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The analysis of production and trade patterns in cocoa market worldwide and in Poland

Abstract. Cocoa belongs to the group of one of the most valuable commodities in the world. Most production of cocoa beans takes place in the African countries in the Equatorial "Cocoa Belt". However, most processing of raw products is made in Western European countries. Poland is a substantial producer of confectionery chocolate products, therefore the country imports cocoa butter and cocoa paste, which gives it 8th and 6th place in the world in terms of quantity imported. This paper presents an analysis of the world's major cocoa trading countries in four basic physical forms: cocoa beans, cocoa butter, cocoa paste and cocoa powder.

Key words: cocoa trade, cocoa production, market analysis, Poland

Introduction

Cocoa and its products has been grown and used in Central and South America for thousands of years, however in Western European culture cocoa was virtually unknown until the late 16th Century. Up to around the 20th Century, cocoa and the chocolate made from it was regarded as a luxury product. It was only after the turn of the 20th Century that cocoa production crossed the amount of 100,000 tons annually. But the real explosion of cocoa production started after the Second World War and steadily continues until today. In general, cocoa production can be split into two kinds: fine or flavored cocoas, which account for less than 3 per cent of the total and bulk cocoas [Wood et. al 2008]. Today cocoa is a well-established and important crop in the world commodities trade. It's also a cash crop for growing countries and a key import for processing and consuming countries [Cocoa 2012]. It is one of the world's most valuable crops, cultivated worldwide on more than 9 million hectares, grown in 58 countries, and worth over US$4 billion annually. Economic cocoa cultivars are grown for the production of dried beans, which are the source of cocoa liquor, cocoa butter, cocoa cake and cocoa powder [Pohlan 2010]. This article explores statistics data in production and trade of bulk cocoa and cocoa products. It presents an analysis of the world's major cocoa trading countries in four basic physical forms: cocoa beans, cocoa butter, cocoa paste and cocoa powder.

Research Method

The analysis is based on data from The Food and Agriculture Organization of The United Nations in the time period between 2007 and 2011. In cases where the time series is

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longer than the five year period, prices and production were derived from the Bloomberg database. The data was developed by utilizing a comparative analysis. Basic statistical measures were applied for the data analysis, as well as the classical method of inference. A deduction method was used for the assessment of events.

Analysis of Cocoa Production

In 2011 the world cocoa bean production reached the highest level in the period of interest and peaked at 4,6 mln tons. In terms of area harvested, 2011 was also a record year with over 9,9 mln hectares harvested. At the same time the prices for cocoa beans have seen a dramatic increase from around $1000 USD per metric ton in year 2000, up to $3000 USD in year 2011. However, looking at the graph it is difficult to draw a binding conclusion whether the increase in production was due to the rise in price. It should be taken into account that there are many factors behind the price increase, not only changes in consumer preferences, but also speculation, as well as monetary pumping in some of the biggest economies of the world.

