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Market and Coordination Failures in Poor Rural Economies: Policy Implications for Agricultural and Rural Development¹

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Abstract: This paper argues that the disappointing outcomes of adjustment policies in poor rural economies, principally in sub-Saharan Africa, can be partly attributed to weaknesses in the neo-classical theory which underlies these policies and from associated failures to recognise structural changes (or transitions) in growing agricultural economies. After a brief description of agricultural policy changes in sub-Saharan Africa, the mixed achievements of market liberalisation policies are explained using new institutional economic arguments regarding inherent difficulties in economic coordination in poor economies, difficulties which markets themselves cannot overcome. A novel framework is put forward for understanding coordination failure and integrating it with other causes of under-development – notably low levels of technical and institutional development and poor governance. The paper concludes by considering the implications of these arguments for development policies in different sub-Saharan economies.

Keywords: *development, coordination, markets, institutions*

JEL Classification: *O12, O17, Q12*

1. Introduction

In this paper we argue that the disappointing outcomes of adjustment policies in poor rural economies, principally in sub-Saharan Africa, can be partly attributed to weaknesses in the neo-classical theory which underlie these policies and from associated failures to recognise structural changes (or transitions) in growing agricultural economies. After a brief description of agricultural policy changes in sub-Saharan Africa we explain the mixed achievements of market liberalisation policies, using new institutional economic arguments regarding inherent difficulties in economic coordination in poor economies, difficulties which markets *per se* cannot overcome¹. We conclude by considering the implications of these arguments for adjustment policies in different economies.

The core of our argument is that where markets are not functioning (due to economic coordination and other problems inherent in very poor rural economies) then market-based development processes cannot be relied on to drive development. Under such circumstances policies should initially promote the development of non-market based mechanisms for economic coordination, but do this in a way that eases the subsequent difficult task of both stimulating and managing a process of transition from reliance on non-market to market-based mechanisms. This task must be accomplished at the same time as other transitions are stimulated and managed: from food deficit to food surplus, from emphasis on production of staple food crops to production of other (higher value and diversified) agricultural products, and from an economy dominated by the agricultural sector and by farm incomes to a more diversified economy with a small, declining agricultural income share.

2. The Agricultural Adjustment Story

Dominant (agricultural) development policy in SSA (sub-Saharan Africa) over the last forty years or so can be (simplistically) divided into two broad phases: state- and then market-led developmentⁱⁱ (with most countries experiencing an extended period of adjustment between). These two policy phases reflect changes in dominant economic policy paradigms, the first phase emphasising problems of market failure in poor economies (and promoting state interventions to address these market failures), the second phase emphasising state failures when intervening in markets, and promoting reliance on the private sector and markets with state withdrawal from market interventions. Continuing difficulties with agricultural growth in liberalising economies in Africa have led more recently to increasing recognition of another sphere of state failure, in supporting the conditions necessary for markets to work. We argue below, however, that difficulties in getting markets to work in poor rural areas are not just the result of state failures in

¹ This paper draws heavily on Kydd and Dorward, 2003 and builds on ongoing work involving Jamie Morrison.

enforcing property rights and in delivering infrastructure: poor rural areas face inherent market failures in economic coordination.

In the immediate post- independence period SSA governments needed to act, and to be seen to act, to promote agricultural and rural development. The private sector was weak (in organisational capacity and in access to capital and human resources) and large scale private investments in rural areas were generally risky and unattractive, partly because simultaneous investments were needed in communications infrastructure; input and output trading; research and extension; and in farmers' input purchases and production. State intervention, however, could coordinate smallholder farm activities with state controlled trading, infrastructural, research and extension investments and through such coordination both reduce systemic investment risks and takes them over from the private sector. It could also access public sector finance sources and invest in organisational and human resource development. State activism also matched a common mistrust of private companies (with their colonial associations), socialist suspicions of the private sector and of markets, confidence in the ability of the state, and dominant economic development theories stressing the importance of industrial sector development (and the taxation of agriculture to finance this). State activism was also a convenient tool for extending personal, party and state power and patronage into rural communities.

As a result the state took a dominant role in actively intervening in, and taking over, strategic economic activities and many SSA countries set up or continued with and extended the activities of monopolistic marketing parastatalsⁱⁱⁱ. By the early 1970s parastatals were a dominant part of the agricultural sector in most SSA countries, engaged in input supplies, seasonal credit disbursement (and sometimes recovery), and crop purchases. In some countries a single parastatal might have responsibility for a range of food and export crops, together with input sales. In other countries different parastatals had specific responsibilities for particular crop sub-sectors or for particular marketing activities. They were often supported by donor funds and monopolistic / monopsonistic regulations, and promoted pan-territorial pricing, and were sometimes linked in with integrated rural development programmes.

The weaknesses of parastatals, however, became more and more evident, and during the early 1980s donor support waned and turned to hostility, with growing recognition of major problems with the whole state led development approach^{iv}. Fundamental problems with parastatals included the absence of clear (profit driven) disciplines promoting efficiency, susceptibility to political interference for short term political and private gain, corruption, and lack of technical and marketing innovation. There is an extensive literature which argues that monopoly parastatals were an instrument for turning the terms of trade for agricultural output against farmers resulting, for example, in implicit taxation of export crops and/or, in the case of food crops, subsidisation of urban consumers and rural net consumers. Wider economic or system problems resulted from parastatals' growing fiscal demands and from price distortions stifling farmers' and others' incentives to make wider economically (rather than financially) optimal investments.

Policy analysts' and donors' response to this was based largely on neo-classical theory, narrowly defined here as theory that "postulate(s) maximising behaviour plus interactions through a complete set of perfectly competitive markets" (Hoff, 2000, p2). State functions were limited to provision of non-excludable and non-subtractable 'public goods' - in agriculture commonly considered to include research into pro-poor technologies; dissemination of information about these technologies and about markets; market regulation; and provision of physical infrastructure (such as roads & telecommunications). Physical infrastructure is also, of course important for wider economic development, as is the provision of a generally stable and favourable macro-economic environment. Actions were therefore taken to privatise or dismantle agricultural marketing parastatals (generally de-linking credit, input and output markets), deregulate these markets, and eliminate credit, input and output subsidies. With time increasing emphasis was given to "social action funds" to assist poor short-term losers from the stabilization and liberalization processes and, more recently, to development of institutions supporting markets^v (see for example recent World Development Reports).

3. Empirical Challenges to Agricultural Adjustment and Liberalization Orthodoxy

Agricultural adjustment and market liberalisation have not, however, been generally successful in 'getting agriculture moving' in liberalising countries. Agricultural sector performance over different regions in different parts of the world from 1960 are summarised in Table 1. For low income countries (excluding China and India) agricultural growth has been fairly constant from the 1960s to late 1990s, marginally positive in per capita terms. However, although (predominantly low income) countries in sub Saharan Africa achieved slightly higher rates of growth in the second half of this period, growth was still negative in per capita terms and was achieved largely by extensification in cereal production (with falling rates of fertiliser use). Although the data on which these estimates are based can be criticised (for example Wiggins, 1995; Block, 1995), the general picture of low or negative per capita growth in agriculture in much of Sub Saharan Africa over the last 30 years is widely accepted and supported by the increasing incidence and severity of rural poverty in Sub Saharan Africa as compared with other regions.

