

SPATIAL PATTERNS OF REVEALED COMPARATIVE ADVANTAGE OF PAKISTAN'S AGRICULTURAL EXPORTS

KHALID RIAZ and HANS G. P. JANSEN*

Abstract. Pakistan is widely believed to be underperforming as far as its agricultural export potential is concerned. However, analyses to support this allegation are very few, in part due to the lack of easily accessible data. By using a detailed data set on country level trade flows and adapting Balassa's concept of revealed comparative advantage to regional context, this study attempts to fill this knowledge gap. Revealed comparative advantage indices for a fairly wide range of Pakistan's agricultural exports to several regional markets and country markets are presented. Unlike earlier analyses that looked at the world market only, analysis of spatial patterns of revealed comparative advantage offers new insights. Several product and region combinations are identified where Pakistan has demonstrated comparative advantage despite not enjoying such advantage at the world level. In addition, the analysis highlights opportunities in bilateral trade, especially in trade with neighbours. Finally, the approach identifies top export markets for Pakistan's main exports, and sheds light on the types of agricultural products from Pakistan that have the potential for penetrating the markets in developed countries.

*The authors are, respectively, Professor, Department of Management Sciences, COMSATS Institute of Information Technology, Islamabad (Pakistan), and Senior Agriculture Economist, Sustainable Development Network, Agriculture and Rural Development Unit, South Asia Region (SASDA), World Bank.
Corresponding author e-mail: kriaz100@gmail.com

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I. INTRODUCTION

Many analysts of the Pakistan economy in general the agriculture sector in particular believe that the country is punching below its weight as far as agricultural export performance is concerned. Specifically it is often argued that Pakistan has a comparative advantage in a number of agricultural commodities but fails to exploit this advantage to its fullest potential in overseas markets.

However, little or no analysis has been done that sheds some more light on this issue, in the sense of better specifying in which commodities and which markets Pakistan's comparative advantage is strongest. This paper attempts to start filling that void by quantifying the degree of comparative advantage of Pakistan agricultural export products in major overseas markets. This quantification is a necessary first step in getting a better handle on the factors that may limit the extent to which Pakistan is able to enter markets where it has a comparative advantage. Expansion of Pakistan's share in overseas export markets is crucial for further development of the country's agricultural sector.

Mahmood (2004) analyzed comparative advantage for Pakistan's non-agricultural sector. Hanif and Jafri (2008) studied RCA for Pakistan textile sector, and Mehmood *et al.* (2012) focused on chemicals sector. Only a few studies have attempted to analyze actual comparative advantage for Pakistan's agricultural exports. For example, Akhtar *et al.* (2009) constructed RCA index for Pakistan's fruit exports. Samaratunga *et al.* (2007) and CARIS (2008) considered the country's revealed comparative advantage for a few broad categories of agricultural products. Riaz (2009) was the first study that estimated RCA indices for a fairly wide range of agricultural products, using the world market for each product as the reference market. However, to better understand factors that limit Pakistan's agricultural export potential, there is a need to identify specific markets and products where the country enjoys demonstrated comparative advantage. The present paper extends the analysis of Riaz (2009) by incorporating spatial dimensions into investigation of relative export performance. We demonstrate that new insights can be gained by considering actual export performance at regional levels and within the context of bilateral trade, and especially the trade with neighbours.

The paper analyzes actual export flows and calculates measures of revealed comparative advantage. The focus in this paper being on agricultural trade, the analysis is based on international trade data that incorporates a unique degree of detail not seen before in trade analyses for Pakistan.

The paper is organized as follows. The next section presents the concept of revealed comparative advantage due to Balassa, and explains how the concept can be operationalized to measure revealed comparative advantage in the regional context. The spatial patterns of revealed comparative advantage are analyzed from three alternative vantage points. Section III identifies product-region combinations where agricultural products demonstrated strong relative export performance. This is followed in the next section by an analysis of revealed comparative advantage in Pakistan's trade with its neighbours. What are the top regional markets for Pakistan's main agricultural products? This question is addressed in section V. The last section provides conclusions and recommendations.

II. THE CONCEPT OF REVEALED COMPARATIVE ADVANTAGE

Revealed comparative advantage (RCA) indices offer a useful way of analyzing a country's comparative advantage, based on demonstrated (*i.e.* actual) export performance. This contrasts with other popular measures such as the domestic resource costs coefficients (DRCs) that are considered indicators of potential comparative advantage and often used in *ex-ante* types of analysis of export possibilities.¹

The original RCA measure was proposed by Balassa (1965) who defined the export performance of a specific product/industry from a country – as measured by revealed comparative advantage index – as the relative share of

¹The DRC ratio of a traded product is the ratio of the domestic social costs of export production to foreign exchange earned (Bruno, 1963). The numerator is domestic resources and non-traded inputs valued at their opportunity costs, and the denominator is the net foreign exchange earned or saved (*i.e.* value added) by producing the product domestically. The DRC can be loosely interpreted as “the domestic resources needed to generate one unit of foreign exchange”. Since output and tradable inputs are valued at border (world market) prices, a DRC ratio smaller than one is indicative of “efficient” national production giving the country a “comparative advantage” in the product in question.

