Options for Income-Enhancing Diversification in Burkina Faso

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WEIGHTS AND MEASURES

Metric System

ABBREVIATIONS AND ACRONYMS

AFD	*French Development Agency*
AfDB	*African Development Bank*
AICB	*Association interprofesionnelle du coton du Burkina*
ANVAR	*Agence Nationale de Valorisation des Résultats de la Recherche*
ARTEL	*Telecommunication Regulatory Agency*
AZ	*Anglo Zimele*
BCEAO	*Central Bank of West African States*
BNLA	*La Direction de la Brigade Nationale de Lutte Anti-fraude de l'Or (National Brigade Against Fraud in the Gold Sector)*
BUMIGEB	*Bureau des Mines et de la Géologie du Burkina (Bureau of Mines and Geology of Burkina Faso)*
CAS	*Country Assistance Strategy*
CAS-PR	*Country Assistance Strategy Progress Report*
CEAS	*Centre Ecologique Albert Schweitzer*
CEM	*Country Economic Memorandum*
CFAA	*Country Financial Accountability Assessment*
CFAF	*Franc of the African Financial Community*
CID	*Computerized Expenditure Circuit*
CIE	*Government Integrated Accounting Software*
CNRST	*National Center for Scientific and Technological Research (Centre national de la Recherche Scientifique et Technologique)*
COGES	*Health Management Committee*
CONAGESE	*National Council for Environmental Management*
CPAR	*Country Procurement Assessment Report*
CSPs	*Community Health Centers*
CRA	*Regional Agriculture Chambers*
CSO	*Civil society organization*
CSPs	*Community Health Centers*
DAAF	*Directorate of Administrative and Financial Affairs*
DCMP	*Central Directorate for Public Procurement*

DEP	*Directorate for Planning and Studies*
DGB	*Directorate General for the Budget*
DGCCOP	*Directorate General for International Cooperation*
DGE	*Directorate General for the Environment*
DGMGC (DGM)	*Direction Générale des Mines, de la Géologie et des Carrières (Directorate General of Mines, Geology, and Quarries)*
DGTCP	*Directorate General of the Treasury and Public Accounts*
DHS	*Demography and Health Survey*
DSA	*Debt Sustainability Analysis*
DTIS	*Diagnostic Trade Integration Study*
ECOWAS	*Economic Community of West African States*
EIA	*Environmental Impact Assessement*
EITI	*Extractive Industries Transparency Initiative*
EMP	*Environmental Management Plan*
ENEP	*Teachers Training Colleges*
EU	*European Union*
FASOCOTON	*Private Cotton Company*
FRSIT	*Fire Service Improvement Team*
GAMA	*Environmental Management in Artisanal Mining (Peru)*
GDP	*Gross Domestic Product*
GNP	*Gross National Product*
GoB	*Government of Botswana*
GTZ	*German Technical Cooperation*
HIPC	*Heavily Indebted Poor Countries*
HIPC-AAP	*HIPC Accountability Assessment and Action Plan*
ICA	*Investment Climate Assessment*
ICRR	*Implementation Completion and Results Report*
ICT	*Information, Communication and Telecommunications*
IDA	*International Development Association*
IFC	*International Finance Corporation*
IGAME	*L'Inspection Générale des Activités Minières et Energétiques (Inspection General of Mining and Energy Activities)*
IGE	*General State Inspectorate*
IGF	*General Finance Inspectorate*
IMF	*International Monetary Fund*
INERA	*National Institute for the Environment and Agronomic Research*
INGO	*International non-governmental organization*
INSD	*National Institute of Statistics and Demography*
IRCT	*Cotton and Textile Research Institute*
IRD	*Institut de Recherche pour le Développement*
IRSAT	*Research Institute for Applied Science and Technology (Institut de Recherche en Sciences Appliqués et de Technologie)*
JSAN	*Joint Staff Advisory Note*
LDP	*Letter of Development Policy*
MAMS	*Maquette for MDG Simulations*
MDGs	*Millennium Development Goals*
MDRI	*Multilateral Debt Relief Initiative*
MEBA	*Ministry of Basic Education and Literacy*
MEDEV	*Ministry of Economy and Development*
MEF	*Ministry of Economy and Finance*
MMCE	*Ministère des Mines, des Carrières et de l'Energie*
MnO2	*Manganese Dioxide*

MOH	*Ministry of Health*
MTEF	*Medium-Term Expenditure Framework*
NGO	*Non-governmental Organization*
OECD	*Organisation for Economic Cooperation and Development*
ONAPAD	*National Poverty and Development Observatory*
ONATEL	*National Telecommunication Company*
OPA	*Producer Organization*
ORCADE	*Organisation pour le Renforcement des Capacités de Développement*
P2O5	*Phosporous Pentoxide*
PAMS	*Poverty Analysis Macroeconomic Simulator*
PAP	*Priority Action Plan*
PAFASP	*Projet d'Appui aux Filières Agro-sylvo-Pastorales*
PDDEB	*Ten-year Basic Education Development Plan*
PER	*Public Expenditure Review*
PNDS	*National Health Care Development Plan*
PNDSA	*National Program for the Development of Agricultural Services*
PNGT	*National Program for the Management of Territory*
PRECAGEME	*Le Projet de Renforcement des Capacités Nationales du Secteur Minier et de Gestion de l'Environnement*
PRGB	*Budget Management Reform Plan*
PRGF	*Poverty Reduction and Growth Facility*
PRSC	*Poverty Reduction Support Credit*
PRSP	*Poverty Reduction Strategy Paper*
PRSP-APR	*Poverty Reduction Strategy Paper Annual Progress Report*
ROSC	*Report on the Observance of Standards and Codes*
SBI	*Sustainable Budget Index (Botswana)*
SDR	*Special Drawing Rights*
SITARAIL	*Société Internationale de Transport Africain par Rail*
SME	*Small and Medium-sized Enterprises*
SMEELP	*Small and Medium Enterprise and Empowerment Program (Mozambique)*
SIGASPE	*Budget Payroll Management System*
SOCOMA	*Private Cotton Company*
SOFITEX	*Largest Cotton Company*
SONABEL	*National Electricity Company*
SONABHY	*National Petroleum Product Distribution Company*
SOPAFER	*Société de Gestion du Patrimoine Ferroviaire du Burkina*
SP-PPF	*Permanent Secretariat for the Supervision of Financial Policies and Programs*
STC-PDES	*Technical Secretariat for the Coordination of Social and Economic Development*
TOD	*Decentralization Laws*
TOFE	*Government Financial Operation Table*
UNDP	*United Nations Development Program*
UNIDO	*United Nations Industrial Development Organization*
UNPCB	*National Union of Cotton Producers of Burkina Faso*
VAT	*Value Added Tax*
WAMU	*West African Monetary Union*
WAEMU	*West African Economic and Monetary Union*
WHO	*World Health Organization*

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EXECUTIVE SUMMARY

One of the objectives of this CEM was to identify the most promising products and conduct competitiveness diagnostic. The products list is summarized in Table 1 below. Competitiveness, in this report, is seen as a combination of productivity and costs, and the second section of the CEM presents industry chapters that systematically benchmarks Burkina's competitiveness performance against its main competitors. Sectoral chapters also explore reforms achieved and their impact on productivity, list remaining bottlenecks and opportunities and discuss possible emulation from other countries. Table 1: Candidates to Economic Diversification outside the Cotton Sector

Product Space Methodology (developed in Volume I)	**Sectoral Analysis** (developed in Volume II)
Cereals, vegetables and other plants/seeds	
Maize (corn), unmilled	Traditional cereals (sorghum, millet, maize)
Buckwheat, millet, canary seed, grains	Rice
Fruit, fresh or dried	Onions
Other fresh or chilled vegetables	Tomatoes
Vegetable products, roots and tubers	Green beans
Plants, seeds, fruits used in perfumes	Cowpeas
	Sesame
	Mangoes
	Shea nuts
Animals/meat and other animal products	
	Short-cycle species (poultry, sheep and goats)
	Cattle/Beef
	Milk
Leather, hides, skins and bones/horns	
Leather of other hides and skins	Hides and skins
Sheep and lamb skin leather	
Bones, horns, ivory, hooves, claws	
Processed products	
Cotton seed oil	
Fixed vegetable oils	
Sugar, beet and cane, raw, solid	
Sugar confectionery and other sugar	
Sacks and bags of textile material	
Manufactures of wood	
Household appliances, decorative art	
Other musical instruments	
Cigarettes	
Soap, organic surface-active products	
Gold, non-monetary	

OPTIONS FOR INCOME-ENHANCING DIVERSIFICATION IN BURKINA FASO

Export Performance in Burkina Faso

1.1 **Landlockedness and overt dependence on cotton exports are identified as constraints on trade competitiveness and growth in Burkina Faso.** Despite reforms that occurred in the 1990s, the diversification has yet to unfold in Burkina Faso. The experiences of similar countries suggest that the crux of development lies in achieving a critical balance between efficiency-improving reforms and economic diversification (Commission on Growth and Development, 2009). Imminent windfalls from newly discovered metal deposits seem to promise a structural transformation away from cotton. However, the discovery of metal deposits can be a double-edged sword that can undermine sustainable and inclusive growth in natural resource rich economies. The challenge of income-enhancing diversification will lie on the one hand in maximizing growth in the uncarded cotton and metals-based economy, and on the other hand, in offsetting overt dependence on these primary commodities by fostering diversification into more sophisticated agricultural exports. Undoubtedly, this is a daunting challenge, but it appears to be the only approach that could thrust the Burkinabè economy onto a faster and sustainable growth trajectory in the direction of a middle-income country.[1]

1.2 **In Burkina, there is a negative correlation between export concentration and income levels** (Figure 1-18). However, none of the measures of economic and export concentration is able to provide any country-specific policy pointers beyond the general case that diversification is good for growth. The Herfindahl Index (HI)[2,3] has been higher than 0.5 in the past five years. This indicates that Burkina Faso has highly concentrated exports in a relatively narrower income range compared to richer economies. By contrast, Singapore, Brazil, Chile, and Mexico typically

[1] This section will provide an analytical approach to the design of an economic diversification strategy, with emphasis on export diversification. The recommended approach can be leveraged by the government of Burkina Faso to inform polices for economic diversification. It takes a forward looking view that assumes that the status quo offers necessary but not sufficient conditions for economic diversification. It also looks at the evidence from Burkina Faso and comparable economies which suggest that diversification will likely require some level of government facilitation in the area of public goods. This section uses a combination of conventional and unconventional evidence-backed concepts to design options. Data used is trade-related.

[2] Figure 1-19 represents the U-shaped relationship between economic/export concentration and per capita income hypothesized by Imbs and Wacziarg (2003).

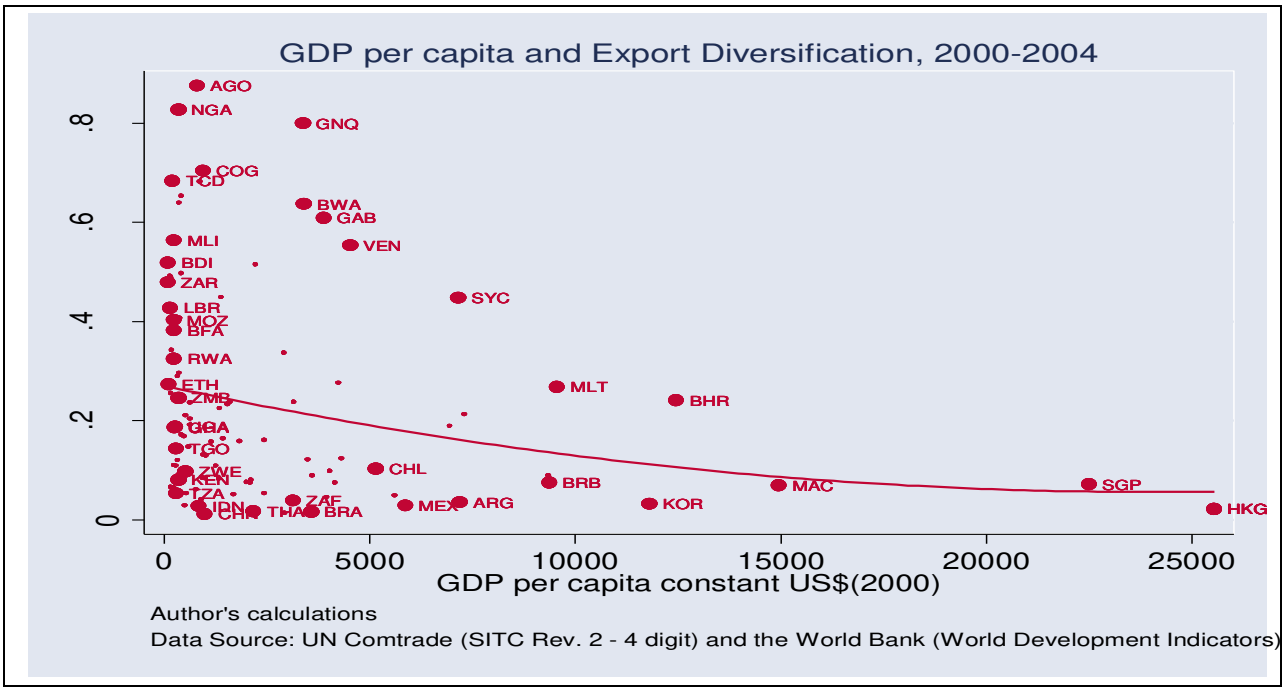
[3] The Herfindahl index simply computes the sum of squared shares of the variable in question, in this case export shares, or

$$HERFINDAHL = \sum_{i=1}^{N} s_i^2$$

where s_i is the share of total exports attributed to the ith industry. It lies between 0 and 1 where being close to 0 indicates well diversified exports. The HI indicates that there are two factors that can lead to a lower HI: an increase in the number of products or a more even distribution of the shares of the products. For the remainder of this study, it will be useful to think about diversification in terms of thresholds. Economies with highly diversified export baskets are likely to have Herfindahl indices below 0.10, while those with concentrated ones above this threshold.

