX12Y4.X1X3X4X8	<0	0.4424	0.044	
rX12Y4.X1X1X5X8	<0	0.3810	0.062	
rX12Y4.X1X3X5X8	<0	0.3423	0.076	
rX13Y3	<0	0.0220	0.469	
rX13Y3.X1X2X4X6	<0	-0.0814	0.203	
rX13Y3.X1X3X4X6	<0	-0.0904	0.198	
rX13Y3.X1X2X5X6	<0	-0.1066	0.189	
rX13Y3.X1X2X4X7	<0	0.0382	0.228	
rX13Y3.X1X3X4X7	<0	-0.0777	0.200	
rX13Y3.X1X2X5X7	<0	-0.0595	0.216	
rX13Y3.X1X3X5X7	<0	-0.1216	0.181	
rX13Y3.X1X2X4X8	<0	-0.0259	0.235	
rX13Y3.X1X3X4X8	<0	0.0176	0.240	
rX13Y3.X1X2X5X8	<0	0.0240	0.236	
rX13Y3.X1X3X5X8	<0	0.0581	0.217	
rX13Y4	<0	0.7070	0.002	
rX13Y4.X1X2X4X6	<0	0.2368	0.121	
rX13Y4.X1X3X4X6	<0	0.2597	0.110	
rX13Y4.X1X2X5X6	<0	0.2697	0.107	
rX13Y4.X1X3X5X6	<0	0.2728	0.105	
rX13Y4.X1X2X4X7	<0	0.2796	0.101	
rX13Y4.X1X3X4X7	<0	0.2247	0.127	
rX13Y4.X1X2X5X7	<0	0.2870	0.098	
rX13Y4.X1X3X5X7	<0	0.2518	0.114	
rX13Y4.X1X2X4X8	<0	0.3476	0.074	
rX13Y4.X1X3X4X8	<0	0.3501	0.073	
rX13Y4.X1X2X5X8	<0	0.2775	0.102	
rX13Y4.X1X3X5X8	<0	0.2828	0.100	
rX13Y4.X1X2X4X9	<0	0.4027	0.055	
rX13Y4.X1X3X4X9	<0	0.4154	0.051	
rX13Y4.X1X2X5X9	<0	0.3760	0.064	
rX13Y4.X1X3X5X9	<0	0.3898	0.059	
rX14Y4.X1X2X4X6	<0	0.4508	0.042	
rX14Y4.X1X3X4X6	<0	0.4480	0.042	
rX14Y4.X1X2X5X6	<0	0.4578	0.039	
rX14Y4.X1X3X5X6	<0	0.4655	0.038	
rX14Y4.X1X2X4X7	<0	0.3945	0.058	
rX14Y4.X1X3X4X7	<0	0.3653	0.068	
rX14Y4.X1X2X5X7	<0	0.4328	0.046	
rX14Y4.X1X3X5X7	<0	0.4056	0.054	
rX14Y4.X1X2X4X8	<0	0.5738	0.016	
rX14Y4.X1X3X4X8	<0	0.5618	0.018	
rX14Y4.X1X2X5X8	<0	0.5526	0.019	
rX14Y4.X1X3X5X8	<0	0.5384	0.022	
rX14Y4.X1X2X4X9	<0	0.6179	0.011	
rX14Y4.X1X3X4X9	<0	0.5198	0.011	
rX14Y4.X1X2X5X9	<0	0.6077	0.012	

H_1	r expected	r obtained	one-tailed significance $p. =$	H_0 rejected
$r_{X14Y4.X1X3X5X9}$	<0	0.6184	0.011	