Table 1 Agriculture Sector Performance by Country Income Level and Region

	AGRICULTURAL GROWTH			POPULATION GROWTH	TOTAL CROP LAND	IRRIGATED LAND	FERTILISER USE		CEREAL PRODUCTION			OTHER CROPS
	(average annual % value added)			(average annual %)	Area per capita	ha	total kg	kg/ha	Area (ha)	Yield (kg/ha)	Yield share in prod'n increase	Area (ha)
	1965-98	1980-90	1990-98	1965-98	% change 1979/81 to 1995/97 or 1996/98							
World	2.3	2.7	1.7	1.7	0%	14%	18%	12%	20%	26%	56%	-5%
Low Income Countries	3.3	4.1	3.7	2.1	-17%	29%	130%	114%	14%	15%	52%	8%
Low Inc. exc. China & India	2.8	3.0	2.7	2.5	-22%	40%	133%	109%	50%	17%	25%	-11%
Middle Income Countries	2.3	2.7	0.8	1.7	46%	6%	-14%	-30%	69%	32%	32%	-3%
High Income Countries	0.8	0.7	-11%	12%	-6%	-3%	-10%	28%	100%	2%
Low & Middle Income Countries												
East Asia & Pacific	3.6	4.4	3.5	1.8	0%	25%	141%	100%	3%	29%	91%	109%
Latin America and Caribbean	2.6	2.1	2.2	2.1	-16%	35%	46%	26%	-1%	33%	100%	25%
Middle East and North Africa	4.2	5.5	2.5	2.8	-28%	69%	85%	57%	13%	53%	80%	32%
South Asia	2.9	3.2	3.7	2.2	-30%	40%	157%	157%	-1%	39%	100%	5%
Sub Saharan Africa	1.9	2.5	2.4	2.7	-22%	26%	-2%	-18%	71%	28%	28%	-5%

Source: World Bank (2000); FAO stat

While few would argue that the pre-liberalisation situation could or should have been sustained (in many cases parastatals became hugely expensive while increasingly failing to deliver any service benefits), liberalisation has not delivered the substantial agricultural growth which is needed to drive rural poverty reduction and increased food security. Despite some benefits (such as reduced food prices for processed staples for poor consumers in southern Africa - see Jayne and Jones, 1997 - and positive impacts in the supply chains for some cash crops in some countries - see Poulton *et al.* (2004) for a discussion of cotton, for example) there has been a notable lack of success in developing input, output and financial markets offering attractively priced, timely and reliable services that are critical for more intensive crop, and particularly cereal, intensification.

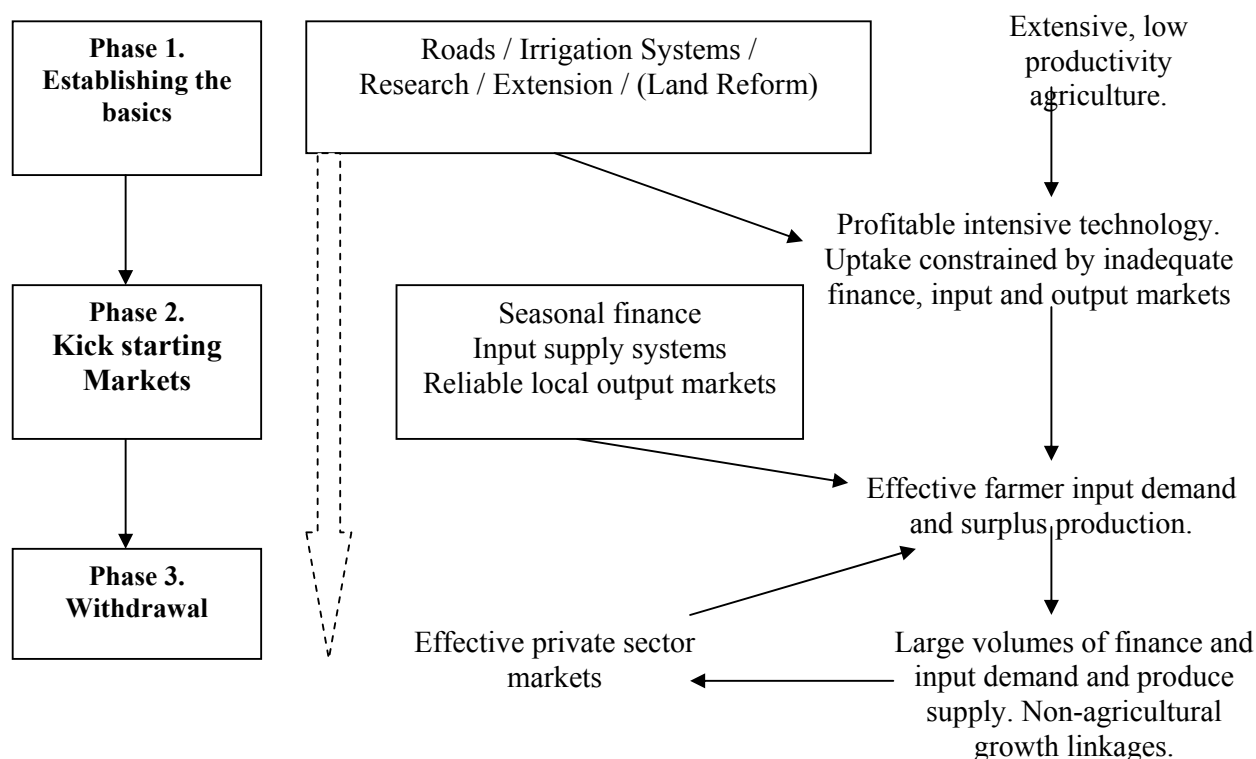
Three principal explanations are given for this lack of success. The *partial liberalisation* view argues that lack of thorough liberalisation is the principal problem, with piecemeal liberalisation and frequent policy reversals (or fears of policy reversals) depressing returns and increasing risks to private sector investment (see for example Kherallah *et al.*, 2000, and Jayne *et al.*, 2002). Alternatively (or additionally) the *weak institutions* view explains slow market development in terms of weak institutional support to market and private sector development (for example [World Bank, 2002, 2003] with cultural, political and legal factors undermining clear property rights and hence private investment incentives. Here the liberalisation agenda that tried to escape the problem of state failure in market interventions has run up against different problems of serious state failure, now in delivering public goods, the institutions and infrastructure needed for privatised competitive markets to operate in the challenging conditions where poverty is most intractable.