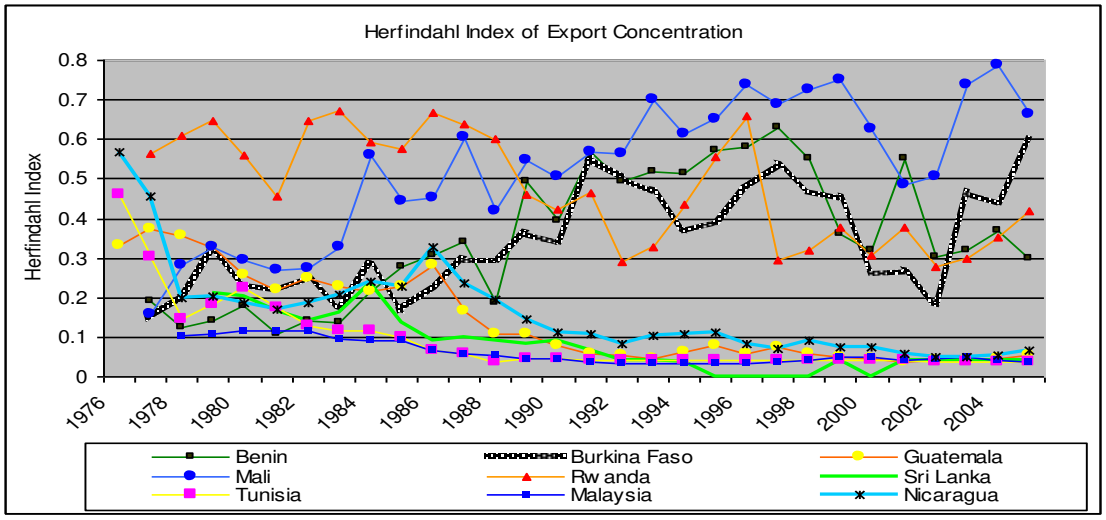
have highly diversified export baskets – therefore, they have HI scores that are less than 0.10 across a wide income range (Figure 1-19).

Figure Error! No text of specified style in document.**-1: The Relationship between the Herfindahl Index of Export Concentration and Per Capita Income**



Source: Authors' calculations, COMTRADE, SITC 2- 4 digit.
RWA - Rwanda., BFA – Burkina Faso, MLI – Mali, CHN- China, BRA – Brazil.

Figure Error! No text of specified style in document.**-2: Trends in the Herfindahl Index**

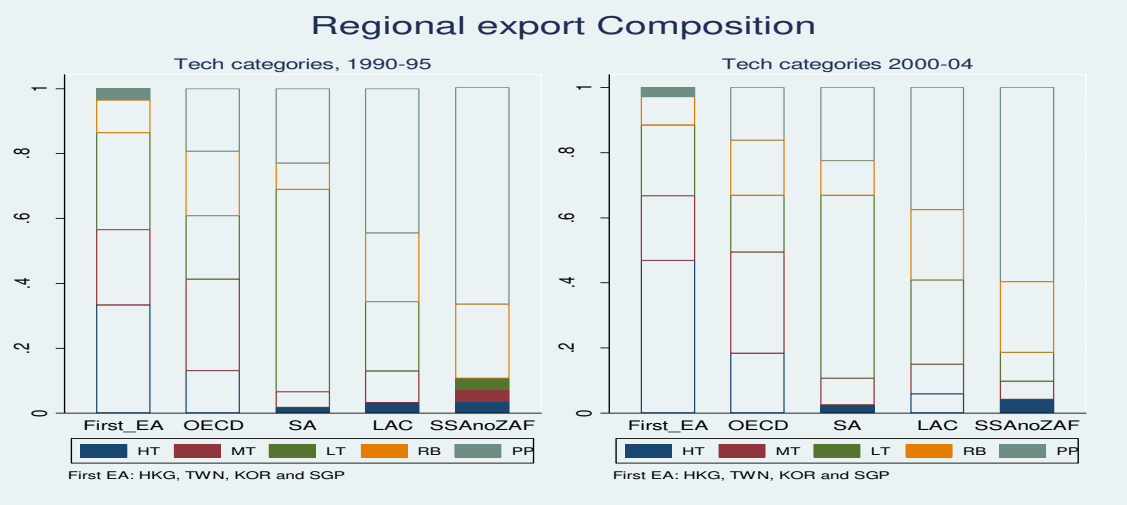


Source: Authors' calculations, COMTRADE, SITC2-4 digit.

1.3 **Burkina's natural comparative advantage in cotton has reinforced its export concentration in unprocessed cotton**.[4] Between 1976 and 2006, Burkina's HI increased from 0.2 to 0.6, due to an increase in the share of cotton from 32-82 percent. During the same time period, Rwanda's HI declined from levels above 0.7 when coffee was the predominant export, to around 0.4 when metal exports became equally important. Relative to other coffee and metal exporters outside Africa that are more diversified and richer, the level of the Index in Burkina Faso is still very high. Richer countries such as Guatemala, Nicaragua, Malaysia, China, and Sri Lanka have Herfindahl indices below 0.10.[5]

1.4 **Burkina's export diversification toward manufactured products has been negligible – most of its exports have been concentrated in the primary products for more than two decades.** Exports from the OECD countries consist mostly of manufactured products, such as low, medium and high-tech (LT, MT, and HT) products. Lall (2000) suggested that these types of exports are technologically superior and amenable to sustainable growth, because of their relatively stable prices and because of growing world demand. From 1980-2006, the share of resource-based (RB) and LT products increased marginally in Burkina Faso, because exports of products like sugar (LT) and metals (RB) grew larger. By contrast, in Bangladesh and Vietnam there was a distinct increase in the share of LT, MT and HT products. This was also true of OECD exports, which mainly shifted from LT to HT products. However, primary products (PP) and RB products still prevail in Sub-Saharan Africa as a whole. Nevertheless, most regions diversified away from primary or natural RB exports (Figures 1-20 and 1-21).

Figure Error! No text of specified style in document.**-3: Diversification across Regions**[6]

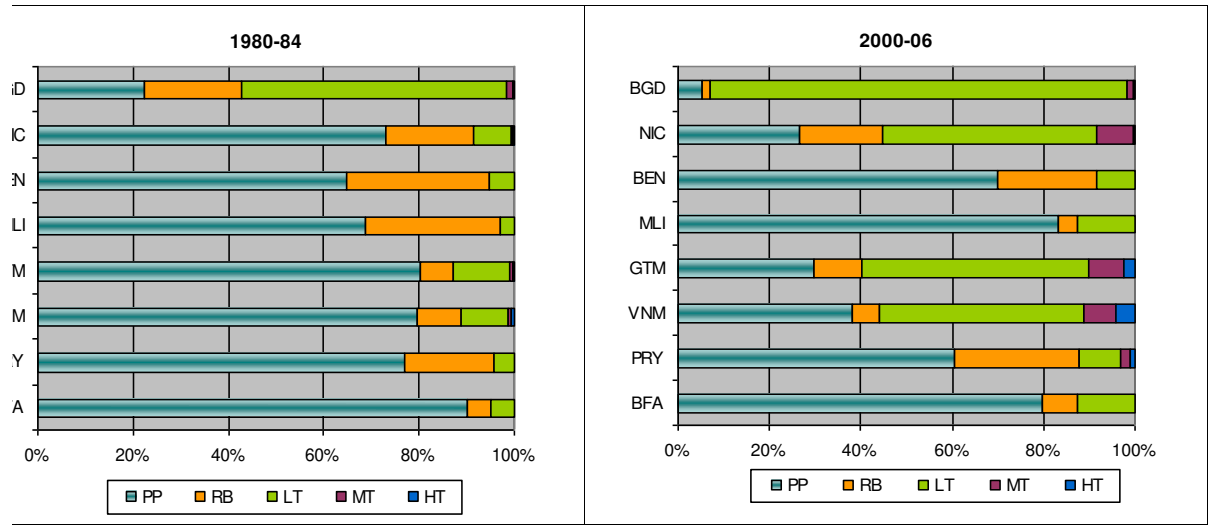


[4] Non-cotton agriculture is oriented mostly toward domestic consumption. The manufacturing sector contributes only about 12 percent to GDP.

[5] Although the The Herfindahl Index provides a measure of export concentration, it does not provide guidance on the mix of products to be exported.

[6] SSA, excluding South Africa.

Figure Error! No text of specified style in document.**-4 Diversification and Export Sophistication in Burkina Faso**



Source: Authors' calculations, COMPTRADE, SITC2 – 4 digit.
Paraguay (PRY), El Salvador (SLV), Burkina Faso (BFA), Togo (TGO), Chad (TCD)

1.5 **The technology classification is useful in linking an exported product to the income level of its exporters, but its implications need to be interpreted cautiously because it suggests that for a country like Burkina Faso, manufactured exports may be the only path to economic development**.[7] Products such as cotton, fish and fruits are all classified as 'primary'. However, the income levels of households that produce these products are significantly higher than that classification would imply. The worldwide demand for these products – unlike unprocessed cotton – rises as countries get richer and consume more fresh produce. They do not have good substitutes. Their exports reflect a certain level of technological sophistication that an exporter needs to acquire in order to comply with the strict phytosanitary standards of higher income countries. Furthermore, exports of these products indicate domestic capabilities that can also be utilized to produce similar high-income products. They may also generate forward linkages, as in the case of fish filleting and fresh produce canning and packaging industries that further lay the foundations of light manufacturing.[8]

[7] This message is also echoed by researchers that point to the "Africa" factor as the main cause for a primary exporter like Burkina Faso's underdevelopment.

[8] Another link between what a country exports and how rich it is underlies the Leamer classification of products into 10 sectors based on their relative factor intensities (Leamer, 1984). Leamer categories are: petroleum, raw materials, forest products, tropical agriculture, animal products, cereals, labor intensive, capital intensive, machinery, chemical. This classification suggests that richer countries export more capital intensive products. Unfortunately, this classification is also not too useful for Burkina Faso as unprocessed cotton does not fall explicitly into any of the 10 categories. Within-sector diversification is difficult to analyze when in fact, it may offer the greatest opportunities for income-enhancing export diversification for Burkina Faso.

Exports Sophistication

1.6 **Burkina Faso's export sophistication is low.** To identify income-enhancing export opportunities, Hausmann, Hwang and Rodrik (HHR) (2007) designed an innovative measure of export sophistication called PRODY. It provides a measurable link between a given product that a country exports and its income level (Box 1-5).[9]

1.7 **Unprocessed cotton has a low PRODY, which indicates the need for Burkina to diversify its exports into higher PRODY products.** Between the 1970s and 2007, the structure of Burkina Faso's merchandise exports moved toward low PRODY products. Unprocessed cotton, Burkina's leading and traditional export, has a PRODY of only 1,500 (Box 1-5). From 2000-2003, unprocessed cotton exports had a share of about 65 percent, which further increased to 80-87 percent by 2004-2006. The low PRODY of unprocessed cotton is mainly due to the fact that, like Burkina, many other low-income countries such as Uganda and Benin export a large amount of unprocessed cotton. By contrast, the PRODYs of fruits, fish and wood products are higher compared to low-tech products (Box 1-5). Although Burkina Faso exports vegetables, fruits and sugars, which have a relatively high PRODY, their export shares are not high.[10] Because the PRODY of a product is identical for all countries, Burkina Faso would benefit from exporting some higher PRODY products which other middle-income countries export.[11]

1.8 **PRODY reveals that manufactured products are not necessarily a prerequisite for growth in Burkina Faso in the short-to-medium term**. By attaching an income level to each product, it makes it possible to differentiate between exporting sesame and cotton and whether diversification into sesame would enhance Burkina Faso's per capita income in the long-term. The higher PRODYs of fruit compared to raw cotton suggests that the former may be a good candidate for a diversification strategy for Burkinabè farmers. The leap from agriculture to manufactures would be unrealistic in the medium-term. Structural transformation within the agricultural sector may be compatible with Burkina Faso's current stage of development. However, in the long-run, income-enhancing diversification into higher PRODY[12] products would need to be considered.

1.9 **The overall income potential of Burkina Faso's export basket remained low relative to landlocked cotton exporters outside of Sub-Saharan Africa.** This is reflected in the low per capita income despite high growth rates in the past two years (Figure 1-23). Burkina Faso's EXPY (in PPP) was 1,700 in 1976 – it rose to 2,900 in 1995, but declined to 870 in 2006. It was lower than EXPY trends in the landlocked and low-income Lao PDR, Paraguay (landlocked and cotton exporter), Nicaragua (cotton exporter), Guatemala (cotton exporter) and Bangladesh[13] (Figure 1-24). Burkina's long-term EXPY trend is nearly flat, which highlights the export

[9] A finer level of disaggregation (SITC2 4 digit – about 800 products). In the absence of good production data, these measures rely on export data.

[10] A high PRODY product can enhance incomes only if it has a sufficiently large export share.

[11] In this sense, the concept of PRODY is close to that of Lall's technology classification, which also shows that high and middle-income countries export a larger proportion of low, medium and high-tech products. It is also close to the diversification literature for Sub-Saharan Africa, which argues that manufactured products are the pathway out of low-growth equilibrium in Burkina Faso (Wood and Mayer, 2001; and Habiyaremye and Ziesemer, 2006).

[12] Diversification that is indifferent to the income potential of products can also occur, but it is unlikely to lead to faster and sustainable growth.

[13] Garment exports in Bangladesh lifted its EXPY from 2,500 in 1976 to 3,500 in the early 1990s. Their flat trend since the early 1990s is explained by an over-concentration of mostly low PRODY garment exports.