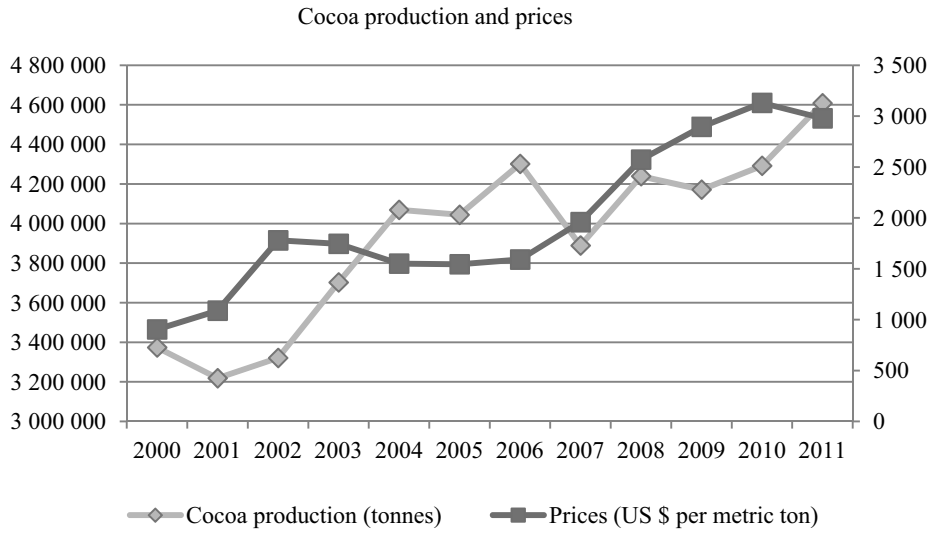

Fig. 1. Cocoa production and prices in the years 2000 - 2011

Source: own study based on the data from Bloomberg database [Bloomberg 2014].

In 2011, the top twenty producers supplied 4,5 mln tons of cocoa beans, which accounts for 98,5% of all cocoa bean production in the world. Looking at regional production of cocoa it's easy to notice the overwhelming predominance of African countries, followed by South-East Asia and South America. In 2011 out of the top twenty producers in the world, the African countries supplied 3,0 mln tons of cocoa beans which amounts to 66,7% of world production. The Asian countries supplied 0,78 mln tons which amounts to 17% and South American countries supplied 0,67 mln tons which is 14,7%.

Table 1. Production of cocoa beans in the world (top 20 largest producers)

No.	Country	Production (tonnes)				
		2007	2008	2009	2010	2011
1	Côte d'Ivoire	1 229 908	1 382 441	1 223 153	1 301 347	1 559 441
2	Indonesia	740 006	803 593	809 583	844 626	712 200
3	Ghana	614 500	680 781	710 638	632 037	700 020
4	Nigeria	360 570	367 020	363 510	399 200	400 000
5	Cameroon	212 619	229 203	235 500	264 077	272 000
6	Brazil	201 651	202 030	218 487	235 389	248 524
7	Ecuador	85 891	94 300	120 582	132 100	224 163
8	Togo	78 000	111 000	105 000	101 500	100 000
9	Peru	31 387	34 003	36 803	46 613	56 500
10	Dominican Rep.	43 322	45 518	54 994	58 334	54 279
11	Colombia	39 904	44 740	44 740	39 534	44 241
12	Papua N.Guin.	49 300	51 500	59 400	39 400	42 000
13	Mexico	31 000	27 000	24 000	20 000	21 388
14	Venezuela	18 911	20 457	18 000	18 000	18 000
15	Malaysia	35 180	27 955	18 152	18 929	15 975
16	Uganda	10 006	13 000	15 000	15 000	15 723
17	Guinea	12 484	14 016	14 577	15 160	15 000
18	India	10 180	10 560	11 820	12 900	14 400
19	Sierra Leone	14 000	10 500	10 000	14 000	12 000
20	Guatemala	9 924	9 911	9 956	10 713	10 927
	Total	3 828 743	4 179 528	4 103 895	4 218 859	4 536 781

Source: own study based on the data from Food and Agriculture Organization of The United Nations database [FAO 2014].

On a per country basis, the unquestionable leader remains Côte d'Ivoire, which in 2011 supplied 1,5 mln tons of cocoa beans alone, which amounts to 34% of the total world production, followed by Indonesia with 0,71 mln tons (15,5%) and Ghana 0,70 mln tons (15,2%) of the world cocoa bean production. Apart from production, what's important in the cocoa business is the grinding capabilities, which means further processing of cocoa beans into cocoa butter, paste and powder. Once the beans leave the farm the quality can get no better, which means they should be processed as soon as possible.

Analysis of Cocoa Trade

The picture of the cocoa trade would not be complete without taking into account all forms of cocoa products. Cocoa is traded on the world market in four basic physical forms: cocoa beans, cocoa butter, cocoa paste and cocoa powder. This stems from the fact that grinding of cocoa beans is more economically viable in countries closer to consumer markets, which traditionally include Europe, the US and now southeast Asia.