Both these views are essentially supportive of the liberalisation agenda and are consistent with its basic neo-classical tenets, although (particularly in the latter case) recognising the importance of state support for institutional public goods necessary for markets to work⁶. The third explanation for liberalisation's lack of success is more critical of its basic agenda. It is this *coordination failure* explanation that we consider in this paper. We argue that where dramatic poverty reducing growth in poor rural economies has been achieved outside SSA it has not generally been in the context of liberalised markets, or liberalised market development. We then consider explanations for this (focussed around institutions, coordination failures and low level equilibrium traps) and the policy implications of these explanations.

Despite the dominance of adjustment ideology in recent years, there is little empirical evidence of the benefits of liberalised market development in stimulating poverty reducing growth in poor rural economies. Indeed, Dorward *et al.* (2004) observe that the green revolutions which led to widespread and rapid pro-poor growth in poor rural areas in the 20th century depended on large scale and pervasive state interventions in establishing and operating institutional arrangements for input finance and supply and for farm gate price stabilisation and support, and in input and farm finance subsidies (in addition to investments in infrastructure, research and extension). Dorward *et al.* observe the establishment of successful green revolutions in three phases (see figure 1). Conditions for more intensive cereal technologies are established through basic investments in the first phase. A small number of farmers with access to seasonal finance and markets may then take up these technologies, but different government interventions are subsequently required (in the second phase) to enable wider farmer access to seasonal finance and seasonal input and output markets at low cost and low risk. This provides a 'kick start' for a broad based agricultural transformation. Transaction costs per unit then fall as traded volumes (of credit and savings, inputs and produce) rise, with growing volumes of non-farm activity arising from growth linkages. The state can then withdraw, progressively liberalising agricultural markets.

This process faces many difficulties in managing interventions and transitions effectively and efficiently, as demonstrated by the parastatal experience in sub Saharan Africa. Political pressures also tend to maintain market interventions and subsidies when they are no longer necessary (and are indeed harmful).

Figure 1 Policy phases to support agricultural transformation in favoured areas ²



Lack of attention to these issues by economists and policy analysts, together with data and methodological difficulties, has limited empirical study of the hypothesis set out in figure 1, but the hypothesis is compatible with Adelman and Morris' empirically based framework of factors determining economic development (Adelman and Morris, 1997; Gaur, 1997). Fann *et al.* (2003) test the hypothesis in India over the period 1960 to 2000. Early investments (in the 1960s and 70s) in credit subsidies, in roads, in fertiliser subsidies, in agricultural research on HYVs, and in power subsidies have high agricultural growth and poverty reduction payoffs (in order of descending poverty reduction returns). Returns to these investments decline markedly over the two following decades, with the exception of roads, which give consistently high (indeed the highest returns) in the later decades, when returns to educational investments (which are low in the earlier periods) rise (see table 2).

² From Dorward, Kydd *et al.* 2004

Table 2 Agricultural Growth and Poverty Reduction Impacts of Indian Government Investments

	Returns in Agricultural GDP (Rps per Rps Spending)				Number of poor reduced per Million Rps spending				Cost per poor person lifted above the poverty line (current UK£)			
	1960s	1970s	1980s	1990s	1960s	1970s	1980s	1990s	1960s	1970s	1980s	1990s
Roads	3.07	3.48	2.92	4.29	229.4	722.4	517.0	473.9	58	18	26	28
Education	1.20	1.49	0.95	1.26	14.8	129.6	167.5	154.4	928	103	80	86
Irrigation Investment	0.51	1.06	1.02	0.07	41.6	125.0	115.9	6.3	320	107	115	2,106
Irrigation Subsidies	0.69	1.20	-1.18	0.24	56.7	142.5	n.a.	24.3	235	94	n.a.	548
Fertiliser Subsidies	n.a.	2.99	0.43	-0.45	n.a.	354.4	48.7	n.s	n.a.	38	274	n.s
Power Subsidies	2.26	1.29	0.30	0.07	184.1	152.8	33.7	7.2	72	87	395	1,847
Credit Subsidies	8.61	3.12	0.70	-0.33	702.4	369.4	79.5	n.s	19	36	168	n.s
HYV Agric. R&D	3.11	1.89	0.39	n.s.	253.9	223.5	44.3	n.s	53	60	301	n.s

Source: Fann, Thorat *et al.* (2003)

4. Theoretical Challenges to Agricultural Liberalisation Orthodoxy

Empirical evidence presented here therefore challenges the liberalisation/ adjustment orthodoxy: rapid and widespread pro-poor growth in poor rural areas tends to have been associated with state intervention^{vii}. Why is this the case? We consider first systemic economic problems facing poor rural areas. This highlights the importance of coordination problems in these areas, and of institutional insights into these problems.

Poor rural areas commonly face a set of generic problems including poor roads and telecommunications; poor human health; an undeveloped monetary economy with a narrow base; thin markets (for agricultural inputs, outputs and finance); poor information (particularly in agriculture, on prices, on new technologies, and on potential contracting partners), difficulties in enforcing impersonal contracts, high risks (discussed in more detail below); and high transactions costs. We focus here on transaction costs incurred when actors protect themselves against the risk of transaction failure (in searching for and screening potential contracting partners and their goods or services, in negotiating and contracting, and in monitoring and enforcing contracts)^{viii}.

Recognition of the riskiness in agriculture in poor rural areas (for example Chambers, 1983), has tended to focus on vulnerability to natural (weather, pests, sickness) and market (price) shocks. Transaction failure, however, poses a further major 'systemic investment risk' in poor rural areas (Dorward and Kydd, forthcoming) and these three risk categories together lower productivity by (a) directly lowering average returns to investment, (b) discouraging investments, and (c) distorting investments towards those that reduce risks under adverse conditions and away from those that maximise expected returns.

Transaction risks, however, are particularly damaging, as they directly undermine exchange and specialisation. Dorward and Kydd (forthcoming) identify two major transaction risks as (a) coordination risks and (b) risks of opportunism (the latter being the better-known in the literature). We define coordination as "a process in which players within a supply chain are encouraged to take common or complementary actions necessary to achieve individual goals" (adapted from Poulton *et al.*, 2004). Economic coordination failure can then be defined in terms of its direct effects on individual investors, as "the failure to make an investment due to a possible absence of complementary investments by other players at different stages in the supply chain" (modified from Dorward and Kydd, forthcoming). Coordination risks are then the risk of investment failure due to a lack of complementary investments by other players in a supply chain. Risks of opportunism, on the other hand, arise where another player with complementary investments (a) has an effective monopoly over a critical service and can capture an undue share of the revenue in the supply chain, or (b) can deliver sub-standard goods or services whose quality cannot be easily assessed when entering a contract. Examples of opportunism include loan default by farmers; low produce prices offered by traders at harvest time (when farmers are desperate for cash) or in remote areas (where farmers have no other sales outlets); sale of poor quality or adulterated inputs; and use of inaccurate/ loaded weights and measures. Coordination failure can arise even in a basically profitable supply chain as a result of coordination risks and risks of opportunism, and will then be an equilibrium "worse than some alternative state of affairs that is also an equilibrium" Hoff (2000)