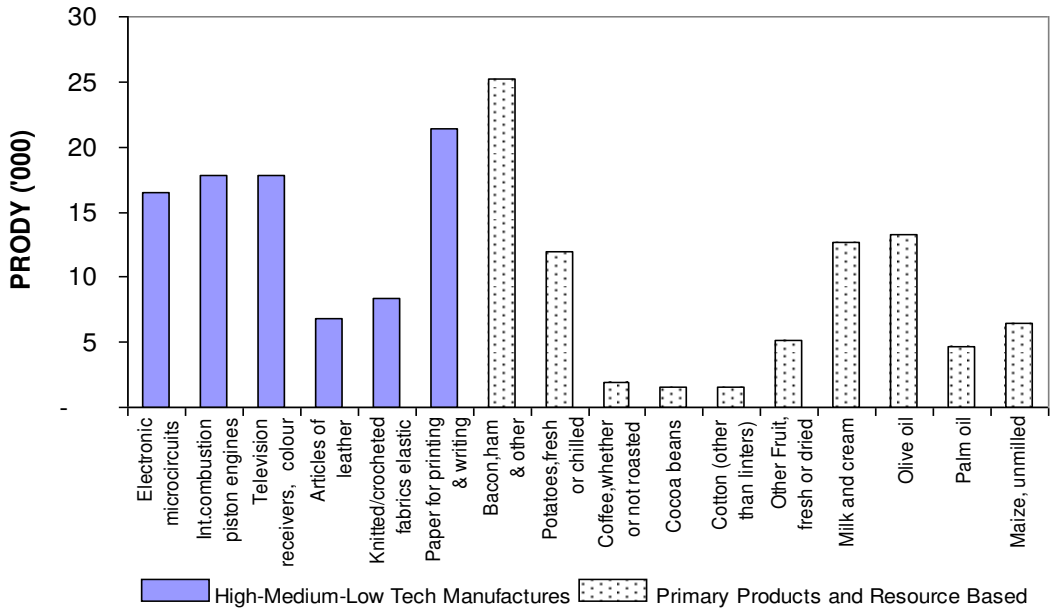
dominance of uncarded cotton with a PRODY of only 1,500. The gap between an almost flat EXPY and a rising per capita income also reflects the fact that exports were not the main engine of growth of income in Burkina Faso.[14] When exports of the newly discovered deposits of higher PRODY gold and other metals come on line in a few years, it may cause a significant rise in Burkina Faso's EXPY. Nevertheless, a rise in the EXPY should not diminish the urgency of diversification into more stable and higher PRODY products.[15]

Box Error! No text of specified style in document.**-1: PRODY and EXPY Measurement of Export Income Potential**

HHR's concept of PRODY ranks products according to their income potential. The PRODY of a product is the sum of the revealed comparative advantage (RCA)[16] of each country which exports the product weighted by its per capita GDP (Appendix 3). For example, the PRODY of quality cotton textiles is high because high-income countries such as the U.S., Japan, Italy and Germany export it. It comprises a significant share of the exports of those countries compared to low-income countries. Not all primary and resource-based commodities are low PRODY products (see Figure 1-22 below).

The income potential of a country's full merchandise export basket can be gauged from its EXPY. The latter is the weighted sum of the PRODYs of all products (the average PRODY) that it exports. The weights are the export value shares of the products.[17]

Figure Error! No text of specified style in document.**-5: PRODY of Selected Products**



[14] In countries where exports have played a dominant role in the economy, diversification and a rise in the proportion of products with higher PRODYs have lifted the EXPY and per capita incomes over time.

[15] The metal deposits are estimated to last for about a decade (McMahon and Ouédraogo, 2009).

[16] Burkina Faso would have an RCA in cotton if the share of cotton in Burkina Faso's total exports were larger than the share of cotton in total world exports.

[17] Hausmann, Hwang, and Rodrik (2007) demonstrate that there is generally a strong and positive correlation between EXPY (denominated in dollar values – US$2,000 constant or PPP) and the exporter's per capita GDP.

Source: Authors' calculations using UN-Comtrade Database, based on Hausmann, Hwang and Rodrik, 2007.

Box Error! No text of specified style in document.**-2: High PRODY of Bacon**

The average world exports of bacon in 2000-04 were US$1.9 billion. 99 percent of total exports depart from developed countries. Outside developed countries, only China, Poland, Mexico and Brazil have export values of bacon greater than US$1 million. In the world, just 5 countries have a revealed comparative advantage in it.

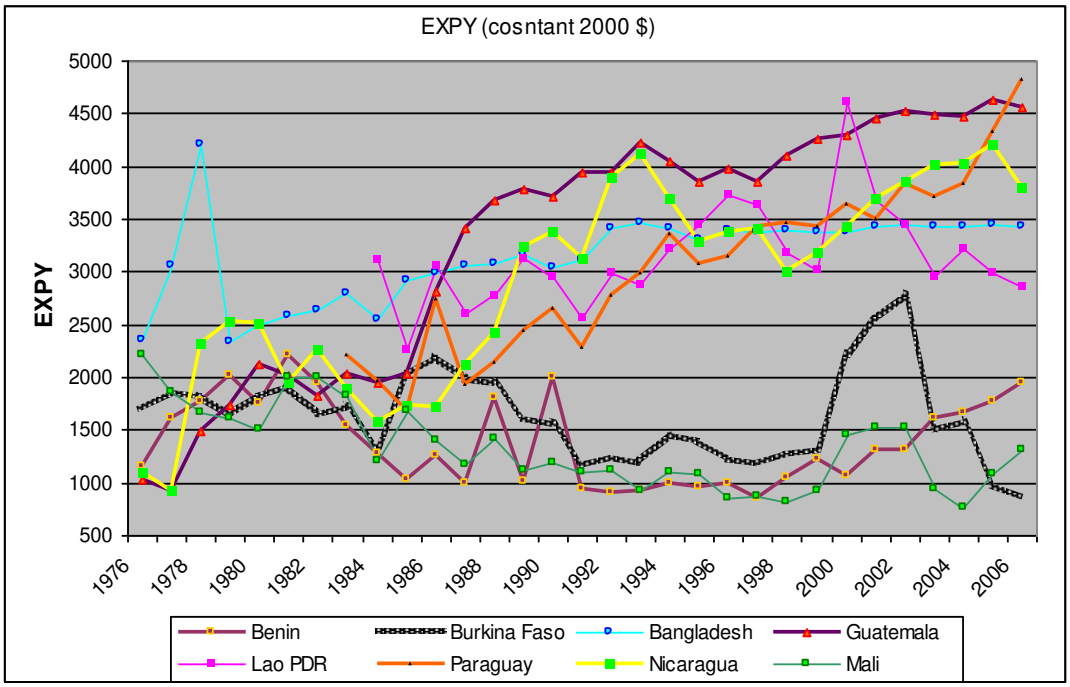
Country	Exports ('000 US$)	Market share (%)
Netherlands	415,185	22
Italy	383,327	20
Denmark	378,110	20
Spain	127,913	7
Canada	112,455	6
Belgium	106,345	6
Total		79

Source: Authors' calculations based on Hausmann, Hwang and Rodrik, 2007.

1.10 **Competitiveness in a few high PRODY natural resource-based products may trigger higher income levels of growth in Burkina Faso**. For rapid growth, not every product Burkina exports needs to be high PRODY, nor must it be a manufactured good. Burkina Faso can maximize the gains from cotton cultivation by reinforcing its comparative advantage in cotton through diversification into genetically modified (GM) seeds and adoption of more efficient production technologies (World Bank, DTIS 2007a). For example, although Chile's export basket continues to be dominated by copper, Chile has also successfully diversified into high PRODY wood pulp and paper, sawn wood, wine, fish, grapes and other fruits. Malaysia continues to export wood, rubber and palm oil products, but in order to leapfrog to a middle-income status, it developed the capability to export some medium-tech electronics. The dominance of tea exports has not diminished in Sri Lanka, but its dampening effects on EXPY have been mitigated by diversification into garments and electronics.[18]

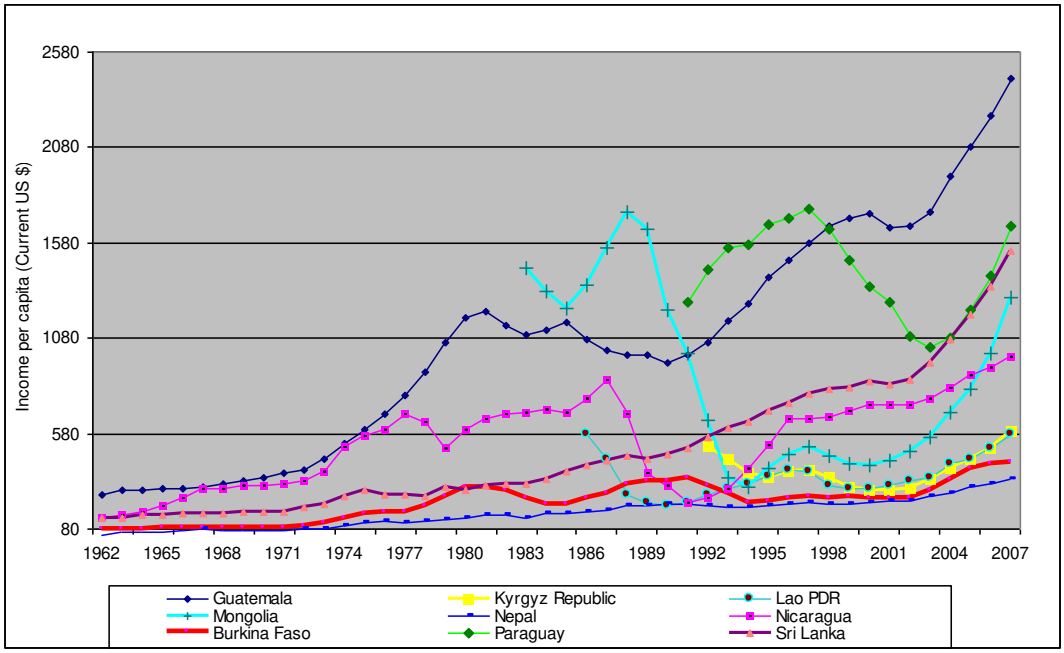
[18] Brazil's leading exports remain soy beans, oil cake and iron ore, but it has also developed the capability to export high PRODY passenger cars. The leap in China's EXPY is an example of a country whose leading exports virtually transformed the economy in a period of less than 25 years.

Figure Error! No text of specified style in document.**-6: Burkina Faso's EXPY Trend**



Source: EXPY - Authors' calculations using UN-Comtrade Database and WDI, based on Hausmann, Hwang and Rodrik, 2007.

Figure Error! No text of specified style in document.**-7: GNI Per Capita in Burkina Faso Compared to Other Landlocked and Natural Resource-based Product Exporters**



Source: EXPY - Authors' calculations using UN-Comtrade Database and WDI, based on Hausmann, Hwang and Rodrik, 2007.

Table Error! No text of specified style in document.**-1: Structure of Burkina Faso's Merchandise Exports**

		1976-1980	1981-85	1986-1990	1991-95	1996-2000	2001-02	2003-04	2005	2006	2007
	GDP per capita (2000 constant US$)	161	170	180	182	212	229	242	252	258	260
		1985	**1986**	**1987**	**Prody_PPP**						
2631	Cotton (other than linters),uncarded	31.5%	25.4%	32.7%	1500						
9710	Gold,non-monetary	21.6%	38.5%	42.6%	5716						
545	Other fresh or chilled vegetables	7.7%	9.6%	6.0%	5477						
2114	Goat & kid skins,raw (fresh,salted)	7.4%	4.9%	2.6%	1217						
2225	Sesame (sesamum)seeds	5.3%	0.8%	0.3%	1179						
2116	Sheep & lamb skins with wool	4.5%	3.3%	2.5%	4956						
2238	Oil seeds and oleaginous fruit.	4.5%	4.1%	1.8%	1902						
	Share of Total Exports	82.6%	86.5%	88.6%							
					1994	**1995**	**1996**	**Prody_PPP**			
2631	Cotton (other than linters),uncarded				57.7%	59.9%	67.6%	1500			
9710	Gold,non-monetary				16.4%	14.4%	9.7%	5716			
545	Other fresh or chilled vegetables				6.6%	7.6%	4.2%	5477			
6116	Leather of other hides or skins				4.2%	4.6%	4.6%	2156			
2223	Cotton seeds				2.0%	0.9%	0.0%	2473			
2116	Sheep & lamb skins with wool				1.8%	2.0%	0.0%	4956			
2877	Manganese ores and concentrates				1.7%	0.0%	0.0%	4238			
	Share of Total Exports				90.3%	89.4%	86.2%				
								2004	**2005**	**2006**	**Prody_PPP**
2631	Cotton (other than linters),uncarded							65.2%	80.7%	82.1%	1500
2225	Sesame (sesamum)seeds							4.1%	3.3%	3.7%	1179
579	Fruit,fresh or dried, n.e.s.							1.1%	1.7%	2.2%	5187
611	Sugars,beet and cane,raw,solid							7.2%	1.7%	1.0%	4516
2223	Cotton seeds							1.6%	1.5%	0.6%	2473
1222	Cigarettes							2.8%	1.0%	0.0%	12204
6116	Leather of other hides or skins							0.8%	0.9%	0.9%	2156
	Share of Total Exports							82.6%	90.9%	90.5%	

Options for Export Diversification

1.11 **The scope for across sector and within sector income-enhancing export diversification in Burkina Faso may be analyzed based on a framework that combines the concept of PRODY with product space methodology**.[19] Burkina Faso presently occupies low PRODY trees. It is clearly at the periphery, and its challenge is to jump from cotton and other traditional export trees toward the core. Figure 1-25 presents a map of the product space of Burkina Faso's current exports.

