China and EU agricultural trade in international perspective
(Paper on trade data base for CATSEI-project)

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1. Introduction

Since the start of the economic reform process at the end of the 1970s, and especially since the accession to the World Trade Organization (WTO) in 2001, China has rapidly increased its involvement in world agricultural trade. Its current share in world food trade may be estimated roughly at around 5% (both as importer and exporter). In most years the country was a net agricultural exporter (considering the total of food, feed and fish), but in 2004 the surplus turned into a deficit and, in spite of the good prospects to increase fruit and vegetable exports, this situation is likely to remain so for the coming years, due to the fast rising incomes and related feed and meat requirements. However, the situation is more diverse when looking at its trade with separate country blocks. In particular, China continues to increase its agricultural trade surplus vis-à-vis the countries of the European Union (EU).

The EU itself has been a major player in world agricultural markets for decades already, initially as a significant food importer but due to its Common Agricultural Policy (CAP) gradually also as a major exporter of several food items. Recently, the picture has changed again, after the curtailing of production support measures and the enlargement of the EU to 27 countries. Currently, its imports of food and feed (including fish) from the rest of the world are significantly larger than its exports to the rest of the world. The value of the imports may be estimated at about 13% of world trade, whereas its exports reach only 8%. However, intra-EU trade flows are much larger, covering 30% of total world trade in food, feed and fish.

These developments must be seen against the background of the continuous process of worldwide trade negotiations going on since the end of the Second World War, in consecutive rounds. For agriculture, the rules of the game have changed considerably over the last decades. Initially, agriculture was kept outside the overall negotiations of which the results were laid down in the General Agreement on Trade and Tariffs (GATT), updated after each round. Agricultural products were included in the negotiations not before the Uruguay-round that started in 1986 and ended with the Marrakesh agreement in 1994. At the same time, WTO was established as single institutional framework for multilateral trade negotiations encompassing the GATT.

On agriculture, the main elements of the Marrakesh agreement were tariffication, i.e. conversion of non-tariff barriers (NTBs) into tariffs, and, subsequently, tariff reduction according to well-designed time schedules, although with exemptions for least developed countries. In addition, it was decided that each country should guarantee a minimum volume of imports at low tariff levels (referred to as tariff-rate quotas, TRQs). Furthermore, two separate agreements were signed on how to deal with technical restrictions to trade such as labeling, standards and packaging issues, viz. a general agreement on technical barriers to trade (TBT) and a more specific one on sanitary and phytosanitary (SPS) measures. The latter agreement focuses on the protection of human, animal and plant life from diseases, contamination and pests. Further adjustments of the Marrakesh agreement will be implemented as part of a new round of negotiations on the basis of

the Doha Development Agenda established in 2001. However, the process is stagnating since then.

In this paper, we will give an overview of the major flows and barriers in EU's and China's agricultural trade as observed in recent years, not only bilaterally but also with respect to other trading partners in the world, developed and developing. More precisely, apart from EU and China we distinguish 7 trading regions, distinguished by geographical location. They are listed in Annex 1. Four of them may be characterized as developing regions (Sub-Saharan Africa; North-Africa combined with West-Asia; Rest of Asia; Middle and South America) and three as developed (Oceania; North America; Rest of Europe including Russian Federation). We will consider the years 2001, 2003 and 2005 and focus on trade in food and feed.

The paper is written as part of the EU-funded CATSEI-project that studies the impacts of China's economic transition on its agricultural economy, with a particular focus on the prospects for international trade, especially between China and EU, the social conditions in rural areas and environmental implications. Findings from these separate fields will be integrated in simulations with the Chinagro welfare model, allowing a coherent analysis of future developments. The Chinagro model has been developed in an earlier EU-funded project of the same name and will be updated and improved in CATSEI. With respect to foreign trade, the improvements refer to a more refined representation of China's trade policies and the reaction of the world markets to changes in China's net trade volumes. In both aspects, the current paper provides background material. Therefore, it explicitly covers the regional dimension of foreign trade flows and focuses on the character of the major trade barriers.

Trade flows are discussed primarily in value terms but, whenever useful and data are available, we will also report on the underlying volumes and prices. Barriers that will be addressed consist of ad-valorem tariffs, non-proportional tariffs such as TRQs and, to the extent possible, also non-tariff measures such as TBT and SPS regulations. The commodity classification is an extended version of the 17-commodity list used in the Chinagro model. Apart from the item 'non-food, non-feed' it has 27 items, which are explained in Annex 2. In principle, for each of these commodities the underlying data base will consider 96 trade flows (China/EU, import/export, 8 regions, and 3 years).