The studies that used DRCs to investigate Pakistan's *ex ante* comparative advantage in agricultural products include Qudus and Mustafa (2011), Fatima *et al.* (2007), Khan (2001), AERC (1991), Ahmed (1993), Apleyard (1987), Longmire and Debord (1993), Maan and Khawaja (1993) and Mahmood (1991).

the country's export of the product in the world export of the same product, divided by the overall share of the country in world exports. More specifically, the revealed comparative advantage index of product j exported from country i (RCA_{ji}) can be expressed as follows:

$$RCA_{ji} = \frac{\frac{X_{ji}}{X_{jw}}}{\frac{X_i}{X_w}} \quad (1)$$

Where

- X_{ji} = exports of product j from country i
- X_{jw} = world exports of the product j
- X_i = exports of country i
- X_w = world exports

The RCA index ranges from 0 to infinity with 1 as the break-even point. That is, a RCA value of less than 1 means that the product has no export comparative advantage, while a value above 1 indicates that the product has a "revealed" comparative advantage.² It should be noted that the RCA index is not symmetrical in the sense that one cannot compare both sides of the break-even point.³

MEASURING REGIONAL REVEALED COMPARATIVE ADVANTAGE

The RCA index presented earlier in Section II (equation (1)) uses the world market as the reference market. In order to enable disaggregation of the analysis of revealed comparative advantage at the regional and bilateral levels, equation (1) was adapted as follows:

$$RCA_{ji}^R = \frac{\frac{X_{ji}^R}{X_i^R}}{\frac{X_{jw}^R}{X_w^R}} \quad (2)$$

²Note that RCA_{ji} can also be written as $(X_{ji}/X_i) / (X_{jw}/X_w)$ which when larger than one can be interpreted as "country i has a revealed comparative advantage in product j because the share of product j in country i 's total exports exceeds the share of product j in total world exports".

³The aspect of symmetry was addressed by Laursen (1998).

Here RCA_{ji}^R is the revealed comparative advantage index for exports of product j from country i into region R , and

$$X_{ji}^R = \text{Exports for product } j \text{ from country } i \text{ to region } R$$

$$X_i^R = \text{Exports of country } i \text{ to region } R$$

$$X_{ji} = \text{Total exports of product } j \text{ from country } i$$

$$X_i = \text{Total exports of country } i$$

If RCA_{ji}^R exceeds one then we conclude that the country i has a comparative advantage in the export of product j to the reference market R . This is so because a value of this index greater than unity implies that the share of product j in country i 's exports to region R exceeds the share of product j in the country's total exports.⁴ The reference market may be a region such as the EU or SAARC, or alternatively it could be a single country such as the USA or UAE.

The conceptual RCA index defined above is quite flexible in terms of both product definition and geographic coverage of the markets considered. Various definitions of the 'product' can be used to compute the value of the index. For the purposes of this paper, the Standard International Trade Classification (SITC⁵) was used because it allows products to be defined at various levels of aggregation. Moreover, the flexibility of the index with respect to geographic coverage means that relative export performance can be studied at global or at regional levels.

The analysis in this paper spans a ten year period from 1999-2008 and the data were obtained from IMF's trade database.⁶

⁴Note that RCA_{ji}^R can also be written as $(X_{ji}^R/X_{ji}) / (X_i^R/X_i)$ which resembles Balassa's original measure but narrows it down to the RCA of a country (in this case Pakistan) in a particular geographical area (in this case region R).

⁵The SITC system was developed by the UN in 1962 with the intention of classifying traded products not only on the basis of their material and physical properties and stage of processing but also their economic functions in order to facilitate economic analysis. From 2007 onwards the SITC consists of 10 one-digit sections, 67 two-digit divisions, 262 three-digit groups, 1,023 four-digit groups, and 2,970 five-digit headings. Section "0" is "Food and Live Animals". For detailed information see Shaw (2009).

⁶ See <http://www.imfstatistics.org/DOT/>.