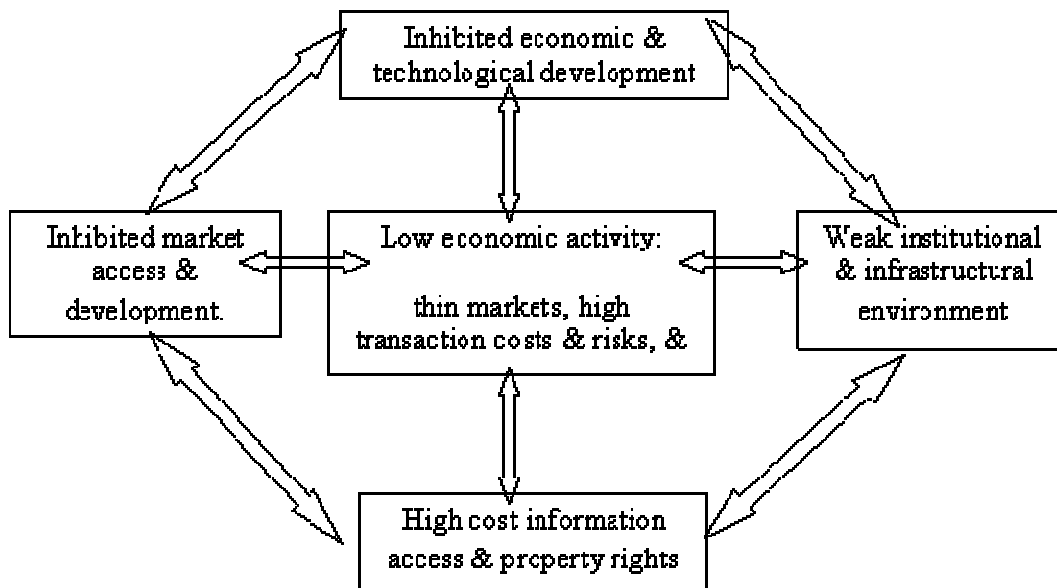
. Coordination failure can constrain agricultural intensification by depressing investments by mutually dependent investors: input suppliers (who need to invest in input supply systems and stock); financiers (who need to invest in farmers and traders); farmers (who need to invest in input purchases and labour); and traders (who need to invest in crop marketing systems, transport and purchases). This low level equilibrium, with a set of mutually self-sustaining generic problems in a vicious cycle of underdevelopment, is illustrated in figure 2. Weak institutions (for coordination or contract enforcement), coordination failures, depressed investments, and thin markets are at the heart of this.

The low level equilibrium concept is not, of course, new. Rosenstein-Rodan (1943) argued that markets at the early stages of development may not coordinate activities needed for development, due to spillovers or externalities between different sectors (for example in infrastructural development, skills and knowledge development, or falling costs of intermediate products), such that investment in each single sector may not be profitable when investment in all of them is. Hoff (2000) describes more modern and robust models of the persistence of low level equilibria despite positive individual changes such as "good mutations" of

existing institutions, technological “silver bullets” or improved resource prices. Persistence occurs where spillovers are widespread and diffuse, preventing a “Coasian” solution through negotiation and institutional innovation by private agents. These models, together with different strands of new institutional economics (NIE) theory, provide valuable insights into both the existence of low level equilibrium traps and the potential for and difficulties in escaping to more favourable equilibria or growth paths.

In one strand of NIE, North has examined the political economy processes of institutional change (Davis and North, 1971; North and Weingast, 1989; North, 1990; North, 1995) as an evolutionary process of self interested powerful groups modifying institutions in response to changes perceptions of prices, technologies and transaction costs. He observes that similar changes may stimulate very different types of institutional change in different situations as initial conditions determine the perceptions and relative power of different groups. Hoff (2000) uses the term ‘ecological economics’ to describe the way that agents’ opportunities and behaviour (and hence wider economic development) is determined as much by the nature and structure of interaction between agents as by the fundamental properties of the system (its natural endowments).

Figure 2: Coordination Failure and the Low Level Equilibrium Trap³



Williamson (Williamson, 1985, 1991, 1994) uses a more micro-economic analysis of the way that agents structure institutional arrangements in the context of their institutional environment. This influences choices between firms, markets and relational contracts (or hierarchical, market and hybrid contractual forms) for exchange and coordination. Key insights are the influences on contractual form and transaction failure of asset specificity^x, risk exposure, frequency of contracts, the nature of goods and services exchanged, the institutional environment, and human propensity for opportunism (see also Jaffee and Morton, 1995; Dorward, 2001). Widespread relevance of this analysis to poor rural areas becomes apparent when it is recognised that asset specificity is partly the result of thin markets (Dorward and Kydd, forthcoming). This underlies the core problems of coordination risk and risk of opportunism, as where the returns to an investment are dependent upon complementary action in a very thin market, any investment is subject to the risk of coordination failure or of opportunism.

Williamson’s conclusion for developed economies (that “non-standard contractual forms” often provide the best solutions) thus poses a major challenge to market liberalisation dogma in poor rural economies where

³ From Dorward, Kydd *et al.* forthcoming

thin markets are pervasive: it calls for more nuanced perspectives on, for example, interlocked markets, sharecropping, and local (private and state) monopolies as these may be the most efficient contractual forms, and in many circumstances the only contractual forms which lower transactions costs and risks sufficiently to make transactions worthwhile and prevent supply chain failure. Policy attention then has to be focused on ways of permitting, even promoting, non-standard and sometimes monopolistic contractual forms while also promoting efficient and equitable pro-development institutional change. These policy implications are nuanced because they are critical of more simplistic perceptions of the universal benefits of markets and competition but are nevertheless fundamentally in favour of the private sector and of competitive processes.

Another perspective on coordination is found in the examination by Hall and Soskice (2001) of ‘varieties of capitalism’ in OECD economies. They propose two “types” of national economy, at poles of a spectrum: Liberal Market Economies or LMEs (where activities are coordinated via intra-firm hierarchies, competitive market arrangements and vertical hybrid arrangements between firms in a supply chain) and Coordinated Market Economies or CMEs (with greater use of “non market relations to coordinate endeavours and to construct core competencies” with more extensive relational investment, more incomplete contracts, and more exchange of private information within networks). CMEs draw on a further set of organisations and institutions, supporting more horizontal or networked strategic interaction, both across and within supply chains.