Basic data sources are national trade statistics and measures notified to WTO. However, not all information is directly ready for use. With respect to imports and exports there is the issue of balancing the bilateral import and export flows reported by different countries. For trade volumes there is the additional issue of combining goods at different processing levels in order to reduce the mass of information. With respect to trade measures there is the issue of how to get an accessible and adequate overview of the huge amount of detailed regulations that have been established by trade partners. Often, all measures are expressed in terms of ad-valorem tariff equivalents but one has to be careful in this respect since this method hides the difference between marginal effects and average effects. Several international organizations are engaged in the compilation of worldwide trade and tariff data sets. Before presenting actual figures, the paper provides background information on the activities in this field and the methodologies used. In particular, it will focus on the suitability of alternative methods to express non-proportional tariff measures in ad-valorem equivalents.

The plan of the paper is as follows. In section 2 we give an overview of the compilation of international trade data bases explaining the selection of our basic data sources (BACI for trade

data and MAcMap for tariffs). Section 3 presents the major trends in food and feed trade flows from and to China and EU in recent years. Section 4 discusses the corresponding ad-valorem tariffs and other trade measures expressed in ad-valorem equivalents. For a selected set of relevant commodities the arrangements behind these ad-valorem equivalents are elucidated in section 5, invoking at the same time an assessment of the suitability of the ad-valorem equivalents. In this discussion also the main trade disputes, still ongoing or recently settled, are taken into consideration since they are a good indication of the force of the arrangements. Finally, section 6 draws conclusions about the severity of existing trade impediments and the most appropriate way to represent them in simulation modelling. This paper is accompanied by the file "CATSEI_tradedatabase.mdb", an Access database containing the data analyzed in this paper.

2. Compiling international trade databases

For modelling international trade data on trade flows and on trade policies are required. Even if the analysis does not explicitly focus on trade policy analysis, trade policies affect the possibilities and costs of international trade and may thus affect the implications of non-trade policies. Expected policy impacts may vary widely depending on the data used. Analyses of the WTO Doha negotiations provide a recent example of the importance of data. Estimated gains for developing countries from a WTO agreement dropped from around 500 billion dollars in 2003 studies to around 100 billion dollars in 2005 studies (Ackerman, 2005). This drastic decline is due to a change in the GTAP database. The more recent database (GTAP version 6) includes actual applied tariffs that account for the presence of trade agreements granting preferences to specific countries. Accounting for actually applied tariffs implied that the potential gains for developing countries are much lower than indicated by earlier analyses based on MFN tariffs.

One faces several methodological and technical hurdles when compiling international trade data covering several years and countries, as is needed for the CATSEI project. The first, choice of classification system, is rather technical in nature but has important implications for example for the amount of detail that can be included in the database. The second choice is that of the most appropriate database from which to build the CATSEI trade database. We discuss these choices separately for trade and tariff data. We then conclude by outlining the steps taken in constructing the CATSEI dataset, which forms the basis for more detailed inquiries in the data in the remainder of this report.

2.1. Choices related to statistical classification

The existence of different statistical classifications that vary over the years introduces several challenges. The two main international classification systems are the Harmonized Commodity Description and Coding System (known as the Harmonized System or HS) and the Standard International Trade Classification (SITC). The HS system has been adopted by all WTO members, the UN statistical Commission has adopted it as the core classification system and most modelers focusing on international trade use the HS system (Droguć et al., 2007). Furthermore, the commodity aggregation of the GTAP model (the only model in CATSEI that requires bilateral trade data) is based on an aggregation of HS codes. We therefore adopt the HS system as the basis for our database.

By a choice of classification system we are not yet out of the woods regarding the classification methodology. The harmonization of HS unfortunately stops at the 6-digit level, making it practically impossible to compare data involving more than one country in more than 6-digit detail. Tariffs however are defined at 8 or more digits. The lack of harmonization beyond 6-digits prevents a direct comparison of detailed tariff data between countries and hampers construction of ad valorem equivalents (AVEs) of non-ad valorem tariffs since this requires trade data. Lack of harmonization beyond 6-digits even creates inconsistencies between dataset from a single country (Droguć et al., 2007). In practical terms lack of harmonization implies a consistent global trade dataset can only be constructed at the 6-digit level. We therefore build our database for the products distinguished in the models employed in CATSEI from a database at 6-digit level. In the remainder of this report we explore the loss of information following from this 6-digit level database for EU-China agricultural trade.

Choosing a 6-digit HS classification as the basis for the database encounters another major technical issue, the presence of revisions of the HS system over time. Currently there are four revisions available: HS-1992 (H0), HS-1996 (H1), HS-2002 (H2); HS-2007 (H3). These revisions do not map into each other without a loss of information. For example three 6-digit codes in H1 are combined into two H2 codes preventing an unambiguous mapping of H2 to H1 data. Based on the classification used in the MAcMAP and BACI databases from which the CATSEI database is constructed, we use the H1 or HS-1996 classification in our analysis.