For the purposes of this study, Pakistan's agricultural exports were taken to be products listed under the SITC's 'Food and live animals' (code = 0) category. From the perspective of analyzing trade performance, only those agricultural products are included that figure prominently in Pakistan's exports. The following categories were therefore selected at the SITC 2-digit level:

- 01 – Meat and meat preparations
- 02 – Dairy products and birds' eggs
- 04 – Cereals and cereal preparations
- 05 – Vegetables and fruit

Each of these categories has several sub-categories and more than 20 disaggregated products were considered for this study. On the other hand, in this preliminary investigation also some other agricultural products were excluded. Among these are cotton (SITC code 263) which is a key cash crop in Pakistan; fish (SITC code 03); hides and skins (SITC code 21); and cut flowers and foliage (SITC code 292.7). In recent years Pakistan has become a net importer of cotton. The share of other excluded products in Pakistan's exports is relatively low, although they remain in the domestic market.

DEFINING REGIONAL MARKETS

Having defined revealed comparative advantage at regional level, the next step is to define regions. Towards this end, a regional classification of countries was developed based on the UN regional classification and other major economic groupings. The economic groupings selected were the European Union (EU), South Asian Association for Regional Cooperation (SAARC), Association of South East Asian Nations (ASEAN) and the Gulf Cooperation Council (GCC).

Some of the regional groupings such as the EU have highly uniform trade policies and no barriers to trade between member states. Other economic groupings have varying degrees of common trade policies. For example, while SAARC member countries are gradually introducing preferential trade arrangements for other members under the South Asia Free Trade Agreement (SAFTA), many obstacles remain (for an in-depth discussion of SAFTA, see Chapter III in World Bank 2010). In most cases, however, countries within a particular regional grouping have some common characteristics. For example, the EU is dominated by highly developed industrial economies and a number of economies in transition; ASEAN comprises mostly newly industrialized countries; and GCC is a grouping of

oil-rich Middle Eastern states. These common characteristics generate similar demand patterns that provide a strong rationale for constructing regional (synthetic) RCA indices.

In addition to economic groupings, countries were also classified based on their respective geographic sub-regions. These sub-regional groups included Central Asia, North Africa, Sub-Saharan Africa and Latin America. Broad similarities in levels of economic development and other geographic characteristics within sub-regions provide some justification for this classification.

Partial overlap of economic groupings and regions made it necessary to classify countries in a sub-region that were not in the relevant regional economic grouping into 'Rest of' regional groups. The latter include Rest of East Asia (RO EASTASIA), Rest of Europe (RO EUROPE), Rest of Middle East (RO Middle East) and Rest of the World (RO World). Finally, some large countries were treated as entirely separate markets including USA, China, Japan, Russian Federation, Australia, Canada and Mexico.⁷

III. SPATIAL PATTERNS OF REVEALED COMPARATIVE ADVANTAGE

This section presents patterns of comparative advantage for main categories of Pakistani agricultural exports with a view to identify product and market combinations where relative export performance has been demonstrably strong. The various tables in this section mention only those regions where Pakistani export products have a revealed comparative advantage (*i.e.* markets where RCA values exceed 1).

MEATS AND MEAT PRODUCTS

Although livestock contributes over half of Pakistan's agricultural GDP, the country does not have a worldwide comparative advantage in meat and meat products (see Table 1 in section IV.1 above). Low productivity in the livestock sector, sizeable domestic demand, and the inability to meet overseas SPS requirements are some of the factors that explain the modest export performance. However, once comparative advantage is analyzed on a

⁷Mexico was taken as a separate market because the remaining two North American countries – USA and Canada – were similarly treated. The other possibility would have been to lump together all three as North American Free Trade Agreement (NAFTA) countries. However, the size of the US market and the importance of its trade relations with Pakistan weighted in against doing this.

regional basis, it turns out that beef and meat exports from Pakistan do enjoy a comparative advantage in the GCC region with RCA indices exceeding 5 for both product categories (Table 1). This can largely be explained by the geographical proximity of the GCC region to Pakistan. In addition various types of meat offal find good markets in China and East Asia.

TABLE 1

Regional RCA of Pakistani Meat Products in Different Regions

SITC code	Product category	Region	RCA
011	Beef, fresh/chilld/frozn	Gulf Coop Council	5.52
012	Meat n.e.s., fresh/chilld/frozn	Gulf Coop Council	5.48
016	Meat/offal preserved	Gulf Coop Council	5.20
017	Meat/offal presvd n.e.s.	China	2.07
017	Meat/offal presvd n.e.s.	Gulf Coop Council	1.80
017	Meat/offal presvd n.e.s.	RO_EASTASIA	2.29
017	Meat/offal presvd n.e.s.	SAARC	3.06