Cocoa Beans

Cocoa beans are the raw material for all further processing. By looking at countries which import the largest amounts of raw cocoa beans we can quite accurately establish where the grinding capacity is located. In 2011 the biggest processor of cocoa beans in the world was The Netherlands with over 0,78 mln tons of cocoa beans imported. The second biggest was the US with 0,46 mln tons, closely followed by Germany with 0,44 mln tons. In Asia, Malaysia with 0,32 mln tons imported is one of the biggest processors of cocoa beans, supplied mostly by Indonesia.

Table 2. Largest cocoa bean importing countries

No.	Country	Cocoa Beans Import Quantity (tonnes)				
		2007	2008	2009	2010	2011
1	Netherlands	628 215	680 942	731 814	686 057	784 316
2	USA	355 135	355 751	442 375	402 061	463 883
3	Germany	354 149	334 033	348 437	341 273	446 888
4	Malaysia	438 477	398 253	290 015	319 441	327 084
5	Belgium	187 970	178 462	157 422	160 235	201 471
6	France	173 019	155 826	163 352	137 065	145 493
7	Italy	64 615	68 191	73 274	81 902	91 870
8	United Kingdom	149 112	119 815	150 913	89 364	91 358
9	Spain	92 970	95 469	87 631	91 954	86 522
10	Singapore	89 693	93 917	80 575	93 445	84 630
	Total	2 533 355	2 480 659	2 525 808	2 402 797	2 723 515

Source: own study based on the data from Food and Agriculture Organization of The United Nations database [FAO 2014].

Table 3. Largest cocoa bean exporting countries

No.	Country	Cocoa Beans Export Quantity (tonnes)				
		2007	2008	2009	2010	2011
1	Côte d'Ivoire	803 886	782 868	917 700	790 912	1 073 282
2	Ghana	506 358	474 706	395 711	281 437	697 236
3	Nigeria	174 900	227 303	247 000	226 634	262 295
4	Indonesia	379 829	380 513	439 305	432 427	210 067
5	Netherlands	173 119	155 657	167 521	167 081	207 773
6	Cameroon	131 075	178 101	193 973	193 881	190 214
7	Ecuador	80 093	80 143	124 404	116 318	157 782
8	Belgium	142 040	117 763	97 578	82 614	81 350
9	Papua N. Guin.	46 900	51 588	59 276	57 764	62 751
10	Dominican Rep.	39 512	32 745	60 714	55 097	50 994
	Total	2 477 712	2 481 387	2 703 182	2 404 165	2 993 744

Source: own study based on the data from Food and Agriculture Organization of The United Nations database [FAO 2014].

The biggest exporter of cocoa beans in 2011 was Côte d'Ivoire with more than 1mln tons of beans exported, followed by Ghana with 0,69 mln tons and Nigeria with 0,26 mln tons. Traditionally, the third biggest exporter of cocoa beans in previous years was Indonesia, however in 2011, a higher export tax contributed to lower levels of exports. The export tax policy was introduced by the government of Indonesia in order to develop cocoa processing industry in-house, which can be seen in the following tables as a shift of export product composition from coca beans to other cocoa products [Rifin 2013].

Cocoa Butter

Cocoa butter is a byproduct of cocoa processing, and is widely used in chocolate manufacturing. The biggest importer of cocoa butter is the US with 92 thousand tons, followed by The Netherlands with 91 thousand tons and Germany with 89 thousand tons.

Table 4. Largest cocoa butter importing countries

No.	Country	Cocoa Butter Import Quantity (tonnes)				
		2007	2008	2009	2010	2011
1	USA	86 258	102 868	84 498	102 878	92 572
2	Netherlands	70 598	72 786	72 609	70 529	91 297
3	Germany	85 113	85 605	84 939	88 713	89 511
4	Belgium	75 283	64 782	70 155	65 336	75 003
5	France	78 858	69 153	64 495	57 639	61 948
6	United Kingdom	48 911	42 879	42 921	50 639	43 440
7	Russia	25 753	26 087	22 969	25 021	28 398
8	Poland	20 769	21 391	17 721	22 678	27 634
9	Switzerland	27 265	27 193	24 820	26 462	26 813
10	Canada	31 301	23 516	20 759	20 885	22 463
	Total	550 109	536 260	505 886	530 780	559 079

Source: own study based on the data from Food and Agriculture Organization of The United Nations database [FAO 2014].