Box Error! No text of specified style in document.**-3: A Framework to Identify Products with Export Potential**

To identify products with export potential, it is important to build an analytical framework. Within this framework, each product in Burkina Faso's export basket is assigned to a category that is determined by its current and former revealed comparative advantage (RCA). An RCA that is less than or equal to 1 is assigned a value of 0. An RCA that is greater than 1 is assigned a value of 1. The time span considered should be about 25-28 years. This period of time is sufficient to study the direction of structural transformation in any given economy. Starting in 1980-1984, Burkina's exports were classified into four different categories based on their past and present RCA. Those categories are: (i) classics; (ii) disappearances; (iii) emerging champions; and (iv) marginals (Table 1-16). Each quadrant displays: (i) the products in a particular category; (ii) the export shares of those products in two periods 26 years apart; and (iii) their PRODY. The latter suggests that the export share of low PRODY uncarded cotton (1,500) increased from 32 percent to 62 percent. This is detrimental compared to the income growth that would have been possible through an increase in the share of higher PRODY products such as leather, vegetables, sugar, and cotton seed oil.

Table Error! No text of specified style in document.**-2: Sample of Burkina Faso Exports Organized by RCA in 1980-1984 and 2000-2006**

(a) The Classics

RCA 80-84 = 1		SHARE	SHARE	PRODY
RCA 00-04 = 1		80-84	00-06	
1.	Cotton uncarded	32.1	62.3	1,500
2				
3				
4				

(b) Disappearances

RCA 80-84 = 1		SHARE	SHARE	PRODY
RCA 00-04 = 0		80-84	00-06	
1	Oil cake & residues	2.6	0.3	5,718
2				
3				
4				

(c) Emerging Champions

RCA 80-84 = 0		SHARE	SHARE	PRODY
RCA 00-04 = 1		80-84	00-06	
1	Sugar	-	3.4	4,516
2				
3				
4				

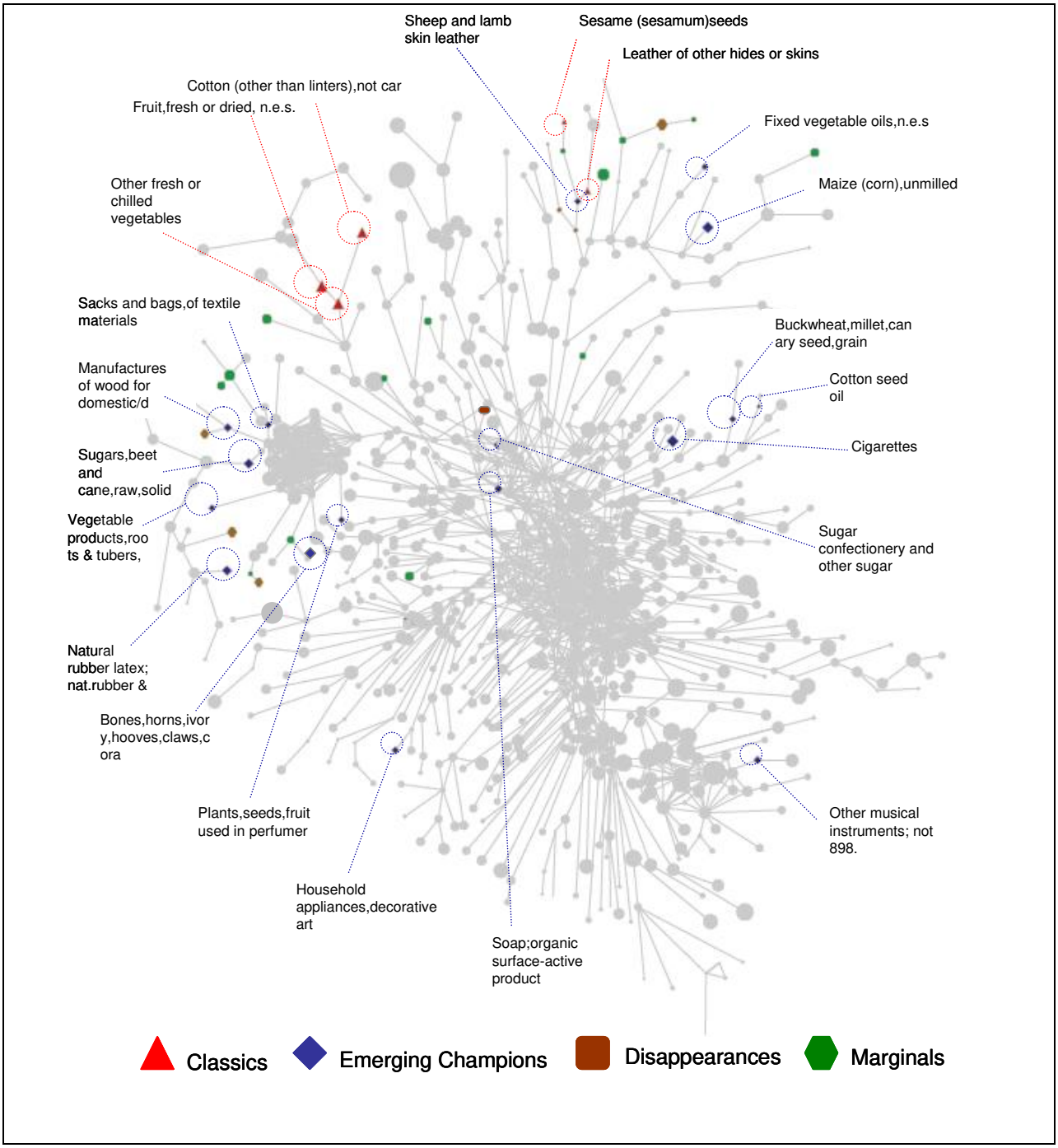
(d) Marginals

RCA 80-84 = 0		SHARE	SHARE	PRODY
RCA 00-04 = 0		80-84	00-06	
1	Cotton seeds	-	0.9	2,473
2				
3				
4				

Source: Authors' representation.

[19] Hausmann and Klinger developed the product space methodology in 2006. This methodology is different from a traditional diversification strategy that adopts a value chain approach. For example, if you are a cotton exporter you can diversify by producing ginned cotton or yarn. Instead, the product space methodology allows firms to diversify in a discontinuous manner to products that may not be a part of the value chain.

Figure Error! No text of specified style in document.**-8: Burkina Faso's Position in the Product Space**[20]



Source: Authors' estimates / Map generated using software by Hidalgo, et. al. (2007) available in http://www.nd.edu/~networks/productspace/index.htm. The colored dots are markers of Burkina Faso's current exports.

[20] Non-monetary gold is also an emerging champion, and is located near the natural rubber product exports.

1.12 **Burkina's inability thus far to diversify out of cotton indicates that catching-up with richer countries requires different and more efficient ways to reach higher PRODY trees.** To determine which high PRODY trees Burkina Faso can move to from its present location depends on its capability and the inputs required for higher PRODY products. Burkina Faso needs to jump to trees in which it has a relatively high density.[21] [22] If densities of the Burkinabè products are low, then the development of higher density products will require longer-term investments in the factors necessary to produce those products. Moreover, because Burkina Faso and a number of its competitors such as Benin export similar products, the densities of related products are likely to be similar.[23]

1.13 **The four categories of exports identified in Burkina Faso based on their comparative advantage have different income potentials.** However, the correlation between density and PRODY of these products is negative.[24] This suggests that a scaling-up to higher PRODY products would be a challenge for the Burkinabè exporters (Figure 1-26). However, reversing this negative trend would trigger a process of sustainable diversification. The four categories are:

- The **classics**, which have maintained an RCA greater than 1 in the past (1980-84) and the present (2000-06). These are traditional exports dominated by cotton. They tend to have low PRODYs that reflect Burkina Faso's low per capita income. A rapidly increasing value (in '000s of US dollars) of the classics indicates their growing concentration in Burkina Faso's export basket. This is mostly due to the high demand for exports of uncarded cotton in China. At 3,100, the average PRODY of the classics is significantly below that of the emerging champions and suggests the diversification into the latter.
- **Disappearances**, which have an average PRODY that is higher than that of the classics. These are products that maintained an RCA greater than 1 in the past, but their present RCA tends to 0. Their density is also very low (0.002 in 2000-2006). Therefore, in the absence of an RCA, it would be risky and inefficient to scale-up these products. Their declining densities also reflect weaker capabilities to export these products.
- **Emerging champions**, which are products in which Burkina Faso has developed an RCA in recent times. They have evolved in a fiercely competitive global market and, on average, have significantly higher PRODYs than the classics. Therefore, they are attractive for income-enhancing diversification. Their lower densities reflect the fact that exporters have had less experience with them. This also suggests that scaling them up would require more effort.

[21] This is the capability – or ease of diversification – density (Hausmann and Klinger, 2006). For each product, density measures how close one specific product is to the country's current production capabilities. Density varies from 0 to 1. The higher the country's density in a product, the easier it is to develop or maintain an RCA in that product. Density basically measures the ease with which the current capabilities in the economy can be adapted to a new product. Unlike other product space concepts, density is a country-specific concept.

[22] Typically, higher densities imply that the country can diversify into the product relatively easily and in the short-term, while lower densities imply longer learning and planning horizons.

[23] Two countries are likely to have similar densities for a product if their capabilities are approximately similar, which implies that there is similarity between their exports.

[24] By contrast, a positive relationship between the PRODY and density of exports would suggest a dynamic economy in which exporters are rapidly sharpening their capabilities to produce higher value products.

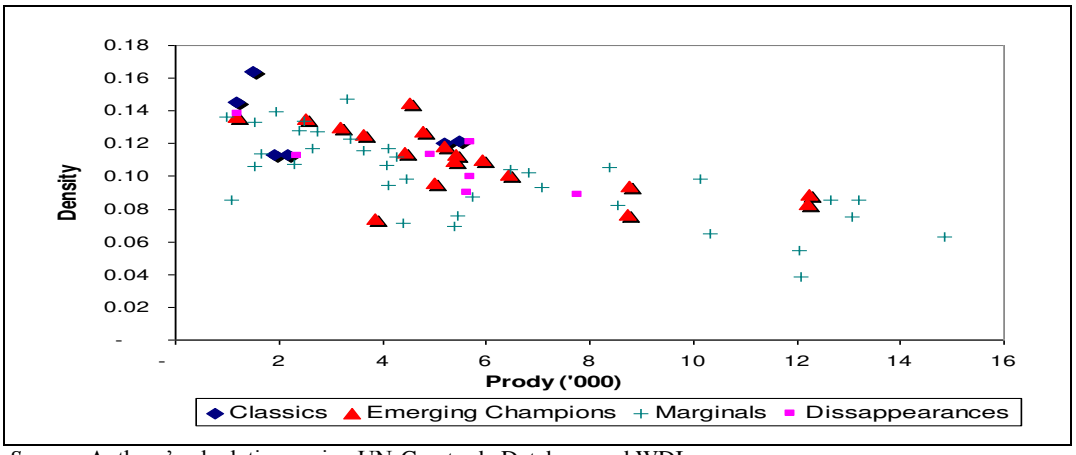
- **Marginals**, which are products in which Burkina Faso has not yet developed an RCA. Some of them are exported sporadically and in very small quantities. Their densities are low (0.003 in 2000-2006). Nevertheless, their PRODY is higher than the classics. They should not be fostered until the country develops an RCA in them and they command a sizable share of exports.

Table Error! No text of specified style in document.**-3: Average Value and Densities for Burkina Faso's Exports**

Exports ('000 US)	1980-84	1990-94	2000-04	2005-06	
- Classics	24,942	98,789	155,496	272,043	
- Emerging Champions	1,030	1,256	37,943	12,454	
- Disappearances	27,075	28,979	5,816	4,428	
- Marginal Products	3,027	2,509	6,007	7,211	
Prody / Density	**PRODY (PPP)**	**Density 1980-84**	**Density 2000-06**	**RCA 1980-84**	**RCA 2005-06**
- Classics	3,100	0.044	0.156	1	1
- Emerging Champions	5,360	0.001	0.006	0	1
- Disappearances	4,412	0.043	0.002	1	0
- Marginal Products	3,581	0.004	0.003	0	0

Source: Authors' calculations using UN-Comtrade Database, concepts from Hausmann and Klinger 2007.

Figure Error! No text of specified style in document.**-9: Density and PRODY in Burkina Faso**



Source: Authors' calculations using UN-Comtrade Database and WDI.

1.14 **Classics such as uncarded cotton and sesame have the lowest income potential, whereas the strong RCA Burkina Faso has in exporting fruits, vegetables and manufactured leather indicates the potential for diversification.** Of all its exports, Burkina Faso has the highest density in uncarded cotton (0.19) and sesame (0.18) – which is consistent with its long experience in cultivation and export of these products. Nevertheless, uncarded cotton and sesame have low PRODY (1,500 and 1,179, respectively) reflecting their primary product status[25] (Appendix 4).[26] Sesame is often touted as a superior substitute for cotton.

[25] Consistent with their technology code PP.

However, because sesame's income potential is even lower than cotton's, scaling it up would not have an income-enhancing effect.[27] By contrast, classics such as fresh fruits and vegetables, and leather have a higher technology content and a significantly higher PRODY (5,187 and 2,156, respectively). This makes them superior alternatives to cotton and sesame. Despite the fact that fruits and vegetables, and manufactured leather have high PRODYs and have given Burkina Faso strong RCAs in the past two decades, they have only managed to capture a low share of exports. This highlights how difficult it has been for Burkina to diversify outside the cotton sector. However, the aforementioned products may be good candidates for scaling-up as a part of an income-enhancing diversification strategy.