TABLE 2

Regional RCA of Dairy Products and Eggs and Sub-categories

SITC code	Product category	Region	RCA
02	Dairy products and eggs	SAARC	4.57
022	Milk products excl butter/cheese	SAARC	5.07
023	Butter and cheese	EU	1.08
023	Butter and cheese	Gulf Coop Council	1.63
023	Butter and cheese	RO_EASTASIA	2.47
023	Butter and cheese	SAARC	2.93
024	Cheese and curd	Gulf Coop Council	3.75
024	Cheese and curd	USA	1.41
025	Eggs, albumin	Gulf Coop Council	1.23
025	Eggs, albumin	RO_MIDEAST	1.27
025	Eggs, albumin	SAARC	3.80

Table 2 indicates that the dairy products and eggs category (SITC code 02) have strong revealed comparative advantage in the SAARC market only. The same is true for SITC code 022 which mainly consists of milk powder. On the other hand, a number of other sub-categories representing processed dairy products (milk powder, butter, cheese and curd) also enjoy a comparative advantage in several other markets, including some in developed countries. For example, butter, cheese and curd products (SITC codes 022 and 023) have strong revealed comparative advantage in both SAARC and GCC regions with the RCA measure approaching 4 in both cases. This is followed by good relative export performance in East Asia (non-ASEAN countries). But perhaps even more importantly, Pakistani exports of butter, cheese and curd enjoy a certain degree of comparative advantage in the high-income EU and US markets where consumers are particularly quality-conscious. This suggests that moving up the processing chain can allow penetration into markets of high-income regions.

CEREALS

Although Pakistan is a large producer of wheat, it is not a significant wheat exporter mainly because of high domestic demand. Nevertheless, wheat exports to Afghanistan – through official and informal channels – take place on a regular basis, mainly driven by Afghanistan's traditional (but highly variable) food grains deficit and Pakistan's relative geographic proximity.⁸ This situation is reflected in relatively high value of the RCA index of 2.4 for the SAARC region as a whole (Table 3).

Rice is Pakistan's largest food export earner. From a regional perspective, promising export destinations for this product are in Middle East and sub-Saharan Africa (Table 3). However, at a more disaggregated level there are several individual countries that are good markets of Pakistani rice, as will become clear from the discussion of bilateral RCA indices in section VII below.

Over the last decade, maize productivity in Pakistan has been on an upward trend mainly due to the increased use of hybrid seeds. Table 3 shows that the RCA index for maize is highest in "Rest of the World" region (6.36), followed by the ASEAN region (3.86) and the Gulf countries (1.95). Just like rice the export performance of Pakistani maize in high income country markets is also fairly robust (see section VII).

⁸The links between food security in Pakistan and Afghanistan are discussed in detail in World Bank (2010).

TABLE 3
Regional RCA for Cereals

SITC code	Product category	Region	RCA
041	Wheat/meslin	ASEAN	1.37
041	Wheat/meslin	Gulf Coop Council	1.21
041	Wheat/meslin	North Africa	1.16
041	Wheat/meslin	SAARC	2.42
041	Wheat/meslin	Sub Saharan Africa	1.71
042	Rice	Gulf Coop Council	2.31
042	Rice	Sub Saharan Africa	1.10
043	Barley grain	Gulf Coop Council	1.96
043	Barley grain	SAARC	4.54
044	Maize except sweet corn	ASEAN	3.86
044	Maize except sweet corn	Gulf Coop Council	1.95
044	Maize except sweet corn	RO_WORLD	6.36
044	Maize except sweet corn	RO.WESTASIA	1.27
044	Maize except sweet corn	SAARC	1.59

Barley grain exports seem largely to result from the proximity advantage in the SAARC (mainly Afghanistan) and GCC markets.

VEGETABLES

Exports in the fresh, chilled, and frozen vegetable category (SITC code 054) show revealed comparative advantage in South Asian and Gulf countries (Table 4). This pattern of revealed comparative advantage is a result of the transport cost advantage, limitations imposed by perishability of vegetables, and relatively lower SPS standards in these markets. At the same time the latter two factors also prevent exports to farther away (but higher value) markets in Europe and North America, at least for the time being. The transport cost advantage of Pakistani vegetable exports is less in the Gulf than within South Asia which is reflected by a lower value of the RCA index.

Processed vegetable products not only have much longer shelf life and are less bulky, but the higher degree of processing also makes it possible to conform to more stringent quality requirements. Vegetable preparations and preserved vegetables enjoy relatively strong comparative advantage in the

EU and non-EU European markets. This again underscores the fact that processing can help opening up markets in more developed countries.