The biggest exporter of cocoa butter in 2011 was the Netherlands with 0,21 mln tons exported, followed by Malaysia with 0,18 mln tons and Indonesia ,which expanded its processing capabilities with 82,5 thousand tons exported – a stunning 78% increase compared to the previous year. From examining the two tables of import and export trends in cocoa butter, it's reasonable to state that The Netherlands, by being a major processor, is also an important player in the cocoa butter trade on the world market, as the country appears on top of the table in both export and import of cocoa butter. Moreover, taking into account the exported amounts, The Netherlands is almost twice as big as the second biggest exporter of cocoa butter - Malaysia. The biggest importer of cocoa butter in the world is the US with 92,5 thousand tons of imports in 2011. The country has a large internal market for chocolate products, and uses the cocoa butter mainly for the internal confectionery industry.

Table 5. Largest cocoa butter exporting countries

No.	Country	Cocoa Butter Export Quantity (tonnes)				
		2007	2008	2009	2010	2011
1	Netherlands	209 598	205 653	197 595	219 435	212 629
2	Malaysia	103 307	103 696	100 024	104 407	118 374
3	Indonesia	51 149	55 584	41 606	46 687	82 535
4	France	79 587	78 863	80 324	74 729	79 181
5	Côte d'Ivoire	57 685	62 410	67 201	63 506	56 226
6	Germany	14 061	23 255	32 381	40 820	50 839
7	Ghana	15 920	6 105	10 490	23 026	39 054
8	Singapore	22 640	23 974	20 577	22 260	28 921
9	Brazil	32 744	25 997	20 669	24 957	22 433
10	USA	20 987	23 945	21 333	23 596	22 219
	Total	607 678	609 482	592 200	643 423	712 411

Source: own study based on the data from Food and Agriculture Organization of The United Nations database [FAO 2014].

Cocoa Paste

In 2011, three European countries where the biggest importers of cocoa paste: France with 84 thousand tons, The Netherlands with 82 thousand tons and Germany with 79 thousand tons. Côte d'Ivoire was the biggest exporter of cocoa paste in 2011 with 0,14 mln tons exported, closely followed by The Netherlands with 0,13 mln tons, and Germany which exported 51 thousand tons of cocoa paste.

Table 6. Largest cocoa paste importing countries

No.	Country	Cocoa Paste Import Quantity (tonnes)				
		2007	2008	2009	2010	2011
1	France	79 733	58 304	59 017	59 205	84 704
2	Netherlands	44 044	49 399	44 915	60 067	82 633
3	Germany	48 038	51 712	64 206	94 860	79 039
4	Belgium	43 529	40 910	42 347	41 039	49 137
5	Russia	25 588	32 795	29 831	31 042	34 597
6	Poland	29 386	32 272	31 956	31 154	32 134
7	USA	20 180	23 652	19 367	29 709	22 996
8	Ukraine	16 567	19 618	18 303	13 168	19 310
9	Canada	18 602	16 156	11 971	13 856	18 210
10	China	6 976	9 295	9 488	12 378	17 465
	Total	332 643	334 113	331 401	386 478	440 225

Source: own study based on the data from Food and Agriculture Organization of The United Nations database [FAO 2014].