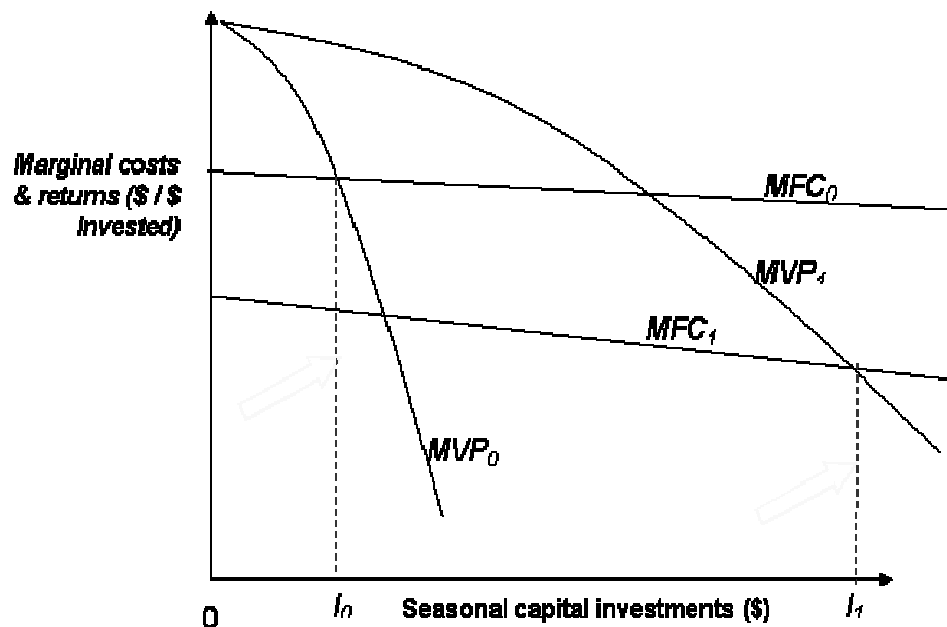
Hall and Soskice find that the LME/CME distinction within the OECD is a distinction between the English speaking countries and the rest, and that LMEs tend to be specialised in activities characterised by radical innovation whereas CMEs tend to be specialised in activities requiring continuous technical innovation. There are clear theoretical arguments for this specialisation which are related to the need for coordinated strategic commitment for investment in specific assets. In CMEs this is achieved through various deliberative mechanisms that bring together the different actors and promote institutions for promoting and enforcing coordinated action and shared understandings of goals and distributive outcomes of such action. Governments may facilitate these deliberative and coordination processes, facilitate strategies which emerge from these processes, and actively promote particular coordination strategies. However although state facilitation is a pre-requisite for CMEs, strong state action can also be problematic because of imperfect information, goal displacement, and firms’ wariness of governments unilaterally changing the rules of the game.

Again this analysis is highly relevant to poor country smallholder agriculture facing serious background weaknesses in the institutional environment, a need for continuous technical innovation, and serious coordination failures, suggesting the need for a CME rather than LME type approach. It is also pertinent to note that historically LMEs have tended to be pioneers in specific sectors, but ‘followers’ have used state coordination to catch-up (and often overtake) these pioneers. State coordination is not, however, a panacea, and the analysis poses serious questions about appropriate roles for the state in promoting coordination. Finally, we consider more formal models of low level equilibrium traps and coordination failure. Building on Hoff’s (2002) summary of work on ‘underdevelopment traps’ and our earlier discussion of coordination and opportunism costs and risks (from Dorward and Kydd, forthcoming), we develop a model of coordination failure to (a) formally demonstrate simple mechanisms by which coordination failure leads to under development traps, (b) highlight key variables affecting the movement of a poor rural economy to low or high level equilibria, and (c) integrate this with wider governance debates.

We consider a situation where all actors face a two stage investment problem, in which they must make stage 1 investments in assets specific to a particular supply chain activity in order to reap net revenues in stage 2. Their revenues in stage 2, however, are determined not only by the scale of their own stage 1 investments, but also by the scale of others’ stage 1 investments (investments which are not known to them when they make stage 1 investments). This results from potential coordination failure (limited stage 1 investment by others may lead to insufficient supply or demand of complementary products or services to utilise the capacity generated by the actor’s stage 1 investments) and from potential opportunism by other agents in a thin market.

In figures 3 and 4 we describe some aspects of the coordination problem of poor rural areas. Figure 3 shows the

Figure 3: High and Low Level Firm Investment Equilibria



relationship between individual actors' marginal factor costs and marginal revenue products (on the vertical axis) from seasonal investments, under conditions of different behaviour by other actors in the supply chain, taking smallholder maize production in a poor rural area as an example. This diagram shows high marginal factor costs (MFC_0) for investment in seasonal inputs, with a rapidly falling marginal revenue product (MRP_0) if a smallholder invests in increased production without complementary investments by input sellers, financiers, and produce buyers. The result is profit maximisation around subsistence production (with investment I_0), with only small surplus sales in good and normal years, the small surplus representing a safety margin against lower production or increased subsistence needs in adverse years. In the presence of complementary investments by other actors, however, marginal factor costs fall to MFC_1 , and the marginal revenue product is maintained at higher production (MRP_1). The combination of lower MFC and higher MRP lead to profit maximisation at much higher levels of investment (I_1) and net income, with a significant marketable surplus beyond the households' own subsistence needs.

If a similar situation is faced by the other actors making complementary investments in the supply chain (to continue our smallholder maize example these would be crop input suppliers, seasonal farm financiers, and produce buyers), then we can demonstrate the existence of two system equilibria, as in figure 4. This shows marginal factor costs and marginal revenue product across the industry as a whole, but distinguishes between different elements of MFC: transformation costs and risks, coordination costs and risks, opportunism costs and risks, and rent costs and risks. Rent costs and risks refer to extraction by powerful players, for example politicians, civil servants or formal or informal groups or individuals, representing weak poor and predatory governance. We hypothesise, critically for our argument, marginal costs and risks of coordination failure and opportunism declining with significant increases in total investment in the supply chain (at low levels of investment they may initially rise, as drawn in figure 4, but this is not critical to the general argument made here).

Figure 4: High and Low Level Supply Chain Equilibria (*Figure 4 not provided*)

A simple neo-classical analysis postulates equilibrium at point E, where MFC cost is equal to MRP, and falling. The addition of costs and risks of coordination failure, opportunism and rent, however, pushes this equilibrium point to the left (to point D), leading to lower levels of investment and production (and hence reduced producer and consumer surplus). A more significant change, however, is that there is now only a small region where MRP is greater than MFC (between investment levels C and D). If investments in a supply chain are initially below C, then investors have no immediate gains from increased investment (since MFC is greater than MRP) and no incentives to invest – in fact the incentive is to reduce investment as long as MFC is greater than MRP. As drawn, this will cause investment to fall to B, which represents a low level equilibrium (equivalent to profit maximisation around subsistence production in Figure 3). It should be clear from figure 4, however, that the small area on the left of the graph where MRP is greater than MFC (between A and B) is sensitive to the shapes of the MFC and MRP curves, and in many situations will not exist at all, in which case the low level equilibria will involve zero investment.^x

The overall result of this analysis is a threshold level of total supply chain investment (point C in figure 4) below which the marginal returns to investment are negative. The total level of investment therefore has positive (or negative) spillovers, and positive (or negative) feedbacks above (or below) this threshold. Below the threshold the supply chain is caught in a low level equilibrium trap. Above the threshold we may expect the dynamics of competition and technical and institutional innovation to further lower costs with time, with continuing increases in investment.