TABLE 4

Regional RCA for Vegetables and Processed Vegetable Products

SITC code	Product category	Region	RCA
054	Vegetables, fresh/chilled/frozen	Gulf Coop Council	1.38
054	Vegetables, fresh/chilled/frozen	SAARC	3.48
056	Vegetable root/tuber preparations/preservatives	EU	2.89
056	Vegetable root/tuber preparations/preservatives	RO_EUROPE	1.65

ORANGES AND MANDARINS

Pakistan is the largest exporter of *Kinnow* mandarin in the world. On the other hand, exports of (sweet) oranges are relatively minor, and strong export performance of *Kinnow* is limited to regional markets in the ASEAN and Gulf countries (Table 5).

TABLE 5

Regional RCA for Oranges and Mandarins

SITC code	Product category	Region	RCA
05711	Oranges, fresh or dried	ASEAN	1.44
05711	Oranges, fresh or dried	CANADA	3.11
05711	Oranges, fresh or dried	Gulf Coop Council	1.57
05711	Oranges, fresh or dried	RO_WORLD	1.71
05711	Oranges, fresh or dried	SAARC	2.84
05711	Oranges, fresh or dried	Sub Saharan Africa	2.40
05712	Mandarins etc. fresh/dried	ASEAN	2.02
05712	Mandarins etc. fresh/dried	Gulf Coop Council	1.73

Outside of these regions there are individual country markets such as Iran where *Kinnow* exhibits strong relative export performance (see section VII). However, the strong revealed comparative advantage of *Kinnow* does not seem to exist in developed country markets. The reasons for this are more stringent SPS requirements, higher degree of bitterness in taste compared to oranges, and large numbers of seeds in the fruit.

OTHER FRUITS AND FRUIT PREPARATIONS

Pakistan has a substantial comparative advantage in the export of dates (SITC code 0596) to countries in the SAARC region (Table 6). In the case of Pakistan, the category fresh 'avocado/mango/guava' (SITC code 0597) represents primarily mango exports. The revealed comparative advantage in this category is strong in markets in Europe and Gulf countries (Table 6).

TABLE 6

Regional RCA for Mangoes, Other Fruits and Fruit Preparations

SITC code	Product category	Region	RCA
0596	Dates, fresh/dried	SAARC	4.91
0597	Avocado/mango/guava fresh	EU	1.19
0597	Avocado/mango/guava fresh	Gulf Coop Council	4.13
058	Fruit preserved/fruit preps	EU	1.13
058	Fruit preserved/fruit preps	Gulf Coop Council	1.76
058	Fruit preserved/fruit preps	SAARC	1.12
059	Fruit/vegetable juices	EU	1.78
059	Fruit/vegetable juices	SAARC	2.39

For Pakistan this is the only example of a product with a rather modest level of processing⁹ that has strong revealed comparative advantage in developed country markets. This is attributable to the high quality of mango varieties grown in Pakistan. On the other hand, equally noteworthy is the fact that similar inroads have not been made into the US market, possibly due to

⁹Mango processing largely consists of grading, cleaning, and packaging.

more stringent SPS requirements and transport disadvantages. It has been observed that mangoes from Pakistan have ‘excellent eating qualities’ but inconsistent quality and relatively short shelf life (see *e.g.* Jansen, 1991). As a result Pakistan mangoes fetch relatively low prices even in high quality markets (Collins *et al.*, 2006). Table 6 also shows that preserved fruits, fruit preparations, and fruit juices have substantial revealed comparative advantage in the high income EU and GCC markets.

IV. BILATERAL TRADE BETWEEN PAKISTAN AND NEIGHBOURING COUNTRIES

This section presents and discusses patterns of revealed comparative advantage with Pakistan’s principal neighbours: Afghanistan, China, India and Iran.

AFGHANISTAN

Pakistan provides the main transit trade route for land-locked Afghanistan. The most diversified pattern of comparative advantage of Pakistani products exists in the Afghan market (Table 7).

TABLE 7
RCA with Afghanistan

SITC code	Product category	RCA
017	Meat/offal preserved n.e.s.	11.6
022	Milk products excluding butter/cheese	34.9
023	Butter and cheese	29.1
025	Eggs, albumin	18.4
041	Wheat/meslin	17.0
042	Rice	2.1
043	Barley grain	29.8
044	Maize except sweet corn	16.0
045	Cereal grains n.e.s.	20.1
046	Flour/meal wheat/meslin	33.2
047	Cereal meal/flour n.e.s.	9.9
048	Cereal etc flour/starch	4.4
054	Vegetables, fresh/chilled/frozen	4.0
058	Fruit preserved/fruit preparations	3.9
059	Fruit/vegetable juices	9.6
05712	Mandarins etc fresh/dried	1.7

Wheat flour has a RCA index value of 33. Grains from Pakistan, particularly wheat, also have strong comparative advantage in Afghanistan as indicated by RCA index values in the high teens and twenties. Although the RCA index value of 2.0 for rice indicates comparative advantage, the value is an order of magnitude smaller than that for other grains, reflecting preferences of the Afghan population that consumes mostly wheat. Milk powder is another product with a very high comparative advantage. Strong revealed comparative advantage is also evident in a range of processed products including butter and cheese, fruit/vegetable juices, preserved fruits and fruit preparations.