Table 7. Largest cocoa paste exporting countries

No.	Country	Cocoa Paste Export Quantity (tonnes)				
		2007	2008	2009	2010	2011
1	Côte d'Ivoire	121 066	135 434	141 275	147 371	142 819
2	Netherlands	102 118	107 041	113 139	142 937	135 170
3	Germany	33 658	30 204	32 497	41 118	51 793
4	France	24 277	23 662	25 367	22 552	28 102
5	Malaysia	19 479	16 142	13 856	19 207	26 431
6	USA	15 087	16 162	11 175	11 617	17 864
7	Belgium	0	0	9 763	11 252	14 426
8	Singapore	11 868	12 242	11 548	11 009	12 931
9	Indonesia	2 055	1 448	1 640	6 253	11 538
10	Switzerland	2 977	8 143	10 477	8 508	8 647
	Total	332 585	350 478	370 737	421 824	449 721

Source: own study based on the data from Food and Agriculture Organization of The United Nations database [FAO 2014].

Côte d'Ivoire also stands out as a single African country which has got enough processing capabilities to export substantial amounts of cocoa paste despite all the negative effects of processing cocoa beans in the tropical belt of Africa. As mentioned in the Cocoa guide to trade practices - Côte d'Ivoire has long been attracted to the idea of adding value to its cocoa exports by capturing the cocoa-processing margin. Inherently, however, it is difficult for cocoa-producing countries to compete with the efficient large-scale processing operations in Europe. The country's processing industry continues to be subsidized by being given access to cheaper cocoa beans as well as special tax incentives [Cocoa 2001].

Cocoa Powder

Cocoa powder as a byproduct of cocoa processing is the second most traded cocoa product. In 2011 the US imported the largest amount of cocoa powder in total of 0,16 mln tons. The following two importers were much smaller than the US, with Spain importing 64 thousand tons and France importing 58 thousand tons of cocoa powder. The US with its large domestic market is a leader in cocoa powder consumption. As with cocoa butter, The Netherlands is also the biggest exporter of cocoa powder in the world. In 2011 the country exported over 0,21 mln tons of cocoa powder. The second was Malaysia with 0,15 mln tons exported, followed by Germany with 0,10 mln tons.

Table 8. Largest cocoa powder importing countries

No.	Country	Cocoa Powder Import Quantity (tonnes)				
		2007	2008	2009	2010	2011
1	USA	158 132	156 028	163 874	172 904	162 723
2	Spain	52 442	54 980	53 747	56 068	64 912
3	France	41 030	45 652	42 022	53 861	58 723
4	Germany	47 480	47 232	49 689	54 056	54 215
5	Netherlands	35 979	24 364	35 034	45 047	53 899
6	Russia	42 415	48 293	41 218	43 620	38 427
7	Malaysia	2 314	4 610	8 908	20 135	37 970
8	China	19 200	23 306	23 538	29 000	30 104
9	Italy	28 241	28 576	26 708	26 161	27 717
10	Australia	19 649	20 565	20 958	20 130	23 794
	Total	446 882	453 606	465 696	520 982	552 484

Source: own study based on the data from Food and Agriculture Organization of The United Nations database [FAO 2014].

Table 9. Largest cocoa powder exporting countries

No.	Country	Cocoa Powder Export Quantity (tonnes)				
		2007	2008	2009	2010	2011
1	Netherlands	215 329	221 028	221 801	261 074	214 553
2	Malaysia	112 968	132 922	110 156	117 485	155 380
3	Germany	53 168	59 921	72 814	104 805	107 998
4	Indonesia	52 350	63 016	39 294	50 115	84 878
5	Spain	45 172	46 836	47 836	48 955	50 155
6	France	47 662	48 730	51 847	50 306	48 680
7	USA	25 735	27 334	30 231	36 879	43 589
8	Singapore	33 044	38 075	37 249	33 952	34 607
9	China	9 266	11 373	16 207	19 856	28 686
10	Brazil	36 803	29 825	24 718	24 805	28 587
	Total	631 497	679 060	652 153	748 232	797 113

Source: own study based on the data from Food and Agriculture Organization of The United Nations database [FAO 2014].

The tables above demonstrate that some of the biggest processors of cocoa beans are at the same time the biggest exporters of other cocoa commodities. Such is the case with The Netherlands in Europe and Malaysia in Asia. On the other hand, countries in the top five positions on the list of cocoa bean importers with large internal markets – such as the US, and Germany, or export-oriented such as Belgium, which rank second, third and fifth respectively in the quantity of cocoa beans imported – remain net processors of cocoa beans mainly for the benefit of their own confectionery industry.