1.15 **The total export share of the emerging champions inched up from 4 percent in 1980-1984 to over 15 percent in 2000-2004**. The 16 emerging champions – with the exception of natural rubber – constitute a combination of high PRODY primary resource-based products and low-tech manufactures in which Burkina Faso has recently acquired an RCA (Appendix 4). The current export value of each emerging champion is small but growing. For example, Burkina Faso has a relatively high density of 0.182 in sugar, beet and cane (raw, solid), which rivals cotton and sesame. These are perfect candidates for scaling-up in the short-to-medium term. The densities of most of the agricultural and animal product emerging champions are around 0.14-0.16 higher than the classics, which suggest that a concerted long-term strategy of diversification may be needed to foster the scaling-up of these nascent products. Cultivators could also consider diversifying toward cotton seed oil, vegetable oils, wood products, and even some low-tech products such as sheep and lamb skin leather, sacks and bags of textile material. Non-monetary gold had volatile values in the early 1990s, when its exports boomed and later collapsed. As exports from the newly discovered gold mines come on-line in 2009, the export share of the emerging champions will rise rapidly and record a significant and speedy diversification toward higher PRODY metals. Nevertheless, the limited gold reserves suggest a diversification into more sustainable products.[28]

1.16 **The total export share of disappearances collapsed from 44 percent in 1980-1984 to less than 3 percent in 2005-2006.** In the early 1980s, their aggregate export share exceeded the classics. At that time, uncarded cotton (share of 32 percent) and oil seeds (share of 34 percent) comprised over two-thirds of Burkina Faso's exports. Ten years later, the decline in the share of oil seeds was absorbed by a corresponding increase in the share of cotton. It is not clear why Burkina Faso lost its RCA in a variety of high PRODY animal products, such as hides and skins.

1.17 **The marginals have a low importance in the Burkinabè export basket, with shares ranging from 2-5 percent since the 1980s.** Most of the marginals, including animal products, live animals, skins and tobacco, also have relatively low densities (range of 0.10-0.17). The classifications of some of these products are anomalies, apparently because they seem to be from the same family, and have a similar PRODY and density. One would expect to find marginals such as cotton seeds, cotton waste, beans, peas and lentils, spices and groundnuts in the emerging

[26] Appendix 4 presents a complete product matrix framework. Several export statistics in levels are unreliable (World Bank, DTIS 2007a) and may explain the jumps in levels, especially in recent years. They may also explain some anomalies, such as why beans and peas fall in the marginals group as opposed to the emerging champions.

[27] The low PRODY of sesame is explained by the stagnant world demand. This is unlikely to grow as fast as world income as the world supply of sesame comes mainly from low income countries. As more of the latter compete to export it, its price will fall.

[28] Current estimates suggest that once the metals are exhausted, the export basket will become concentrated again.

champion category. Their misclassification as marginals could be due to data reporting deficiencies.[29]

Selection of Income-enhancing Exports

1.18 **Scaling-up the non-cotton and non-sesame exports is the crux of the export diversification strategy in Burkina Faso.** The development of this strategy depends on how far other products' trees are from the cotton and sesame trees on which Burkina Faso is presently located.[30] However, since the distances between the trees are long (distances between products are the same for all countries), income enhancing diversification is unlikely to occur on its own (Figures 1-27). The distance argument based on product location highlights the need for an income-enhancing diversification strategy.

1.19 **Thus far, diversification has been negligible because most classics and emerging champions are far from the uncarded cotton tree.** It is striking that there are no trees in the vicinity of the cotton tree that would qualify as potential candidates for scaling-up. For example, the closest tree – goat or kid skins – is a disappearance. There are also several marginals and missing exports, but they are not desirable because they have no RCAs, and selecting them would imply picking winners. The classics – sesame and leather trees – as well as the emerging champion sugar and beet trees are the farthest and do not make the jump easily (Figure 1-27). Therefore, an automatic diversification from cotton to other products is unlikely, and explains why – in spite of structural adjustment – diversification in Burkina Faso has not occurred.

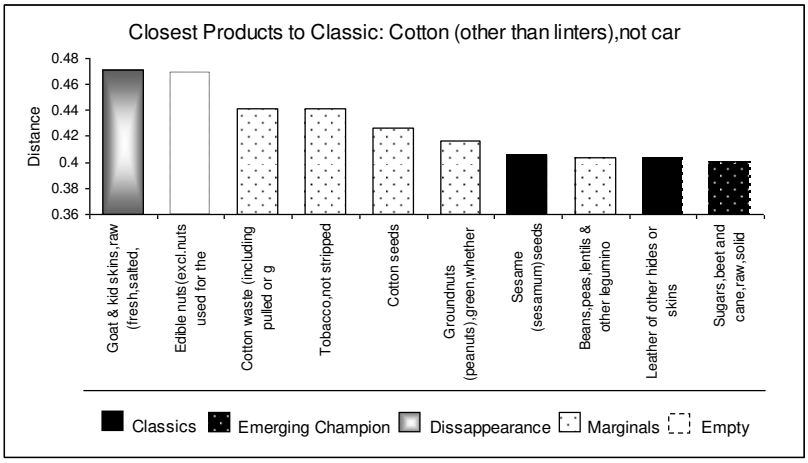
1.20 **Burkina Faso has an RCA in several emerging champions, such as plants, seeds, vegetables and soaps, which suggests export potential.** Figure 1-27 shows that these emerging champions are in the proximity of the classic export – fresh or dried fruits. Since Burkina Faso has an RCA in these products and they are also trees with PRODYs higher than cotton, they may be considered as potentially income-enhancing export products. The other products in the vicinity of the classic fresh or dried fruits are either marginals or simply not a part of the set of products exported by Burkina Faso, which suggests that they would not be good candidates for diversification.

[29] Like the emerging champions and some disappearances, the World Bank DTIS 2007 flags them as new exports – although it does not comment on their competitiveness as measured by their RCA. Because the DTIS notes that live animals are an important export product, it is possible that the official statistics are flawed and report smaller figures. To compensate for missing data, import data reported by Burkina Faso's trading partners (mirror data) were used. This is usually deemed more reliable.

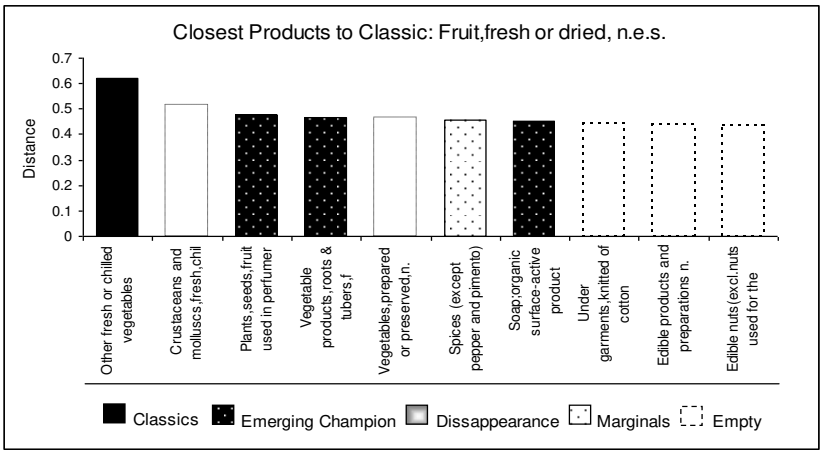
[30] Three factors were used to identify which trees Burkinabè firms can jump to: (i) whether they are in the neighborhood, (ii) whether they have RCAs in Burkina, and (iii) whether they comprise a high PRODY, non-cotton export that should be scaled-up. The distance between two trees is useful in determining whether the jump is feasible – the farther the distance, the more difficult will be the jump.

Figure Error! No text of specified style in document.**-10: Distance between High PRODY Trees**

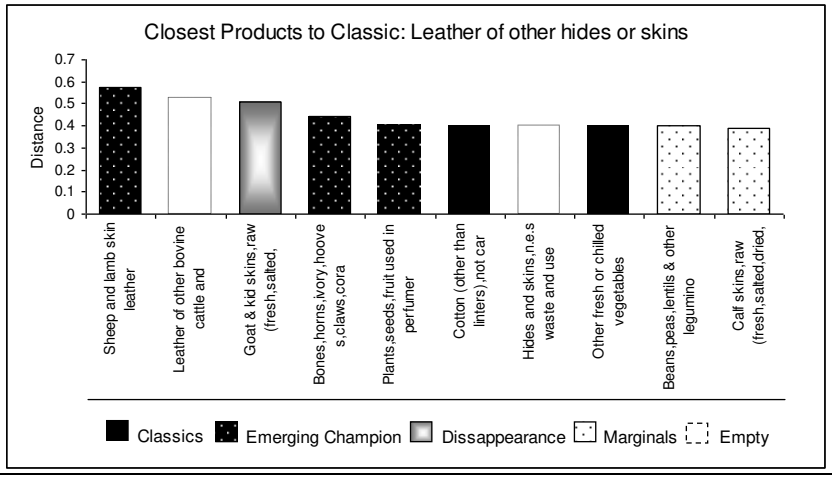
a. The distance between uncarded cotton tree and the emerging champions/classics



b. The distance between fresh or dried fruits and several emerging champions



c. The distance between leather of other hides and skins and the classics



Source: Authors' calculations.

Box Error! No text of specified style in document.**-4: A Comparison between the Product Matrix Framework and the DTIS Results**

The product matrix framework helps identify similar products to the World Bank DTIS 2007 recommendations. Appendix 4 shows several overlaps. The list of common products covers all five classics, and nearly all agro-pastoral emerging champions. It does not cover those products that are more processed. Nor does it cover light manufactures, such as musical instruments, wood manufactures for domestic use, simple household appliances, cigarettes, and surface active organic soap and related products that are prolific in all metal/mineral exporting countries. The disappearances list contains several products that DTIS recommended, such as oil seeds and various types of animal products. The marginals list also contains several products DTIS recommended, such as cotton seeds, cotton waste, groundnuts and other animal products. The product matrix framework – like the DTIS – suggests that Burkina Faso does not have a comparative advantage in exporting cotton textiles.

The differences with the DTIS recommendations may stem from several factors. First, as the DTIS notes, government data is inconsistent with official trade data. The sole source of data used by the product matrix framework is official COMTRADE statistics. The latter were used to verify that export data reported by the Burkinabè Government matches with data reported by the countries importing Burkinabè products. Therefore, the classification of products in the marginals and disappearances list may include some products that could be classified in a different category. This is highly dependent on the accuracy of the COMTRADE statistics.

A significant difference between the product matrix framework and the DTIS is that the former uses a set of objective and robust criteria to screen products in ways that attach to each product a notional income value (PRODY), or a notional capability statistic (Density). Both measures are neutral with respect to data flaws, and independent of whether Burkina Faso has an RCA in the product or whether it is a classic or emerging champion. Density and PRODY are also useful in distinguishing products that can be scaled-up in the medium-term as opposed to the long-term. The framework is useful in informing planning and policy.

The DTIS presents a wealth of information regarding each sector, and also the main sub-sectors of Burkina Faso's exports. It recommends specific actions in the following sub-sectors:

- Cotton: increase farmers' productivity, improve marketing, and manage price fluctuations;
- Livestock: clarify the export data, develop semi-intensive animal production systems to increase live animal exports, and reorganize and strengthen associations of actors and professionals;
- Sesame: encourage private sector development and better organization within the sector, and increase the share of sesame that is processed in Burkina Faso;
- Groundnuts, cashew nuts and shea: improve the groundnut action plan, increase profitable exports of shea nuts, and decide on the level of support to provide to the cashew nut sector;
- Cereals: evaluate potential to expand maize exports, collect better information on increased regional cereals trade, increase the volume of processed cereals sold with greater value added, implement Burkinabè standards for cereals, and relaunch the cowpeas sector action plan;
- Horticulture: assess and improve Burkina's competitiveness in horticultural exports, increase the exports of fruits and vegetables to sub-regional markets, and increase the share in European horticultural product markets;
- Mines: increase the efficiency of artisanal mines, improve the living conditions of artisanal miners, and improve overall sector management;
- Industrial products: increase the value added of by-products, encourage transformation of agricultural products, and develop the hides and skin sector (World Bank, DTIS 2007a).

1.21 **Other options, such as ship and lamb skin leather, bones and horns may provide income-enhancing opportunities.** The emerging champions – sheep and lamb skin leather, bones and horns and plants and seeds – are high PRODY, and, hence, may be good candidates for diversification (Figure 1-27). They are in the proximity of the classic leather of other hides and skins, which is in a relatively dense part of the forest because there are several attractive trees in the vicinity. This highlights the importance of searching for diversification options not

just around cotton, but also around relatively small exports – especially the classic leather of other hides and skins.[31]

1.22 **In the past, gold has not been an outlier in Burkina Faso's export basket – nor will it be in the future**. Interestingly, some of the other products that the country exports – groundnuts, beans, peas, legumes, nuts, hides and skins, leather, and sugar – are in the distant neighborhood of gold. The probability that a given country would have an RCA: (i) in gold and in groundnuts is 0.37; (ii) in gold and in beans and legumes is 0.36; and (iii) in gold and in ores and other metallic concentrates such as manganese and zinc, is 0.51.

1.23 **Burkina Faso may consider a mix of agriculture and manufactured products to lead its economic diversification.** The automatic diversification into manufactured exports is not necessarily a viable option for Burkina since those areas may require a certain level of capacity development, including capital, skilled labor and technology. Table 1-19 identifies a set of approximately 20 products and industries from the classic (all except cotton and sesame) and emerging champion categories that could be scaled-up to achieve an export basket that has a significantly higher income potential. The PRODYs of all these products are higher than cotton's and – with the exception of sugar – their densities are lower than cotton's and sesame's.