INDIA

India is a huge potential market where Pakistan enjoys a transportation cost advantage. The figures in Table 8 indicate the products with the strongest revealed comparative advantage: these include dates, vegetables and fruits (especially oranges). Exports of fruit and vegetable juices to India have shown a growing revealed comparative advantage since 2004.

TABLE 8
RCA with India

SITC code	Product category	RCA
023	Butter and cheese	1.9
025	Eggs, albumin	3.1
041	Wheat/meslin ¹	9.9
054	Vegetables, fresh/chilled/frozen	26.0
057	Fruit/nuts, fresh/dried	30.2
059	Fruit/vegetable juices	2.4
05711	Oranges, fresh or dried	14.8
05796	Dates, fresh/dried	90.4

¹The RCA index value for wheat is based on a one-time export in 2007.

IRAN

Rice exports provide a degree of stability to the otherwise rather erratic pattern of Pakistani exports to Iran (Table 9). Over the past decade, the RCA index for rice has been consistently high with an average of around 9, indicating strong revealed comparative advantage of Pakistani rice in Iran.

TABLE 9
RCA with Iran

SITC code	Product category	RCA
042	Rice	9.1
048	Cereal etc flour/starch	1.2
054	Vegetables, fresh/chilled/frozen	5.6
057	Fruit/nuts, fresh/dried	2.0
059	Fruit/vegetable juices	4.8
05712	Mandarins etc fresh/dried	7.0
05797	Avocado/mango/guava fresh	1.5

Even though Pakistani vegetables also exhibit revealed comparative advantage in the Iranian market, the year-to-year pattern is highly variable. The same holds for fruit juices and fresh or dried fruits/nuts. The Iranian citrus market has opened up for Pakistani exports only recently. RCA index values for mandarin (*Kinnow*) were in excess of 10 during 2006-08 although the average for the past decade was 7.0. However, the risk of instability cannot be ruled out even in this category. For example, in early 2009 Iran raised import duties on *Kinnow* mandarins even though this increase was undone later that same year.

CHINA

Meat offal (SITC code 017) is the only agricultural product from Pakistan whose exports to China are significant as indicated by a RCA index value of 11.6. Even though the aromatic long-grain Basmati rice is a key export product from Pakistan to many countries throughout the world, it does not have market in China due to different preferences among Chinese rice consumers. Vegetables also have limited potential because China is not only the world's largest producer and consumer of vegetables but also a large exporter. Pakistan may want to explore the prospects of mango exports to China. Pakistani mangoes have done well in high income markets in western countries and also in Brunei. There may well be good potential for Pakistani mangoes for developing a niche in the Chinese market.

V. TOP EXPORT MARKETS FOR SELECTED PRODUCTS

This section identifies export markets for selected Pakistani agricultural products where revealed comparative advantage exists. The selected products

include mangoes, *Kinnow* mandarins, and dates. For the purpose of market identification, two filtering criteria were employed. First, the selected markets have an average RCA greater than one during the period 1999-2008. Second, Pakistan has exported the product in question to the specific market during six or more years during that same period.

MANGOES

Mango exports from Pakistan exhibit strong revealed comparative advantage in Oman, Saudi Arabia, United Arab Emirates and Brunei. The value of the RCA index for mango for the Oman market is 15 and in the remaining three markets it ranges between 5 and (nearly) 7. In addition there are several other Middle Eastern markets where RCA index values are high. An interesting aspect of mango exports is their penetration into European markets. The RCA index value is 3.7 for Norway, 2.9 for Switzerland, and 2.8 for the UK. Pakistani exporters may want to team up with major supermarket chains in these countries to further increase their market share.

TABLE 10
RCA of Mango in Different Markets

Market	No. of years exported during 1999-2008	Mean RCA
Oman	10	15.0
Saudi Arabia	10	6.8
United Arab Emirates	10	5.9
Brunei	8	5.5
Bahrain	10	4.4
Qatar	10	4.1
Norway	10	3.7
Maldives	10	3.6
Switzerland	10	2.9
United Kingdom	10	2.8
Kuwait	10	2.6
Singapore	10	2.0
Malaysia	10	1.0

KINNOW MANDARINS

The top markets for Pakistani *Kinnow* mandarins have been the Philippines and Indonesia with RCA index values of 39.2 and 25.0, respectively (Table 11). However, exports values to the Philippine market and the resulting RCA index values have been rather variable during the latter part of the 1999-2008 period.