Cocoa Trade in Poland

Poland belongs to a group of marginal cocoa bean processors. In 2011 the country imported just 11 thousand tons of cocoa beans, which gives it 24th place among world cocoa importers. At the same time the country is not involved in cocoa bean export. On the other hand, the country is a substantial manufacturer of cocoa-related final products, such as chocolate and other cocoa-based confectionery. In 2011 Poland imported 27 thousand tons of cocoa butter and 32 thousand tons of cocoa paste – the main ingredients for chocolate production – which gives the country 8th and 6th place in the world in terms of quantity imported. At the same time, as presented in the Table above, Poland re-exported just 1 thousand tons of cocoa butter and 8,6 thousand tons of cocoa paste, which supports the claim that most of the import is further processed in the country by the confectionery industry.

Table 10. Imports and exports of cocoa-related half-products

No.	Poland	Cocoa trade for Poland (tonnes)				
		2007	2008	2009	2010	2011
1	Cocoa Beans Import	17 660	9 834	11 019	9 061	11 797
2	Cocoa Butter Import	20 769	21 391	17 721	22 678	27 634
3	Cocoa Paste Import	29 386	32 272	31 956	31 154	32 134
4	Cocoa Powder Import	23 014	23 306	18 677	23 665	23 517
5	Cocoa Beans Export	2	8	1	1	0
6	Cocoa Butter Export	1 553	1 556	2 182	1 571	1 735
7	Cocoa Paste Export	6 315	7 045	4 443	4 384	8 633
8	Cocoa Powder Export	7 724	7 642	5 836	5 784	7 291

Source: own study based on the data from Food and Agriculture Organization of The United Nations database [FAO 2014].

In the analyzed period, Poland imported 23,5 thousand tons of cocoa powder – the main product for hot chocolate and baking, giving it 11th place in the world. The country re-exported just 7 thousand tons of cocoa powder, which again is turned for products by the confectionery industry. On the basis of the above analysis it is safe to assume that contrary to countries such as The Netherlands or Malaysia, Poland is a consumer of cocoa-related commodities like cocoa paste, cocoa butter and cocoa powder, mostly for chocolate and related confectionery.

Conclusions

Cocoa is a very important crop worldwide – in 2011 between 40 and 50 million people depended on cocoa for their livelihood. Also in 2011, almost 67% of world cocoa production originated from African countries such as Cote d'Ivore, Ghana, Nigeria and Cameroon. More than 17% originated from Asia and Oceania with major producers such as Indonesia, Malaysia and Papua New Guinea, and more than 14% originated from the

Americas with top producers being Brazil, Ecuador, Colombia. The world's unquestionable leader in cocoa production in the analyzed time period was Cote d'Ivore with around 34% of the world's total cocoa production. For trade, cocoa changes hands on the world market in four basic physical forms: cocoa beans, cocoa butter, cocoa paste and cocoa powder. Those are all half-products for making more refined chocolate confectionaries. The most widely traded forms of cocoa are the cocoa beans which flow to the world's major grinding centers located in The Netherlands, USA, Germany and Malaysia. From there it is either consumed locally or exported as confectionaries, or by-products for further processing such as cocoa butter, paste or powder. One of the major cocoa butter and paste importers in Europe is Poland. Although the country has a negligible grinding capacity for processing of raw cocoa beans, it is nevertheless a substantial manufacturer of cocoa-related final products, such as chocolate and other cocoa-based confectionery. In 2011 Poland imported 27 thousand tons of cocoa butter and 32 thousand tons of cocoa paste – the main ingredients for chocolate production, which gives the country 8th and 6th place in the world in terms of quantity imported. Outside of western culture, we are witnessing dynamic growth of cocoa production and trade in the Asian region. Especially Indonesia and Malaysia lead the Asian region in terms of large increases of export of cocoa-related products such as cocoa butter, cocoa paste and cocoa powder.

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