Summary of Confirmed r^2

H_1	r obtained	two-tailed significance $p. =$	H_0 rejected
r_{X1X2}	-0.6083	0.000	yes
r_{X1X3}	-0.7059	0.000	yes
r_{X1X6}	0.8929	0.000	yes
$r_{X1X6.X2X10}$	0.8965	0.000	yes
r_{X1X7}	0.9060	0.000	yes
$r_{X1X7.X2X4X10}$	0.8534	0.000	yes
$r_{X1X7.X3X4X10}$	0.7508	0.000	yes
r_{X1X10}	-0.5097	0.026	yes
r_{X1X11}	-0.8730	0.000	yes
$r_{X1X11.X2X4X6}$	-0.5051	0.048	yes
r_{X1X12}	0.7200	0.002	yes
r_{X1X13}	0.7790	0.000	yes
$r_{X1X13.X2X4X8}$	0.7698	0.000	yes
$r_{X1X13.X3X4X8}$	0.7381	0.000	yes
$r_{X1X13.X2X5X8}$	0.7747	0.000	yes
$r_{X1X13.X3X5X8}$	0.7396	0.000	yes
r_{X1X14}	0.7460	0.000	yes
$r_{X1X14.X2X4X8}$	0.7090	0.006	yes
$r_{X1Y1.X3X4X6X10}$	0.5431	0.042	yes
r_{X1Y2}	-0.8440	0.000	yes
$r_{X1Y2.X3X4X6X10}$	-0.6025	0.026	yes
$r_{X1Y2.X2X5X6X10}$	-0.5905	0.027	yes
$r_{X1Y2.X3X4X6X12}$	-0.5959	0.028	yes
r_{X1Y4}	0.7070	0.004	yes
$r_{X1Y4.X2X5X8X10}$	0.6055	0.024	yes
$r_{X1Y4.X2X4X9X10}$	0.6637	0.014	yes
$r_{X1Y4.X2X5X9X10}$	0.6242	0.020	yes
$r_{X1Y4.X2X5X8X11}$	0.5265	0.048	yes
$r_{X1Y4.X2X4X9X11}$	0.5223	0.050	yes
$r_{X1Y4.X2X5X9X11}$	0.5216	0.050	yes
r_{X2X6}	-0.8420	0.000	yes

H_1	r obtained	two-tailed significance $p =$	H_0 rejected
rX2X6.X1X10	-0.7714	0.000	yes
rX2X10	0.8546	0.000	yes
rX2X10.X1	0.7975	0.000	yes
rX2X12.X1X4X6	0.5393	0.036	yes
rX2X14.X1X4X6	0.6736	0.008	yes
rX2X14.X1X5X6	0.6724	0.008	yes
rX2Y1	0.9880	0.000	yes
rX2Y1.X1X10	0.9496	0.000	yes
rX2Y2	0.5850	0.022	yes
rX2Y2.X1X4X6X10	0.8597	0.000	yes
rX2Y2.X1X5X6X10	0.8596	0.000	yes
rX2Y2.X1X4X7X10	0.9409	0.000	yes
rX2Y2.X1X5X7X10	0.9477	0.000	yes
rX2Y2.X1X4X7X11	0.9808	0.000	yes
rX2Y2.X1X5X7X11	0.9803	0.000	yes
rX2Y2.X1X4X7X12	0.9829	0.000	yes
rX2Y4	-0.5080	0.018	yes
rX2Y4.X1X4X6X10	0.6382	0.018	yes
rX2Y4.X1X4X7X10	0.5832	0.030	yes
rX2Y4.X1X5X6X10	0.6362	0.018	yes
rX2Y4.X1X4X8X10	0.5832	0.030	yes
rX2Y4.X1X5X8X10	0.5834	0.030	yes
rX2Y4.X1X4X7X11	0.6956	0.010	yes
rX2Y4.X1X4X8X11	0.5834	0.030	yes
rX3X7	-0.8310	0.000	yes
rX3X7.X1X4X10	-0.6493	0.002	yes
rX3X7.X1X5X10	-0.6989	0.006	yes
rX3X7.X1X4X11	-0.7378	0.004	yes
rX3X7.X1X5X11	-0.7773	0.000	yes
rX3X14	-0.6980	0.004	yes
rX3X14.X1X4X8	-0.4984	0.050	yes
rX3Y2	0.9612	0.000	yes
rX3Y2.X1X4X6X11	0.9644	0.000	yes
rX3Y2.X1X5X6X11	0.9657	0.000	yes
rX3Y2.X1X4X7X11	0.9251	0.000	yes
rX3Y2.X1X5X7X11	0.9141	0.000	yes
rX3Y2.X1X4X6X12	0.9696	0.000	yes
rX3Y2.X1X5X6X12	0.9696	0.000	yes
rX3Y2.X1X4X7X12	0.9351	0.000	yes
rX3Y2.X1X5X7X12	0.9351	0.000	yes