Table 11
RCA of *Kinnow* Mandarins in Different Markets

Market	No. of years exported during 1999-2008	Mean RCA
Philippines	10	39.2
Indonesia	10	25.0
Singapore	10	8.3
Iran, Islamic Republic	8	7.0
Sri Lanka	10	6.3
Malaysia	10	3.6
Bahrain	10	3.4
Saudi Arabia	10	3.0
Mauritius	10	2.9
United Arab Emirates	10	2.7
Romania	6	2.3
Afghanistan	10	1.7
Oman	9	1.3
Kuwait	10	1.2

The next tier of important markets for mandarins would include Singapore, Sri Lanka, and Iran where average RCA index ranged from 6.0 to 8.0. The Iranian market opened up only in 2006 and has a tremendous potential for future development. On the other hand, the comparative advantage of Pakistani mandarins in the Singaporean, Sri Lankan and also the Malaysia markets has eroded somewhat in the second half of the 1999-2008 period. The factors that are responsible for this decline in export

performance are not quite clear and need to be identified through further research.

DATES

India is the largest importer of Pakistani dates. The transportation cost advantage and strong demand translate into an overwhelming revealed comparative advantage (RCA index value of 90) for Pakistani dates in India (Table 12). Although the size of the Nepali market is small compared to the Indian market, relative export performance of Pakistani dates there has also been quite strong. Pakistani dates also have revealed comparative advantage in Denmark where export performance has been quite consistent in recent years. Pakistan exports dates to Paraguay but the performance in that market has been rather unstable.

TABLE 12
RCA of Dates in Different Markets

Market	No. of years exported during 1999-2008	Mean RCA
Denmark	10	1.2
India	10	90.4
Maldives	7	1.1
Nepal	9	31.0
Paraguay	6	2.0

VI. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Given its relatively fertile soils, diversity of agro-ecological conditions and significant water resources from the Indus Basin, Pakistan is widely believed to be underperforming as far as its agricultural export potential is concerned. However, analyses to support this allegation are very few, in part due to the lack of easily accessible data. In this paper we provide the first necessary step in the analysis of Pakistan's comparative advantage in agricultural export markets. We use an index of Revealed Comparative Advantage that incorporates spatial dimensions to determine the competitiveness of selected agricultural products in overseas export markets. Unlike many other studies that analyze comparative advantage only at the world level, we were able to

access detailed data from the IMF that allowed us to determine the degree of Pakistan's agricultural competitiveness for disaggregated products in specific export markets. The earlier analysis had suggested that at the world market level Pakistan has a comparative advantage in cereals (especially rice) and horticultural products but not in livestock products. However, once specific markets and individual products are considered, the picture becomes considerably more nuanced.

Whereas relatively low yields in wheat and cotton combined with poor public policies towards these crops limit their export performance, Pakistan has traditionally been a significant player in the world rice market. However, even the relatively high value of the RCA index for rice is to a significant degree attributable to the fact that rice trades in a thin international export market. More efforts may be made to further strengthen the revealed comparative advantage in rice by brand name marketing, better quality control, measures of economic diplomacy (with a possible role of Pakistan's embassies) and by teaming up super-market chains aimed at increasing market access for Pakistan's Basmati rice variety in high-end markets in Europe and North America.

Our analysis suggests that there is considerable scope for further strengthening Pakistan's already considerable revealed comparative advantage in mandarin (*Kinnow*). Adoption of improved agronomic practices, control of citrus diseases, and targeted trade promotion campaigns in East-Asian and Central Asian markets can help. Development of seedless varieties of *Kinnow* and diversification into other citrus varieties (*e.g.* Clementine) with a view to penetrate the high-end citrus markets should be a medium term policy objective. Pakistan should also capitalize on the recently opened up Iranian market for mandarins. A measure of economic diplomacy would be needed to ensure that exports are not disrupted by sudden changes in import duties and other taxes in the importing country.

Besides fresh fruits exports, there exists considerable potential for increasing exports of processed citrus products. The citrus processing industry in Pakistan, while highly export oriented, is currently limited to grading, polishing and packing. In order to capitalize on the potential, there is need for developing a wide range of processed citrus products, including *Kinnow* juice and pulp, and by-products such as citrus peel oil. But serious quality control issues have to be addressed before the citrus processing industry diversification can be achieved. At present, the lowest quality *Kinnow* fruits are used for making juice, which is sold in the domestic market. This type of juice and other products of similar quality cannot be

exported and there is a need to upgrade this industry before exports can be successful.