Simplistic though this analysis may be in a number of ways, it helps us to consider three processes by which a set of actors may escape from the trap: threshold shifting, pump priming investment, and coordination.

The first of these processes, threshold shifting, involves movement of the MRP curve upwards and of the MFC curves downwards so that point C moves to the left (to lower levels of investment) or disappears altogether. An upward shift of the MRP curve may be achieved by technical change (with increases in marginal productivity of investment) or by increases in output price. Downward movement of the MFC curves may be achieved by reduced input prices and costs (reducing transformation costs) or by reducing costs and risks of coordination failure, opportunism, or rents. These different approaches to or elements in, threshold shifting may therefore be seen as different strands in the evolving orthodoxy of agricultural development policy: emphasis on agricultural research reflects attempts to shift the MRP upwards through technical change; emphasis on structural adjustment and on ‘getting prices right’ has been concerned to raise MRP and/or lower the transformation costs and risks in the base MFC; institutional and property rights development focuses on reducing the costs and risks of opportunism; infrastructural development contributes not only to better prices but also to lower coordination costs; finally governance emphasises reducing the risks and costs from rent seeking.

This conceptual framework therefore provides an integration across these different (and often analytically disconnected) strands of development, and assistance in asking questions about which strand is likely to be most critical in any particular situation (How do the different type of cost compare as regards importance and the potential opportunities for reducing them? What is the potential for raising productivity or output prices, and what scale of improvement is needed?). It also helps us to answer questions about why development can proceed in some poor governance situations, for example, but not in others. It therefore poses particular challenges to development policy that stresses one particular set of problems and solutions to the exclusion of others.

The second process by which actors may be assisted to escape from the low level equilibrium trap is through what we term ‘pump priming investment’. This represents the way in which government or donor investments in an economy, sector or supply chain may move it to the right in figure 4, by raising the level and density of economic activity and ‘thickening’ markets. Of course different types and modes of investment differ in their effectiveness in promoting these shifts. This may be an aspect of investments that needs to be given more explicit attention in policy analysis.

The third process by which actors may escape from the low level equilibrium trap is through direct attention to institutional arrangements for improving coordination. Coordination requires deliberative

processes and strategic investment commitment discussed earlier in the context of CMEs: from the logic of Figure 4 it is clear that coordination will not be achieved by market mechanisms alone. We classify non-market coordination mechanisms in terms of ‘local’ and ‘extensive’ coordination. Endogenous ‘local’ coordination mechanisms may develop either through vertical integration (effectively larger scale commercial farms) or through local relations linking different local agents interested in investing in different activities in the supply chain, for example through farmer groups or through interlocking arrangements by (generally powerful) traders. In staple crops, where total supply chain profits are likely to be more limited than in cash crops, progress in local investment is likely to be slow (as low returns weaken both the incentives to set up coordinating institutions and the penalties for defection). Eventually, however, if there is sufficient growth in local coordination mechanisms then these may in aggregate reach the threshold level of total investment in the supply chain, enabling a transition into a market based growth path. Left to itself this process is, however, likely to be slow and fragile, highly path dependent and susceptible to political economy processes of rent seeking and to shocks affecting the total investment threshold.

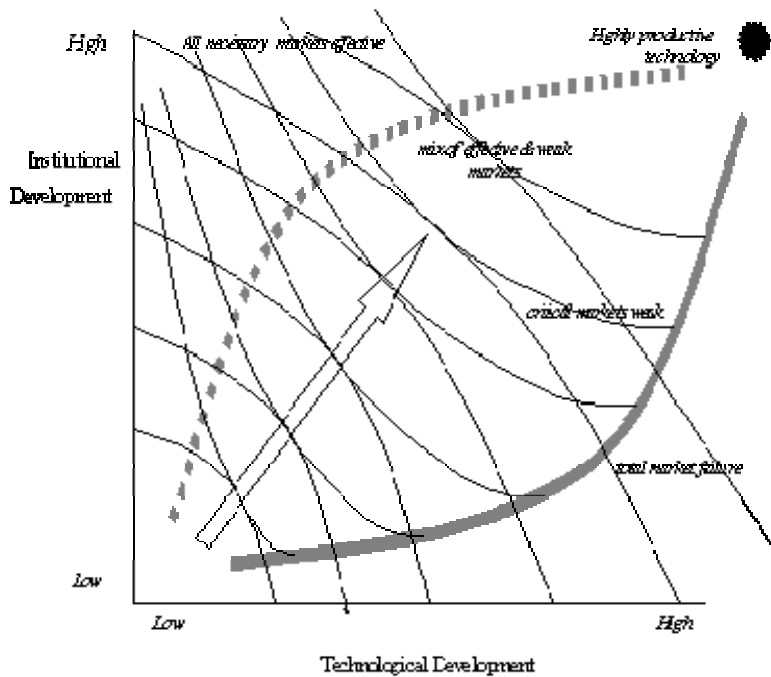
Alternatives to slow and fragile endogenous local coordination processes are (a) externally assisted ‘soft’ coordination processes (for example involving state or NGO support for the development of farmer organisations, for trader associations, or for contract grower, nucleus/ outgrower and other interlocking systems) or (b) more extensive ‘hard’ coordination where a strong central coordinating body with a mandate from the state ensures investments across the supply chain with highly credible coordinated commitments^{xi}.

Agricultural parastatals often attempted to follow this approach by taking over investments and investment risks for all parts of the supply chain except production. They used government and party regulations to provide protection from both opportunism and some elements of market risk. This is not the only model for pursuing ‘extensive coordination’ but, as discussed earlier, it highlights both the difficulties facing the development of extensive coordination and its record of some dramatic success.

The development of coordination mechanisms through endogenous local mechanisms and through different types of external support will all be easier with a lower total supply chain investment threshold, and a low threshold will also ease the transition from non-market to market coordination. This emphasises the importance of supporting the development of coordination mechanisms with complementary threshold shifting and pump priming measures.

These complementarities can also be examined in terms of the relationships between the development of the institutional environment supporting impersonal contractual arrangements and technological development which generally requires coordination between different links in increasingly complex supply chains including input suppliers, financiers, producers and output purchasers and processors. Figure 5 (from Dorward *et al.*, forthcoming) provides a simple and highly stylised representation of this. Economic development is shown as a movement from the south west to the north east, with complementary progress in institutional and technological development: isocost and isoquant curves represent the costs and benefits in achieving different combinations of technical and institutional development. Poorly developed institutions cannot support the coordination required for highly advanced technologies, and therefore the south east of the diagram encounters market failure. In the North West corner, however, high levels of institutional development should allow effective competitive markets to support the coordination required for relatively simple technologies. Along the south west to north east diagonal there is more ambiguity: institutional development may be insufficient for competitive markets to provide the coordination necessary for particular technologies’ supply chains, but the coordination processes discussed earlier may be able to achieve this.