H_1	r obtained	two-tailed significance $\alpha =$	H_0 rejected
rX3Y3.X1X4X8X12	0.5525	0.040	yes
rX3Y4	-0.5510	0.034	yes
rX4Y3	0.5270	0.044	yes
rX4Y3.X1X3X7X10	0.5623	0.036	yes
rX4Y3.X1X3X8X10	0.5504	0.040	yes
rX4Y3.X1X2X6X11	0.5483	0.040	yes
rX4Y3.X1X3X7X11	0.5566	0.034	yes
rX4Y3.X1X2X6X12	0.5431	0.042	yes
rX4Y3.X1X3X6X12	0.5946	0.028	yes
rX4Y3.X1X2X7X12	0.5584	0.038	yes
rX4Y3.X1X3X7X12	0.5946	0.038	yes
rX4Y3.X1X2X6X13	0.5258	0.048	yes
rX4Y3.X1X3X6X13	0.5744	0.032	yes
rX4Y3.X1X3X7X13	0.5689	0.034	yes
rX6X14.X1X2X4	0.6678	0.010	yes
rX6X14.X1X3X4	0.5457	0.032	yes
rX6X14.X1X2X5	0.6632	0.010	yes
rX6X14.X1X3X5	0.4985	0.050	yes
rX6Y2	-0.8610	0.000	yes
rX6Y2.X1X3X4X12	-0.5344	0.046	yes
rX6Y2.X1X3X5X12	-0.5416	0.044	yes
rX6Y4	0.7490	0.000	yes
rX6Y4.X1X2X4X10	0.6255	0.020	yes
rX6Y4.X1X2X5X10	0.5409	0.044	yes
rX7Y4	0.7740	0.000	yes
rX7Y4.X1X2X4X10	0.5752	0.032	yes
rX7Y4.X1X3X4X11	0.6169	0.022	yes
rX7Y4.X1X3X5X11	0.6276	0.020	yes
rX8X14.X1X3X5	-0.4603	0.044	yes
rX8Y3.X1X2X4X12	0.5465	0.042	yes
rX10Y1	0.8530	0.000	yes
rX10Y1.X1X3X4	0.8271	0.000	yes
rX10Y1.X1X3X5	0.8118	0.000	yes
rX10Y3.X1X2X4X6	-0.7240	0.006	yes
rX10Y3.X1X2X5X6	-0.7759	0.002	yes
rX10Y3.X1X3X5X6	-0.5477	0.042	yes
rX10Y3.X1X2X4X7	-0.6665	0.014	yes
rX10Y3.X1X2X5X7	-0.7568	0.004	yes

H ₁	r obtained	two-tailed significance p. =	H ₀ rejected
rX11Y2	0.6870	0.006	yes
rX11Y4	-0.5820	0.024	yes
rX12Y4	0.7130	0.004	yes
rX13Y4	0.7070	0.004	yes
rX14Y4.X1X2X4X8	0.5738	0.032	yes
rX14Y4.X1X3X4X8	0.5618	0.036	yes
rX14Y4.X1X2X5X8	0.5526	0.038	yes
rX14Y4.X1X3X5X8	0.5384	0.044	yes
rX14Y4.X1X2X4X9	0.6179	0.022	yes
rX14Y4.X1X3X4X9	0.5198	0.022	yes
rX14Y4.X1X2X5X9	0.6077	0.024	yes
rX14Y4.X1X3X5X9	0.6184	0.022	yes

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