The relative export performance of mango is quite strong. Adoption of “good agricultural practice” protocols and subsequent certification by importers would help enhance export performance further. High quality mangoes should be marketed more aggressively in high-end markets; for example, Pakistan has high quality mangoes that may find a niche in Chinese fruit market if appropriate market development efforts are made. Better quality control and adherence to SPS protocols along with more aggressive marketing could provide opening for Pakistani mangoes in the US market. Choice brands of high quality mango nectar could also be developed as niche products for certain export markets.

Dates typically found in arid regions are produced in all provinces of Pakistan and the country also has strong demonstrated comparative in their export. Dissemination of post harvest technologies among farmers in remote date-growing regions, and investments in modern processing and packaging facilities can help leverage this advantage. Pakistan may also try to expand the range of marketed date products.

Other fruits such as apples, peaches, grapes etc that are grown in Balochistan and NWFP have much weaker export performance. Access to modern marketing channels would seem essential for improving export volumes of these products.

Even though Pakistan has a revealed comparative advantage in vegetable exports, most of these exports go to neighbouring countries which represent mostly low-value markets. There already exists some vegetable cultivation in tunnels in Pakistan but most of this production is sold during the off-season in domestic markets. However, there is a need for investigating the prospects for exporting these vegetables during the off-season in overseas import markets.

Improved post harvest technologies and better cool chain infrastructure are needed to address perishability issues that currently limit the scope for exports of vegetables to more distant markets. Penetration into high-income developed country markets also requires mainstreaming good agricultural practices, certification and traceability. The traditional wholesale marketing system where produce is sold in the local *Mandi* markets before exports take place makes traceability virtually impossible. Institutional innovation that involves contract farming by, or on behalf of, exporting firms may help to resolve marketing obstacles.

Dairy products are another area of weak relative export performance. This is mainly caused by the predominance of traditional marketing channels that make quality assurance difficult, low milk yields from inadequately fed and mostly non-descript breeds of animals, and high domestic demand. The dairy processing sector is mostly inward-looking and where it does export (*e.g.* to Afghanistan) the main export product is UHT milk. In other words the industry currently seems to overlook the potential for exporting a wider range of dairy products (*e.g.* butter and cheese, and milk powder). But for this to happen there is a need for technical improvements in the milk processing sector. On the other hand, relatively small quantities of cheese produced in Pakistan have made an inroad into high-income countries such as the USA and Europe which demonstrates the potential of moving up the processing chain.

Analysis of bilateral and regional trading patterns reveals that processed products have relatively better prospects for penetrating high-income markets. These are precisely the products that use inputs acquired through non-traditional marketing channels. In the dairy sector, these channels are typically operated by large commercial dairy firms. But the product quantities that move through them are a very small proportion of total output. Expanding the coverage of non-traditional channels requires investments in cool chain infrastructure – preferably under public private partnership modalities – and improving the efficiency of private dairy firms so that they could sell more to middle income strata in urban areas.

With the exception of some limited exports to the Gulf, meat products are another area of weak export performance. Although domestic demand for meat is high, the real impediment to meat exports are SPS concerns: Pakistan needs to improve/upgrade its abattoirs and establish cold chains. Most importantly, it needs to invest in animal health services to ensure a disease-free livestock population, in research for improving livestock's genetic pool and for improving fodder varieties.

Trade with neighbours offers quite good prospects for enhancing agricultural exports. Afghanistan is an important market for a very wide range of Pakistani agricultural products. This market has potential to absorb exports from nascent Pakistani processing industry especially in the dairy processing sector. Indian market needs to be further exploited, which would require greater degree of normalcy in relations with that country. In addition to dates, vegetables, and processed products, revealed comparative advantage in orange exports to India, a citrus variety other than mandarin, offers possibilities for moving away from the near-monoculture in citrus

production, as well as for diversification of citrus exports. Pakistan needs to aim for achieving greater stability in export performance *vis-à-vis* Iran by better quality assurance, adherence to SPS requirements, and economic diplomacy. Penetrating the Chinese market represents a challenge for Pakistani exporters because the country is a large and highly diversified producer of agricultural products; the type rice the Chinese consumers favour is different for Pakistan's signature Basmati variety; and Chinese population concentration is greater on its eastern coast which is at considerable distance from Pakistan's land borders. Nevertheless, high quality mangoes and mango nectar exports, supported with aggressive marketing efforts, have prospects for penetrating the Chinese market. Focusing marketing efforts on areas neighbouring Pakistan, such as Sinkiang province of China may also pay dividends.

Finally, it must be stressed that this study is just a first step; more in-depth and market-and product-specific research will be needed to determine the specific investments and policy measures needed to increase Pakistan's competitive advantage in promising export markets and expand its market share.

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