Table Error! No text of specified style in document.**-4: Options for Export Diversification in Burkina Faso**

PRODUCT DESCRIPTION	TECH CODE	PRODY (00-04)	DENSITY 00-06	SHARE 80-84	SHARE 90-94	SHARE 00-04	SHARE 05-06	Type
Fruit,fresh or dried, n.e.s.	PP	5,187	0.154	2.0	1.5	0.9	2.0	Classic
Other fresh or chilled vegetables	PP	5,477	0.153	4.0	5.8	1.5	0.7	Classic
Leather of other hides or skins	LT1	2,156	0.156	0.9	2.2	1.8	0.9	Classic
Cotton seed oil	RB1	3,173	0.145	-	-	1.1	0.1	Emerging Champion
Fixed vegetable oils,n.e.s	RB1	5,377	0.140	0.9	0.4	0.2	0.2	Emerging Champion
Sugars,beet and cane,raw,solid	LT1	4,516	0.182	-	-	4.2	1.4	Emerging Champion
Sugar confectionery and other sugar	RB1	8,772	0.127	0.0	0.0	0.2	0.0	Emerging Champion
Vegetable products,roots & tubers,f	PP	4,789	0.158	0.2	0.0	0.3	0.3	Emerging Champion
Plants,seeds,fruit used in perfumer	PP	3,622	0.156	0.1	0.0	0.1	0.1	Emerging Champion
Buckwheat,millet,canary seed,grain	PP	5,009	0.131	0.0	0.1	0.3	0.1	Emerging Champion
Maize (corn),unmilled	PP	6,430	0.129	0.3	-	1.5	0.1	Emerging Champion
Sheep and lamb skin leather	LT1	2,526	0.162	0.1	0.2	2.2	0.6	Emerging Champion
Bones,horns,ivory,hooves,claws,cora	PP	4,419	0.145	0.0	0.0	0.1	0.0	Emerging Champion
Sacks and bags,of textile materials	LT1	5,209	0.146	0.0	0.0	0.1	0.0	Emerging Champion
Manufactures of wood for domestic/d	RB1	5,919	0.141	0.0	0.1	0.2	0.1	Emerging Champion
Household appliances,decorative art	LT2	8,725	0.113	0.0	0.0	0.0	0.0	Emerging Champion
Other musical instruments; not 898.	LT3	3,843	0.106	0.0	0.0	0.1	0.0	Emerging Champion
Cigarettes	RB1	12,204	0.118	-	-	4.0	1.0	Emerging Champion
Soap;organic surface-active product	MT2	5,409	0.150	0.0	0.1	0.2	0.0	Emerging Champion
Gold,non-monetary	RB2	5,716	0.144	2.3	16.9	1.2	1.2	Emerging Champion

1.24 **Unsurprisingly, some of the classics and emerging champions in Burkina Faso's export options can be scaled-up more easily than others.** This suggests that the density or capability to export should guide the diversification process and the scaling-up. In the short-to-medium term, the goal should be to reach out for low hanging fruit or to jump to the nearest

[31] One can also jump to several other trees whose products Burkina Faso does not export (empty), or which are disappearances or marginals. Because the country does not have an RCA in these products, they would be risky choices.

trees, preferably those with fruiter fruits (higher PRODY). Because the three classics with densities of about 0.15 have been exported since 1980, policies that identify and remove constraints that are specific to their scaling-up may be feasible in the short-to-medium term. There is a stronger capability to produce and export champions with densities in the range of 0.14 and upward than the other champions, and the former should be useful in scaling-up in the medium-term. Scaling-up products in industries with low densities would require longer horizons, because the development of industry-specific infrastructure, technologies and skills is a longer-term process. Unless investments in these factors are made quickly, the scaling-up of the remaining emerging champions will not be possible. Although many of the marginals seem like attractive choices for diversification, they are not feasible options because Burkina Faso has never had an RCA in them.

1.25 **The list of classics and emerging champions above offers viable diversification options, warranting specific in-depth value chain analyses.** Growing domestic demand (estimated at 4 percent per annum) and demand in the regional market represent real windows of opportunity. For example, urbanization and increased income are boosting demand for rice, while demand in the regional market for Burkina's products (maize, beans, vegetables and livestock) provides export opportunities. Moreover, outside cotton and sesame, Burkina has a real comparative advantage in supplying products, such as fruits and vegetables, hides and skins, to the international markets. Nevertheless, international and regional markets also require quality and timely delivery. To complement product matrix framework, Chapter 6 zooms in on several agricultural products, such as cereals, vegetables and animal products, and provides a detailed Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis of the respective value chains. While the product matrix framework helps identify the income-enhancing products, the SWOT analysis highlights advantages and bottlenecks at micro and meso levels, along the respective value chains. Table 1-20 highlights a menu of promising value chains that may be candidates to diversification.

Table Error! No text of specified style in document.**-5: Candidates to Economic Diversification outside the Cotton Sector**

Product Space Methodology	**Sectoral Analysis**
Cereals, vegetables and other plants/seeds	
Maize (corn), unmilled***	Traditional cereals (sorghum, millet, maize)
Buckwheat, millet, canary seed, grains***	Rice
Fruit, fresh or dried*	Onions
Other fresh or chilled vegetables*	Tomatoes
Vegetable products, roots and tubers**	Green beans
Plants, seeds, fruits used in perfumes**	Cowpeas
	Sesame****
	Mangoes
	Shea nuts
Animals/meat and other animal products	
	Short-cycle species (poultry, sheep and goats)
	Cattle/Beef
	Milk
Leather, hides, skins and bones/horns	
Leather of other hides and skins*	Hides and skins
Sheep and lamb skin leather**	
Bones, horns, ivory, hooves, claws**	
Processed products	
Cotton seed oil**	
Fixed vegetable oils**	
Sugar, beet and cane, raw, solid **	
Sugar confectionery and other sugar***	
Sacks and bags of textile material**	
Manufactures of wood***	
Household appliances, decorative art***	
Other musical instruments***	
Cigarettes***	
Soap, organic surface-active products**	
Gold, non-monetary**	

Note:
* Classic – density > 0.15 → stronger capabilities to produce and export.
** Emerging champion – density > 0.14 → stronger capabilities to produce and export.
*** Emerging champion – density < 0.14 → weaker capabilities to produce and export.
**** According to the product space methodology, sesame is considered to have an income potential lower than that of cotton.

APPENDIX 1: PERFORMANCE OF OTHER LANDLOCKED OR COMMODITY PRODUCING COUNTRIES

Table A2. 1. Economic Diversification in fast growing landlocked or primary product exporters

Lao PDR

SITC	Product Description	%	Tech	PRODY	SITC	Product Description	%	Tech	PRODY
711	Coffee,whether or not roasted	0.36	PP	1,936	2483	Wood of non-coniferous species	0.18	RB	3,667
2471	Sawlogs & veneer coniferous logs	0.19	RB	8,841	8451	Jerseys,pull-overs,cardigans	0.06	LT1	4,464
2483	Wood of non-coniferous species	0.08	RB	3,667	8423	Trousers,breeches etc.of textiles	0.05	LT1	4,789
2482	Wood of coniferous species,sawn	0.03	RB	11,578	2472	Sawlogs & veneer coniferous logs	0.04	RB1	2,287
2923	Veget.materials - primarily fibres	0.03	PP	2,334	8439	Other outer garments of textiles	0.03	ow Tech	5,408

Kyrgyz Republic

SITC	Product Description (1995)	%	Tech	PRODY	SITC	Product Description (2006)	%	Tech	PRODY
2882	Other non-ferr.base metal waste	0.18	RB2	6,030	2631	Cotton (other than linters)	0.081	PP	1,500
2631	Cotton (other than linters),uncarded	0.11	PP	1,500	2882	Other non-ferr.base metal waste	0.0797	RB2	6,030
2111	Bovine & equine hides	0.09	PP	5,653	6644	Cast,rolled,drawn or blown glass	0.0551	RB2	19,719
6899	Base metals,n.e.s.and cermets	0.08	RB2	3,279	542	Beans,peas,lentils etc.	0.045	HV	2,376
6821	Copper and copper alloys	0.06	RB2	4,900	2820	Waste&scrap metal of iron/steel	0.0442	RB2	5,711

Vietnam

SITC	Product Description	%	Tech	PRODY	SITC	Product Description	%	Tech	PRODY
360	Crustaceans and molluscs,fresh	0.29	PP	3,369	3330	Petrol.oils & crude oils	0.21	PP	5,316
3221	Anthracite,whether/not pulverized	0.12	PP	4,786	8510	Footwear	0.16	LT1	7,765
2320	Natural rubber latex; nat.rubber	0.06	PP	1,169	360	Crustaceans and molluscs,fresh	0.05	PP	3,369
2924	Plants,seeds,fruit for perfumes	0.06	PP	3,622	8219	Other furniture and parts	0.04	LT2	10,855
2919	Other materials of animal origin	0.04	PP	8,387	8439	Other outer garments of textiles	0.03	LT1	5,408

Sri Lanka

SITC	Product Description	%	Tech	PRODY	SITC	Product Description	%	Tech	PRODY
741	Tea	0.36	PP	1,655	741	Tea	0.14	PP	1,655
2320	Natural rubber latex; nat.rubber	0.12	PP	1,169	8439	Other outer garments of textiles	0.08	LT1	5,408
8439	Other outer garments of textiles	0.08	LT1	5,408	8462	Under garments,knitted	0.05	LT1	4,975
3344	Fuel oils,n.e.s.	0.07	RB2	5,032	8459	Other outer garments & clothing	0.05	LT1	6,020
8429	Other outer garments of text fabrics	0.05	LT1	5,624	8423	Trousers,breeches of textiles	0.04	LT1	4,789

Paraguay

SITC	Product Description	%	Tech	PRODY	SITC	Product Description	%	Tech	PRODY
2631	Cotton (other than linters)	0.36	PP	1,500	2222	Soya beans	0.33	PP	6,079
2222	Soya beans	0.30	PP	6,079	111	Meat of bovine animals, fresh	0.12	RB1	8,892
2483	Wood of non-coniferous species	0.06	RB1	3,667	813	Oil-cake & other residues	0.09	PP	5,718
813	Oil-cake & other residues	0.04	PP	5,718	4232	Soya bean oil	0.05	RB1	6,491
1211	Tobacco,not stripped	0.04	PP	3,317	2631	Cotton (other than linters)	0.05	PP	1,500

Guatemala

SITC	Product Description	%	Tech	PRODY	SITC	Product Description	%	Tech	PRODY
711	Coffee,whether or not roasted	0.45	PP	1,936	8451	Jerseys,pull-overs,cardigans	0.11	LT1	4,464
2631	Cotton (other than linters)	0.11	PP	1,500	711	Coffee,whether or not roasted	0.10	PP	1,936
612	Refined sugars and other products	0.09	LT1	4,020	573	Bananas,fresh or dried	0.07	HV	5,183
573	Bananas,fresh or dried	0.09	HV	5,183	8439	Other outer garments of textiles	0.05	LT1	5,408
752	Spices (except pepper and pimento)	0.06	PP	2,650	8459	Other outer garments & clothing	0.05	LT1	6,020

Source: Authors' calculations based on data from WDI and COMTRADE.

APPENDIX 2: PRODUCT SPACE METHODOLOGY

1. Charting a far more complex terrain, Hausmann and Klinger (HK)'s, product space methodology links products to their exporters' income levels with the additional advantage of pairing the possibility of exporting a new and more sophisticated product with the country's *capability* to export it. Without directly assigning a numeric income value to a product, the HK methodology uses the relationship between products to hypothesize how difficult it might be for a low income country to diversify into a product exported by higher income countries.

2. HK construct a space of possibilities for export diversification by mapping all products that countries export onto a set or what they call product space or forest. At the SITC2 – 4 digit level of disaggregation, this forest has about 800 products or trees, and in Hausmann and Klinger's terminology, each tree is occupied by a country's firms that are like monkeys. Diversification occurs when the firms develop new capabilities to export (jump) income-enhancing products which they call 'fruitier trees.'

3. Hausmann, Klinger and Lawrence (2008) show that the common policy prescription that supports diversification in natural resource-based economies through the development of forward linkages or the value chain has *not* fostered greater processing of raw materials in too many countries. They find that 'broad factor intensities do a much better job of identifying patterns of production and structural transformation… Structural transformation favors sectors with similar technological requirements, factor intensities and other requisite capabilities, not products connected in value chains," (Hausmann, Klinger and Lawrence, 2008).

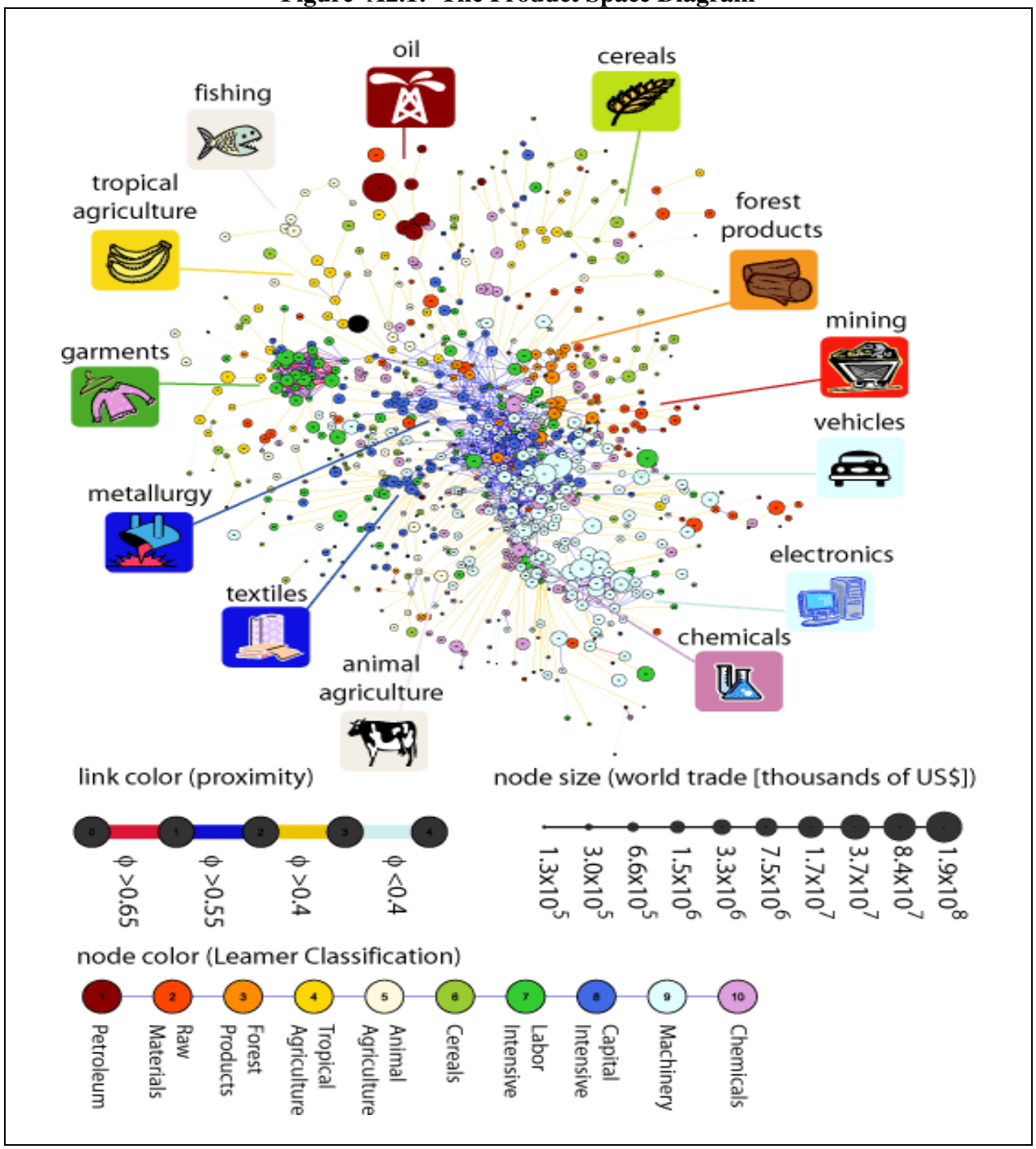
4. In an economy, diversification entails re-allocating resources from the production of a commodity currently produced towards those required by another product. In the case of income-enhancing diversification, this would involve transferring inputs to products with greater income potential (fruitier trees). Of course, this may be difficult in many cases or even impossible. Presumably, it should be easier for inputs to be transferred for the production of products whose trees that are in close proximity such as between those with fruit and vegetables. A map of the product space displays a core that is densely populated with trees whose products require relatively similar inputs such as various types of electronics (Figure A3.1). The jumps from one product tree to another will be short in the core of the product space. In comparison, the periphery contains clusters of trees whose products require relatively dissimilar inputs and are therefore far apart. An example would be a cluster of petroleum products or cocoa trees. The distance between trees does not vary among countries.