2.2. Choosing a trade database as starting point

Several international databases of trade flows are available. Table 1 summarizes a more detailed assessment of these databases in Droguć et al. (2007) focusing on trade databases that contain bilateral trade data (thus excluding FAOSTAT). Although the COMEXT trade database does not have the global coverage needed for the CATSEI trade database it is included in table 1 since it may be used in more detailed explorations of the EU-China trade in later sections of this report.

As can be seen from table 1 the COMTRADE database is the major international source of trade data. It contains trade data at 6-digit level, the most detailed level of detail where product codes can be compared between countries. Only COMEXT has more detailed 8-digit data originating from EU member states. But these data are restricted to trade involving the EU and therefore do not suffice for the CATSEI trade database.

A major drawback of the COMTRADE database is lack of consistency between import and export flows. In the case of product *i* export from country *x* to country *y*, the exports of *i* by *x* in theory should be equal to the imports of *i* by *y* in the database. The data in COMTRADE do not satisfy this "mirroring requirement" which is essential when using the data in a global trade analysis as aimed for in CATSEI. There are several reasons for this lack of consistency (Droguć et al., 2007):

- *CIF versus FOB*: exports are reported in Free on Board (FOB) prices whereas imports are reported in Cost of Insurance and Freight (CIF) prices creating a divergence between export and import data of the same trade flow.
- *Timing of trade*: shipments that leave and thus are recorded as exports in year *n* in one country may arrive in the next year in the importing country and thus registered as imports in year *n+1*.

- *Re-exports*: re-exports (foreign goods exported in the same state as previously imported to the rest of the world) are a notorious problem in trade databases, especially for countries with large ports like The Netherlands, Belgium and Hong Kong. COMTRADE has a heading for recording re-exports which however hardly contains data suggesting that re-exports are included in regular trade flows. This may generate discrepancies in reports, for example with an exporter recording the Netherlands as the destination whereas the Netherlands does not record these goods since they are re-exported to other (European) countries.
- *Taxes*: taxes should not be included in the prices but appears to be so in some CIF prices, making the export data appear more reliable than the import data.

Several authors have assessed the extent of these problems in the light of using COMTRADE data for global trade analysis. Gelhar (1996) compared COMTRADE, FAOSTAT, World Bank and IMF trade data. Although he finds 73 percent of bilateral trade flows to be unreliable, these flows account for only 2 percent of the total value of trade. For 75 percent of bilateral trade the difference between reports of imports and exports is less than 25 percent. These discrepancies require adjustments to the COMTRADE database in order to be used for global trade analysis. Both the NBER-UN and BACI database derive a consistent database from the COMTRADE data, using different methods

Adjustments for the NBER-UN database is based on a rule that importer reports as more accurate than those of exporters. Such a general rule does not take into account differences between countries in quality of reporting nor accounts for the possible inclusion of taxes that may make import data less reliable. Two main drawbacks of the NBER-UN database is that dataflows are not fully reconciled and a loss of detail by constructing the database at 4-digit SITC classification (Drogué et al., 2007).

Adjustments for the BACI database aim at arriving at a fully consistent dataset at 6-digit HS level, i.e. where export and import data referring to the same trade flow are identical. The adjustments to the COMTRADE data are done in three steps (Gaullier et al., 2007):

- *Reconcile CIF and FOB prices*: CIF costs are estimated using gravity estimations and then used to compute imports at FOB prices.
- *Evaluate the quality of reports by country;* based on the distance between declarations of partner countries a variance analysis is used to construct a reliability index for each country.
- *Reconcile trade flows*: the quality index is used as a weight when reconciling trade flows to arrive at a consistent database.

Regarding the caveats of the COMTRADE database discussed above, the BACI database construction only treats the CIF-FOB discrepancy explicitly. Discrepancies related to timing, re-exports and taxes may affect the country reliability estimates but are not analyzed explicitly and their impact on the final data cannot be assessed. Despite these limitations the BACI database offers the best available detailed dataset for modeling bilateral trade at 6-digit level and is used as a basis to construct the CATSEI database.