Figure 5: Mapping an Institutional and Technological Development Path ⁴



We can use this analysis to examine different growth paths and processes for an economy, community or industry to move in a north easterly direction. While in any situation the ‘optimal path’ depends upon the shapes of the isoquant and isocost curves, there is no *a priori* reason for expecting it to be restricted to situations with ‘all markets effective’: a more natural expectation would be for the path to move across the middle of the diagram, as drawn with a mix of effective and ineffective competitive markets with non-market institutional arrangements. Endogenous local coordination would then involve small incremental movements in a north easterly direction, while more extensive ‘hard’ coordination, where successful, would allow more significant shift in a more east-north-east direction. Externally assisted ‘soft’ coordination processes would fall somewhere between these two extremes. Dorward *et al.* (forthcoming) discuss in more detail the relative merits of and influences on different growth paths, but we note here the intuitive attractiveness of CME rather than LME routes, the latter involving movement in a much more northerly direction.

We conclude our discussion of theoretical challenges to agricultural liberalisation orthodoxy by pulling together some key points. First, perfectly competitive markets of the neo-classical theory underlying

⁴ From Dorward *et al.* forthcoming

liberalisation policies do not ignore coordination problems, coordination is achieved efficiently and effectively by markets. However they depend upon the products, processes and actors having certain (restrictive) characteristics and operating in the context of highly sophisticated institutions with adequate regulation & standards and effective state provision of public goods. They also depend upon competitive thick markets. Poor rural areas without these thick markets (and without many of the institutions, regulations, and technical and socio-economic characteristics required for efficient markets) then face a 'catch 22' situation: where does coordination (needed to get the market working) come from when the market is not working?

We therefore put forward arguments that non-market arrangements are necessary to provide the coordination necessary to induce private agents to invest in specific assets for different activities in a supply chain. In addition to the very practical difficulties faced in achieving this non-market coordination, however, there is an underlying theoretical (and also very practical) difficulty and 'catch 22' with inherent contradictions in the transition from a non-market to a market coordination system: effective non-market coordination generally requires a limited number of strong coordinating players at some point in the supply chain (to allow personal coordination mechanisms to work), but market coordination requires a much larger number of players at all points in the supply chain to allow impersonal competitive forces to operate. How can one move from one coordination system to another without destroying the confidence in thick markets which must be the foundation of market coordination? Solutions to this problem are likely to involve movements from 'hard' external and extensive coordination mechanisms to softer forms of external coordination assistance as part of an evolutionary transition process.

5. Policy Implications

We consider the policy implications of the coordination arguments made above first by making some more general observations about policy processes and context, and then by making more specific suggestions for moving policy forward.

A key 'broad' policy message from this analysis is that we need a policy framework that recognises the importance of stages of development and of endogenous 'political economy' processes in institutional change. These 'stages of development', as illustrated in figure 2, demand different types of policy and institutional development at different stages (Adelman and Morris, 1997): thus while India seriously needs to liberalise and reduce agricultural support, current Indian debates (and advocated solutions) should not be carelessly "copied across" to most SSA smallholder agriculture. The endogenous dynamics of policy and institutional development at these different stages also need to be allowed for in policy analysis: it is not enough to argue, for example, that agricultural liberalisation policies have failed because governments have not 'let go' and implemented these policies thoroughly enough: policy analysis must recognise the legitimate concerns which prevent governments from completely 'letting go' of, for example, staple food markets.

If different stages of development need different policies, then governments need to stimulate and manage transitions between these policy stages. A number of different transitions are important here: the transition from non-market to market based coordination mechanisms, and its inherent discontinuities, have been discussed above. Associated with this are three other transitions: from a food deficit to a food surplus economy, from dominance of staple food crops to higher value and diversified agricultural production systems, and from an economy dominated by the agricultural sector and by farm incomes to a more diversified economy with a small, declining agricultural income share. Again, there are policy discontinuities in these transitions, with for example, shifting thresholds and changing relations between staple food prices and economic growth; changing rural/ urban and farm / non-farm relations, concerns and expectations; changes in the structure of the agricultural economy and in the structure of international trade; and changes in structural variables affecting food security policies. The shift from food deficit to food surplus can occur very rapidly and pose major and immediate challenges to development strategies, particularly if surplus production is located far from international ports. India, for example, has accumulated very large food stocks and maintains these with large fiscal costs, while the fiscal costs of surpluses in Zimbabwe in the early 1980s were unsustainable, so guaranteed prices were withdrawn and its maize revolution regressed. Ethiopia's more recent success in stimulating maize production led to dramatic

price falls, large financial and welfare losses for surplus producers, and the collapse of the growth dynamic. Shocks or policies that upset harmonisation across these transitions and thresholds can set back not just the dynamics of ongoing transitions but also, by affecting actors' expectations of and confidence in development, can set back future development and transition processes.

Another broad policy message is that coordination mechanisms need to be given a much more prominent place in policy thinking. Proposals for reform or abolition of parastatals need to be considered against requirement for effective coordination. Particularly if radical reforms or abolition are on the agenda, it is necessary to provide convincing (and therefore explicit and detailed) descriptions of how coordination will be achieved under the proposed reforms. We suggest below particular institutional approaches by which coordination might be achieved, and conceptual 'filters' for examining these, but for these to be developed and implemented we need to pursue (through action research) an "institutionalist" and experiential approach to smallholder agricultural development (see also Omamo, 2003), based on business models that convince private investors and focus on coordination and networks. This will often require commitment to public subsidies to the private sector for commercial service provision in rural areas. This, and other proposals that rub against neoclassical prejudices should not be automatically ruled out: non-standard contractual forms, regulated monopolies and a prominent coordinating role for the state (and others?) may all have their place, though they must also be rigorously designed and governed to overcome historical failures with these types of intervention.

Finally, as regards broad policy considerations, the conceptual framework presented in figure 4 stresses the need for, and offers a way forward for, complementary analysis and action across technical, economic and governance spheres of policy.

What then should be the roles of governments in promoting economic coordination in poor rural areas? The theory of low level equilibria suggests that they should attempt to induce movement from the current low level equilibrium, movement that is sufficiently far reaching that the economy will reach new equilibrium. This can involve action on a number of fronts broadly conceived of as identification of 'critical missing links' causing coordination failure across a supply chain and of cost effective mechanisms for lowering risk and raising expected secure returns to a level that provides opportunities for productive investments that both promise and deliver returns sufficient to attract private agents to invest in these missing links.