5. How easily a country can develop the capability to export a new product depends on its input specificity or how easily its current inputs can be reallocated towards the production of the new product. If the firms in a country are located far from the core, jumps to fruitier trees can be long and hence difficult. Naturally, being in a dense part of the product space is advantageous for catch up.

6. The distance between two trees depends upon the relatedness or similarity in the inputs, no matter how imperfect, needed to produce both products. Inputs include natural endowments, technological capabilities, land, labor, capital, institutions, etc. that a country needs to produce and export a product. As an example, a country that has a suitable environment (soil, climate) to produce vegetables is more likely to move into fruits as opposed to cement. The distance between fruits and vegetables will be shorter (or the proximity greater) than between vegetables

and cement. The concept of distance (or proximity) between products is not an arbitrary number. Its calculation uses the wealth of information available from actual trade data for all countries and is rigorous in the sense that any one country's export mix is unlikely to make a significant difference to its value.

Figure A2.1: The Product Space Diagram



Source: Hidalgo, et. al. (2007)

7. More formally, the proximity between two trees is measured by the conditional probability that exporters that have a revealed comparative advantage (RCA) in product X also have a revealed comparative advantage in product Y. If a country's RCA in a product lies between 0 and 1, Hausmann and Klinger assign it a value of 0; if it is larger than 1, it is assigned a value of 1. In this discussion, if a country has a RCA of 1, it is assumed to have developed a RCA in that product.

8. In their visual network representation of the 800x800 matrix, the unevenly forested product space displays a core comprised of clusters of metals, machinery and chemical trees occupied by high income countries. In contrast, closer to the periphery are clusters of trees such as garments, animal products, cereals, coffee and cocoa trees that are typically occupied by low income countries. It is important to note that the distances between trees or products are the same for all countries. Trees at the core tend to be higher PRODY.

APPENDIX 3: BURKINA FASO'S EXPORTS IN THE PRODUCT MATRIX FRAMEWORK

Table A3.1: Burkina Faso's Exports in the Product Matrix Framework – Classics and Emerging Champions

SITC2-4 digit CODE	PRODUCT DESCRIPTION	TECH CODE	PRODY (00-04)	DENSITY 00-06	LEVEL '000 US$ 80-84	LEVEL '000 US$ 90-94	LEVEL '000 US$ 00-04	LEVEL '000 US$ 05-06	SHARE 80-84	SHARE 90-94	SHARE 00-04	SHARE 05-06	Type	DTIS
2631	Cotton (other than linters),not car	PP	1,500	0.196	18,952	85,781	136,092	250,314	32.1	63.6	54.6	81.4	Classic	x
2225	Sesame (sesamum)seeds	PP	1,179	0.182	2,240	746	9,855	10,747	4.0	0.6	4.0	3.5	Classic	x
579	Fruit,fresh or dried, n.e.s.	PP	5,187	0.154	1,076	1,958	2,188	6,096	2.0	1.5	0.9	2.0	Classic	x
545	Other fresh or chilled vegetables	PP	5,477	0.153	2,152	7,650	3,320	2,115	4.0	5.8	1.5	0.7	Classic	x
6116	Leather of other hides or skins	LT1	2,156	0.156	522	2,656	4,042	2,772	0.9	2.2	1.8	0.9	Classic	x
	Total				24,942	98,789	155,496	272,043	43	74	63	88		
4233	Cotton seed oil	RB1	3,173	0.145			2,368	289	-	-	1.1	0.1	Emerging Champion	x
611	Sugars,beet and cane,raw,solid	LT1	4,516	0.182			11,282	4,165	-	-	4.2	1.4	Emerging Champion	x
620	Sugar confectionery and other sugar	RB1	8,772	0.127	9	5	587	3	0.0	0.0	0.2	0.0	Emerging Champion	x
2320	Natural rubber latex; nat.rubber &	PP	1,169	0.162			834	0	-	-	0.3	0.0	Emerging Champion	
548	Vegetable products,roots & tubers,f	PP	4,789	0.158	130	25	883	807	0.2	0.0	0.3	0.3	Emerging Champion	x
2924	Plants,seeds,fruit used in perfumer	PP	3,622	0.156	85	11	335	337	0.1	0.0	0.1	0.1	Emerging Champion	
4249	Fixed vegetable oils,n.e.s	RB1	5,377	0.140	524	587	428	748	0.9	0.4	0.2	0.2	Emerging Champion	x
459	Buckwheat,millet,canary seed,grain	PP	5,009	0.131	6	94	1,079	256	0.0	0.1	0.3	0.1	Emerging Champion	x
440	Maize (corn),unmilled	PP	6,430	0.129	154		4,484	256	0.3	-	1.5	0.1	Emerging Champion	x
6115	Sheep and lamb skin leather	LT1	2,526	0.162	38	230	4,822	1,785	0.1	0.2	2.2	0.6	Emerging Champion	x
2911	Bones,horns,ivory,hooves,claws,cora	PP	4,419	0.145	1	19	123	128	0.0	0.0	0.1	0.0	Emerging Champion	
6581	Sacks and bags,of textile materials	LT1	5,209	0.146	22	38	163	47	0.0	0.0	0.1	0.0	Emerging Champion	x
6354	Manufactures of wood for domestic/d	RB1	5,919	0.141	25	82	405	281	0.0	0.1	0.2	0.1	Emerging Champion	
6978	Household appliances,decorative art	LT2	8,725	0.113	26	45	118	129	0.0	0.0	0.0	0.0	Emerging Champion	
8982	Other musical instruments; not 898.	LT3	3,843	0.106	3	33	194	88	0.0	0.0	0.1	0.0	Emerging Champion	
1222	Cigarettes	RB1	12,204	0.118			9,441	3,098	-	-	4.0	1.0	Emerging Champion	
5541	Soap;organic surface-active product	MT2	5,409	0.150	6	87	398	35	0.0	0.1	0.2	0.0	Emerging Champion	
9710	Gold,non-monetary	RB2	5,716	0.144	1,436	22,468	2,507	3,840	2.3	16.9	1.2	1.2	Emerging Champion	x
	Total				2,467	23,723	40,450	16,293	4	18	16	5		

Source: Author´s calculations

Table A3.2: Burkina Faso's Exports in the Product Matrix Framework – Disappearances and Marginals

SITC2-4 digit CODE	PRODUCT DESCRIPTION	TECH CODE	PRODY (00-04)	DENSITY 00-06	LEVEL '000 US$ 80-84	LEVEL '000 US$ 90-94	LEVEL '000 US$ 00-04	LEVEL '000 US$ 05-06	SHARE 80-84	SHARE 90-94	SHARE 00-04	SHARE 05-06	Type	DTIS
2238	Oil seeds and oleaginous fruit. n.e	PP	1,902	0.140	19,913	893	1,108	464	34.0	0.6	0.5	0.2	DISSAPPEARANCE	x
813	Oil-cake & other residues (except d	PP	5,718	0.136	1,421	530	1,025	25	2.6	0.4	0.4	0.0	DISSAPPEARANCE	
2114	Goat & kid skins,raw (fresh,salted,	PP	1,217	0.167	2,219	2,259	85	7	3.8	1.6	0.0	0.0	DISSAPPEARANCE	x
2117	Sheep & lamb skins without the wool	PP	2,349	0.153	251	36	832		0.4	0.0	0.4	-	DISSAPPEARANCE	x
2116	Sheep & lamb skins with wool on,raw	PP	4,956	0.136	1,180	2,295	12		2.1	1.7	0.0	-	DISSAPPEARANCE	x
2111	Bovine & equine hides (other than c	PP	5,653	0.121	520	190	38	6	0.9	0.1	0.0	0.0	DISSAPPEARANCE	x
8997	Basketwork,wickerwork etc. of plait	LT2	7,789	0.111	136	308	210	86	0.2	0.2	0.1	0.0	DISSAPPEARANCE	x
	Total				25,639	6,511	3,309	588	44	5	1	0		
2223	Cotton seeds	PP	2,473	0.159		1,078	2,307	3,194	-	0.9	0.8	1.1	MARGINAL	x
2633	Cotton waste (including pulled or g	PP	4,117	0.142		120	146	65	-	0.1	0.1	0.0	MARGINAL	x
6513	Cotton yarn	LT1	4,262	0.136	1	2	1,989	1,215	0.0	0.0	1.0	0.4	MARGINAL	
542	Beans,peas,lentils & other legumino	HV	2,376	0.154	46	1	51	432	0.1	0.0	0.0	0.1	MARGINAL	
752	Spices (except pepper and pimento)	PP	2,650	0.152	20	6	29	1	0.0	0.0	0.0	0.0	MARGINAL	
2221	Groundnuts (peanuts),green,whether	PP	2,739	0.149	91	21	52	57	0.2	0.0	0.0	0.0	MARGINAL	x
4312	Anim./veget.oils & fats,wholly/part	RB1	5,465	0.121	56		393	777	0.1	-	0.2	0.3	MARGINAL	
2112	Calf skins,raw (fresh,salted,dried,	PP	4,065	0.129	34	219	20	2	0.1	0.2	0.0	0.0	MARGINAL	x
12	Sheep and goats, live	PP	1,079	0.118	300	486	16	623	0.5	0.3	0.0	0.2	MARGINAL	x
11	Animals of the bovine species,incl.	PP	4,391	0.101	2,326	429	138	148	3.4	0.3	0.1	0.0	MARGINAL	x
8960	Works of art,collectors pieces & an	LT2	8,542	0.118	110	148	349	614	0.2	0.1	0.2	0.2	MARGINAL	x
1211	Tobacco,not stripped	PP	3,317	0.170			73	46	-	-	0.0	0.0	MARGINAL	
1212	Tobacco,wholly or partly stripped	PP	1,531	0.139	3		371		0.0	-	0.2	-	MARGINAL	
2922	Shellac,seed lac,stick lac,resins,g	PP	987	0.165	40		43	39	0.1	-	0.0	0.0	MARGINAL	
2732	Gypsum,plasters,limestone flux & ca	PP	5,721	0.121			29		-	-	0.0	-	MARGINAL	
	Total				5,536	8,516	13,219	7,216	7	4	5	2		

Source: Author´s calculations

APPENDIX 4: EXPORT DIVERSIFICATION-TECHNICAL DEFINITIONS DISTANCE BETWEEN A PAIR OF PRODUCTS

Distance between a pair of products

$$\varphi_{i,j,t} = \min\left\{P\left(x_{i,t} \mid x_{j,t}\right), P\left(x_{j,t} \mid x_{i,t}\right)\right\}$$

With these calculations we can construct a matrix with all the minimum conditional probabilities for each pair of products. This matrix is a representation of the product space. It contains a numerical measure of revealed distance between each pair of products in the classification.

In the fourth step we simply add all distances in a matrix-row to obtain a very straightforward measure called Product Path.

$$paths_{i,t} = \sum_{j} \varphi_{i,j,t}$$

Product Paths are a fixed measure for every product and they allow us to rank products according to their RCA potential. Because the RCA potential was constructed using conditional probabilities given the condition of having RCA, product path ranks products according to its potential to generate RCA in more products. This is an Export Diversification Potential. For example, the path of cocoa is one of the lowest in all the product classification, meaning that cocoa is not a good product from which a country can diversify and generate RCA in many other products.

In the final step, we develop the concept of product density. It is obtained using previously calculated product distances and categorical variables.

$$density_{i,c,t} = \left(\frac{\sum_{k} \varphi_{i,k,t} x_{c,k,t}}{\sum_{k} \varphi_{i,k,t}} \right)$$

The concept of density recognizes that the more one pair of exporting products are related, the stronger the force to create RCA in one, given that the other had already attained it. The figure below presented by Hausmann and Klinger (2006) exemplifies this case. Using all goods without comparative advantage in initial period t, the density around goods also without RCA in t +1 is shown in brown, and those with comparative advantage in t +1 in green. This means that products with higher densities tend more to have *revealed comparative advantage* in the future. Finally, product densities vary for each year and country.

EXPY – SUMMATION OF THE PRODYS (WEIGHTED)

The productivity level associated with a country's i's export basket, EXPY, is in turn defined by

$$EXPY_i = \sum_l \left(\frac{x_{il}}{X_i}\right) PRODY_l$$

This is a weighted average of the PRODY for that country, where the weights are simply the value shares of the products in the country's total exports.

Source: Hausmann, Hwang and Rodrik (2005)

PRODUCT SPACE DEFINITIONS

The construction of our set of tools is based on Hausmann and Klinger (2006) and it has been developed in five steps. The first step is to identify the products on which each country experiences a *revealed comparative advantage (RCA*). For this, the Balassa-*RCA* Index is calculated for each country, commodity and year in our sample. In a given year *(t)*, a country *(c)* has a revealed comparative advantage in a certain product *(i)* if the *RCA* Index is greater than 1. For example, Ghana has a revealed comparative advantage in cocoa because Ghana's cocoa share in world cocoa exports is greater than Ghana's share in total world exports.

$$RCA_{c,i,t} = \frac{xval_{c,i,t} \Big/ \sum_i xval_{c,i,t}}{\sum_c xval_{c,i,t} \Big/ \sum_i \sum_c xval_{c,i,t}} = \frac{xval_{c,i,t} \Big/ \sum_c xval_{c,i,t}}{\sum_i xval_{c,i,t} \Big/ \sum_i \sum_c xval_{c,i,t}}$$

The second step is quite simple, and it consists in the creation of a categorical variable that identifies those products that have a *revealed comparative advantage* in each country's export basket.

$$x_{i,c,t} = \begin{cases} 1 & if \quad RCA_{i,c,t} > 1 \\ 0 & otherwise \end{cases}$$

In the third step, a measure that can identify *revealed distance* between products is constructed that can avoid any priors one might have as to the root cause of that similarity. Hausmann and Klinger (2006) call it product distance. Product distances (ϕ) for each pair of products *(i,j)* are calculated using the minimum of two conditional probabilities: the probability of having *RCA* in product *j*, given that countries experience *RCA* in product *i*; and the probability of having *RCA* in product *i*, given that countries experience *RCA* in product *j*.

PRODY – THE INCOME-LEVEL OF A PRODUCT

Hausmann, Hwang and Rodrik (2005) define the sophistication of each product in terms of the per capita incomes of the countries that export it. They construct this in steps. First, for each product exported, they calculate the weighted average of the GDP per capita of countries that export that product. The weights denote the revealed comparative advantage of each country that exports that product. In this way, they determine an "income level" for each product, which they call *PRODY*. "Rich countries export rich country products." In this sense, the PRODY reflects the incomes of the type of countries that export the product, i.e. their capabilities embodied in all the factors that make them rich countries – technological sophistication, access to markets and capital, human capital etc.

The productivity level associated with product k:

$$PRODY_k = \sum_j \frac{(x_{jk}/X_j)}{\sum_j (x_{jk}/X_j)} \quad *GDP\_j$$

- Where xjk=Xj , is the value-share of the commodity in the country's overall export basket.
- The denominator aggregates the value-shares across all countries exporting the good
- The index represents a weighted average of per-capita GDPs,
- Weights are the revealed comparative advantage of each country in good k

Products and their Prody values over time

SITC 2 CODE	Product Description	Prody 1980-84
371	Fish, prepared or preserved,n.e.s. i	3035
589	Fruit otherwise prepared or preserved	5869
711	Coffee, whether or not roasted	637
721	Cocoa beans, whole or broken, or raw	582
2320	Natural rubber latex; nat.rubber	910
2631	Cotton (other than linters),not carded	530
2876	Tin ores and concentrates	736
2927	Cut flowers and foliage	2286
3414	Petroleum gases and other gaseous hydrocarb.	4830
6116	Leather of other hides or skins	1063
6672	Diamonds, unwork, cut/otherwise work.	3088
6872	Tin and tin alloys, worked	11974
7764	Electronic microcircuits	11907
8451	Jerseys,pull-overs,twinsets,cardigans	2402
8510	Footwear	4202

REVEALED COMPARATIVE ADVANTAGE

Revealed Comparative Advantage (1)

$$RCA(c,i) = \frac{\frac{x(c,i)}{\sum_i x(c,i)}}{\frac{\sum_c x(c,i)}{\sum_{i,c} x(c,i)}}$$

Share of coffee in Uganda's total exports

Share of coffee in total World Exports

Uganda has a RCA in coffee when the share of coffee in its total exports is larger than the share of coffee in global exports.

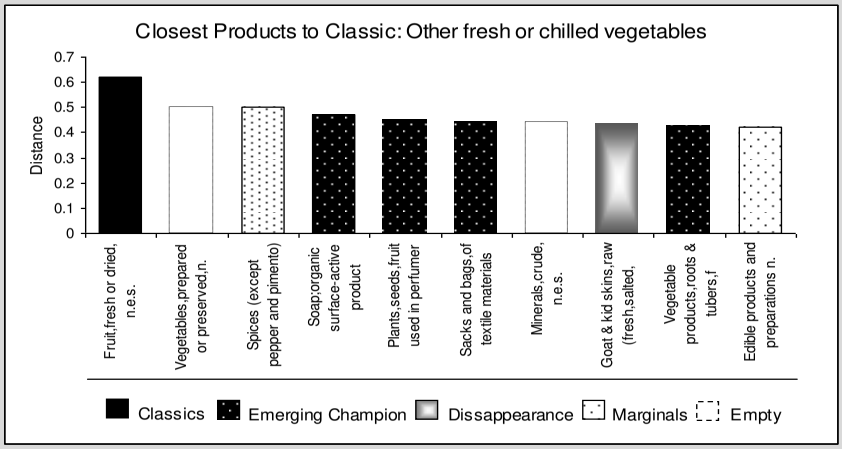
In 2000-04:

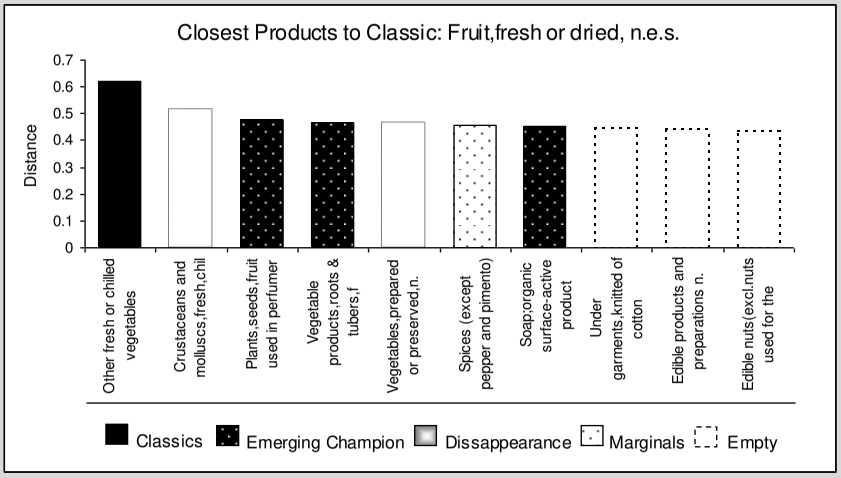
- **Share of coffee in Uganda's exports=36%** ⇒ **RCA in Coffee >1**
- Share of coffee in World exports= 0.001%

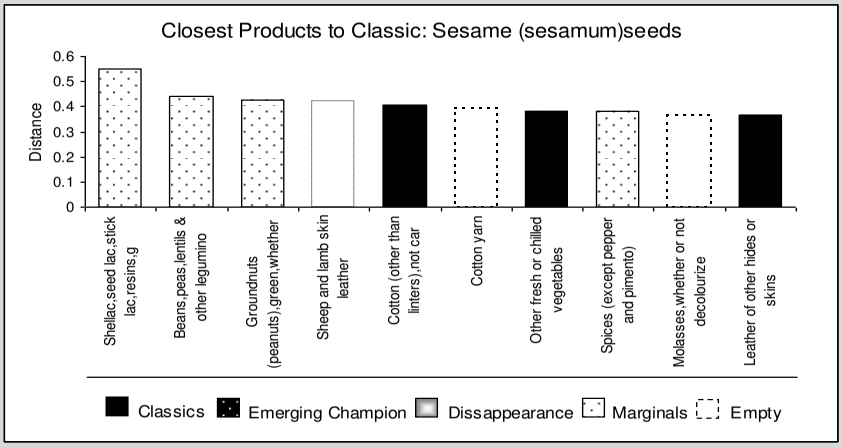
- **Uganda's Share of Fresh Fish Fillet=12%** ⇒ **RCA in Fresh Fillet >1**
- Share of Fresh Fish Fillet in World exports= 0.0004%.

- **Share of Fresh Potatoes in Uganda's exports = 0.0001%** ⇒
- Share of Fresh Potatoes in World exports = 0.0002%. **RCA in Potatoes <1**

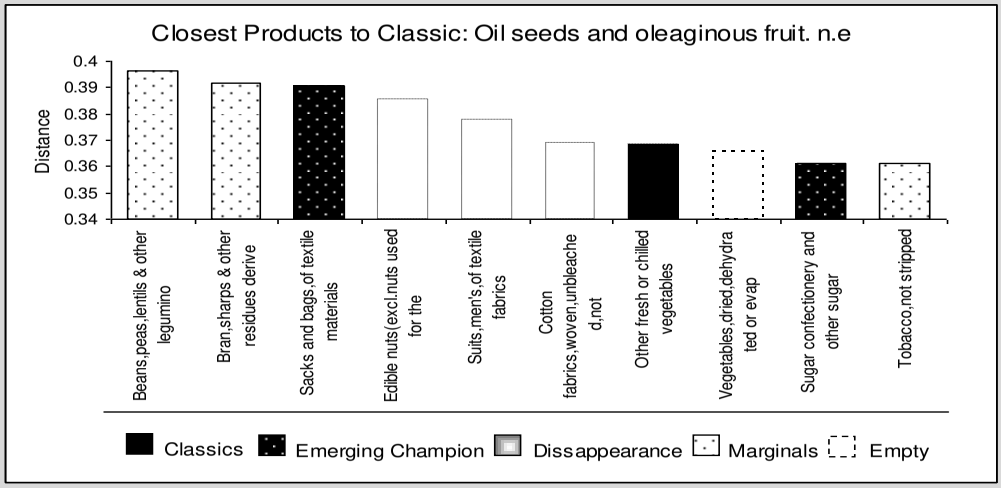
APPENDIX 5: BURKINA FASO'S CLASSIC EXPORTS AND NEIGHBORING PRODUCTS

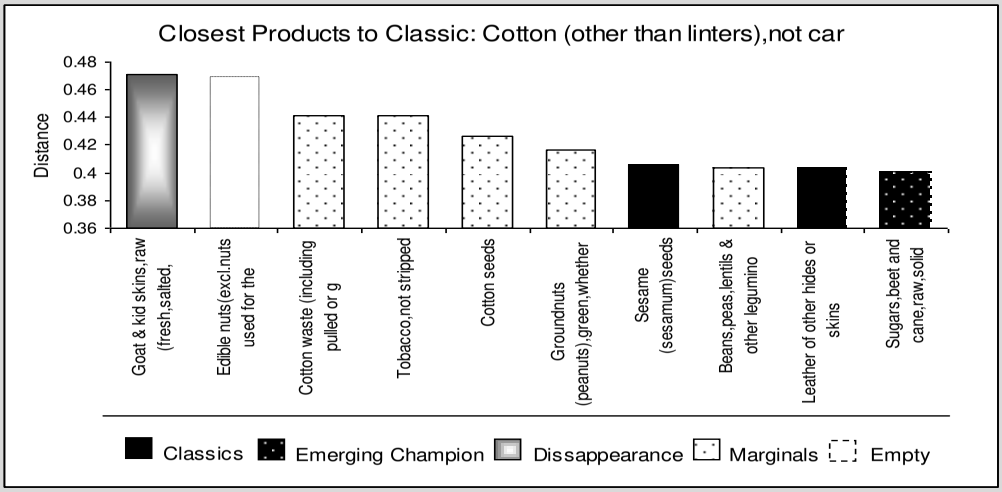


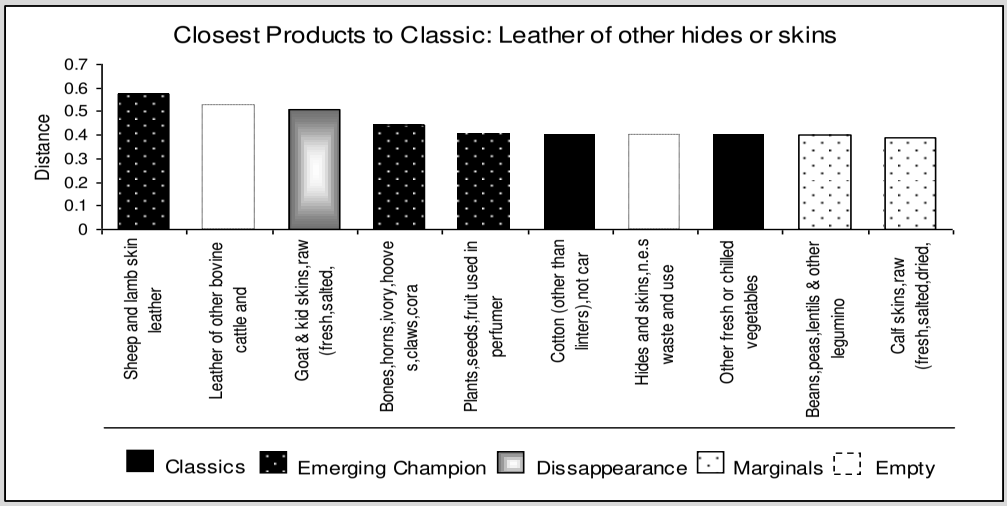




Source: Authors' calculations







Source: Authors' calculations

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