These mechanisms may involve technical change to increase productivity or reduce productivity risks; price intervention to increase profitability or reduce market risks; and institutional change to reduce the private costs and risks of coordination failure and / or transaction enforcement failure. Examples of some of these mechanisms include investment in communications infrastructure, or support for (regulated) monopolies; franchises, trader and farmer associations to address coordination failures and risks from opportunism (but these generally face major governance challenges); grain reserves, price intervention and guarantees, market information systems, market infrastructure development, commodity exchanges and insurance systems to address vulnerability to shocks (although these face major problems of moral hazard & adverse selection); and price support, input/output/credit subsidies, communications infrastructure, technical research and extension, and support for trader and farmer associations to increase basic supply chain profitability.

Classical underdevelopment equilibrium theory proposed a "big push" with a leading role for the state on many fronts. The more recent literature is (rightly) more wary of government led co-ordination (although as argued earlier large scale coordination has, on some occasions but not others in the 20th century, achieved rapid widespread growth). Failures in achieving sustained success with state led approaches include not only rent-seeking, but also a lack of inventiveness, with "*premature greying*" in Sachs' terminology. Where a 'big push' strategy is to be followed, then the timing of this and the design of time limits and exit and market transition strategies are critical. These have to be linked in with more general questions about ways in which trade and domestic policies support appropriate institutions.

Governments, however, while having an overall responsibility for encouraging coordination as a public good are not the only agents who can promote it: producer, processor and trader associations and NGOs all have interests and potential complementary roles. Whatever the agency by which coordination is promoted, however, the theory discussed earlier suggests useful conceptual 'filters' for examining specific proposals.

Thus proposals should address missing markets in the short term while laying the basis for longer term market development and reducing transactions costs and risks for key players in supply chains. They also need to address constraints on a sufficiently broad front, not relying on too much on ‘silver bullet’ technologies or individual business / institutional innovations without complementary improvements in institutions and mechanisms for coordination, as single interventions may not be able to break out of a low-level equilibrium. The timing of proposed interventions is also critical, as they must build on and into existing opportunities and be sufficiently large scale and stable over long enough periods to change perceptions. However they also need to be flexible in response to changing exogenous conditions (for example weather or international markets) and must stimulate and manage the transitions discussed above. They must also be secure against rent seeking and should not remain in position long enough to be subverted by premature greying. The planned complementary roles of government and of other players, is critical in this, with clear objectives, roles and mechanisms for intra-sectoral non-market coordination and price formation, but there must also be clear exit and transition pathways.

6. Conclusions

Economic coordination failures in poor rural areas in Africa have been largely ignored in policy analysis over the last 20 years, but they are crucial to our understanding of the implementation and impacts of agricultural adjustment policies. With further agricultural adjustment policies in prospect, in both OECD and developing countries, much more attention is needed on understanding the nature of coordination failures, their effects, and opportunities for overcoming them. Hoff (2000) suggests that new understanding of coordination failures means that ‘development may be both easier and harder than (analysts) previously thought’^{xii}. This is because the existence of thresholds means that (in theory) once a threshold is crossed, further growth and development is a self-sustaining process, reducing the resources needed for significant development impacts. However, it is very difficult (a) to understand the binding constraints causing coordination failure in a supply chain, (b) to design and implement mechanisms for overcoming these constraints, and then (c) to manage the multiple transitions required to maintain a (more or less) stable growth path. Furthermore, not only can ill judged interventions make matters worse, but the challenges to the development of local coordination mechanisms may be greater now (in an increasingly global economy) than they were in the past (Dorward *et al.*, 2004). Whatever the changing difficulties of development, a focus on overcoming coordination failures involves a different set of policy, analytical and research approaches from that of either current liberalized market approaches or earlier state led approaches. This is a major challenge to those working for agricultural development and significant poverty reduction in rural Africa where severe rural poverty is most entrenched.

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- ⁱ We define such economic coordination for the moment as coordination of individual economic agents' investments in complementary activities which are necessary for these investments to yield satisfactory returns – an example of such complementary investments might be farmers' investments in more intensive crop production and crop buyers' investments in higher volume and more extensive crop purchase, processing and trading systems
- ⁱⁱ These two phases of dominant development thinking, about the role and nature of the state and markets in development, of course interact with other progressions – concerning the goals of development, the relative importance of different sectors, the nature of growth needed for development, etc.
- ⁱⁱⁱ Marketing boards and parastatals were also established by colonial authorities. There were a variety of reasons for this, some overlapping with but others distinct from independent governments' later reasons for supporting these institutions.
- ^{iv} The Berg report (World Bank 1981), for example, marked a watershed in the development of the Washington consensus on economic policies in Africa.
- ^v We discuss later this response to state failures in supporting conditions needed for markets to work.
- ⁶ Common support for farmer groups and for micro-finance as practically effective institutional arrangements for overcoming financial and other market failures are not, however, so consistent with the basic tents of market liberalisation and its neo-classical foundations. Advocacy for these non-market mechanisms for economic exchange and coordination. begs more general questions about the role of such arrangements in economic development in poor economies.
- ^{vii} There is, of course, evidence of dramatic state failure – but while we know that interventionist policies can make a substantial positive impact, evidence of success with market liberalisation policies is more limited.
- ^{viii} Transaction costs are difficult to define. We recognise three different functions of transaction costs: costs incurred in to protect oneself against risks of transaction failure (the focus of this paper); costs incurred to protect a contracting counter-party against transaction failure, to induce them to enter a contract; and costs incurred in meeting licensing or other requirements of bureaucratic and rent seeking government agencies and officials. Reducing this last type of transaction cost is (rightly) an important focus of market liberalisation policies, but it is unfortunate when these different types of transaction cost are not distinguished from each other. Our definition of transaction costs allows a clear distinction of transaction costs from transformation costs, the costs of making or growing things or physically providing services, including processing and transport services.
- ^{ix} 'Specific assets' are assets with very limited, specific applications – so that once an investment has been made to support a particular activity or set of transactions investors have very strong motives to ensure that upstream and downstream activities and transactions are in place.
- ^x In figure 4 the drawing of the precise shape of the curves at low levels of investment is largely conjectural, as at these levels of investment the MFC and MRP curves may take a variety of different shapes, and relate to each other in a variety of ways. The broader arguments for the existence of a low level equilibrium trap is not sensitive to these shapes provided that with increasing total supply chain investment (further to the right in figure 4) MFC moves from a position above MRP to one where it lies

below the MRP, before these positions are again reversed. In other words, crossover points C and D in figure 4 are critical to the existence of high and low equilibria, whereas the existence of crossover points A and B is not. However, the drawing of the curves in figure 4 illustrates ways in which non-zero low level equilibria may exist.

- ^{xi} This distinction between ‘soft’ and ‘hard’ promotion of coordination reflects observations by Hall and Soskice 2001 of differences between CMEs in types of state support.
- ^{xii} This observation begs some interesting questions about the relationships between development analysts and the practical administrators who designed and implemented successful coordination models in the past.