Table 1: Overview of international databases with bilateral trade data

Name	Description	Data source	Coverage Years	Product detail	Countries
BACI	Database for International Trade Analysis of the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII). Data are harmonized (bilateral export and import flows are identical). Values are in thousands US $, quanities are in metric tons.	COMTRADE	1995-2005	HS 6-digit	275 (former) countries
COMEXT	Trade statistics database of the EU. Values in euros, quantities in 100 kilograms (or other units like liters, or numbers).	EU member states	1987 - 2007	HS 8-digit	Trade involving EU members
COMTRADE	Commodity and Trade Statistics database of the United Nations. Exports in FOB, imports in CIF prices in US $. Quantities in kilograms.	National customs authorities	1962 - 2007	HS 6-digit	275 (former) countries
NBER-UN	NBER-UN world trade database of Feenstra and Lipsey of the National Bureau of Economic Research.	COMTRADE	1962-2000	SITC 4-digit	275 (former) countries

Links to databases:
BACI: http://www.cepii.fr/anglaisgraph/bdd/baci.htm
COMEXT: http://epp.eurostat.cec.eu.int ;
COMTRADE: http://unstats.un.org/unsd/comtrade/ ;
NBER-UN: http://www.nber.org/data

Table 2: Overview of international databases with bilateral tariff data

Name	Description	Data source	Coverage Years	Product detail	Countries
AMAD	Agricultural Market Access of Agriculture and Agrifood of Canada, EU, FAO, OECD, World Bank, UNCTAD, ERS-USDA. Contains data on tariffs, TRQs, imports, production, consumption and world unit values.	WTO, UNCTAD,FAO	1995-2002	6-digit HS to 10-digit (depending on country)	Global but varying by data type
APEC tariff database	Asia Pacific Economic Cooperation tariff database with data of most APEC member countries (Australia, Chile, Hong Kong (China), Korea, New Zealand, Philippines, Thailand, Brunei Darussalam, China, Indonesia, Malaysia, Papua New Guinea, USA, Canada, Chinese Taipei, Japan, Mexico, Peru, Singapore).Vietnam and Russia do not provide data.	National governments	Vary by country	8-digit HS	APEC members
MAcMAP	Market Access Map of CEPII and UNCTAD-WTO. Detailed version through GTAP consortium contains ad valorem tariffs and ad valorem equivalents for specific tariffs and quota for 2001. The 2004 full database available through WITS contains estimates of quota rents and estimates of AVEs using reference groups. Compatible with BACI trade data.	WTO notifications, AMAD, national customs	2001, 2004	HS 6-digit	Global
TARIC	Of the EU containing detailed descriptions of EU tariffs.	EU	1970 - 2008	10-digit NC	EU tariffs
TRAINS	Trade Analysis and Information System of UNCTAD. Contains data on tariffs, para-tariffs and non-tariff measures (including AVE estimates for some years) and import flows	National and international sources	#### -2007	6-digit HS to 10-digit (depending on country)	Global

Links to databases:
AMAD: www.amad.org
APEC: www.apectariff.org
MAcMAP & TRAINS through WITS: wits.worldbank.org
TARIC: http://europa.eu.int/comm/taxation_customs/dds/cgi-bin/tarchap?Lang=EN

To get a feel for the extent to which the BACI data diverge from other sources we will compare the trade data from BACI to COMTRADE and COMEXT. This analysis will be done at the CHINAGRO product level for EU-China trade which is the focus of the CATSEI project. The aim of this assessment is establish whether the structure of trade derived from BACI differs significantly from the structure of trade derived from other sources.

2.3. Choosing a tariff trade database as starting point

Next to trade data a database of trade policies is needed for the modeling work. As with trade data several international databases of tariffs are available. Table 2 summarizes a more detailed assessment of these databases in Drogué et al. (2007) focusing on databases that contain data which can be used for analyzing bilateral trade. Although TARIC and the APEC database do not have the global coverage needed for the CATSEI trade database they are included in table 2 since some of these data may be used in more detailed data explorations in later sections of this report.

The AMAD database contains well documented data on agricultural trade policies. In some cases data on bound tariffs and TRQs are known to be inconsistent with official schedules. A major limitation of the AMAD database is the lack of data on preferential tariffs, hampering an assessment of the actual levels of protection (Drogué et al., 2007).

The TRAINS database contains tariff data at tariff line level (which varies by country). There are data on tariffs, para-tariffs (custom charges and taxes) and non-tariff measures (price controls, finance measures related to trade, licensing requirements, quality control measures, monopolistic measures and technical measures). The tariff data for most developing countries seems to contain bound tariffs which do not properly reflect applied rates (Drogué et al., 2007). The detailed amount of data in TRAINS cannot be directly used in a quantitative modeling analysis since the descriptions of measures are not translated in ad valorem equivalents. For some countries and some years ad valorem equivalents are available of specific tariffs (## and quota?) using different methods of computation. Some of these data will be used in the data explorations for EU-China trade.

MAcMap is a recently developed database that has become the major source of quantitative trade policy analyses. It is also the source of the GTAP tariff data from Version 6 onwards. This allowed introduction of bilateral preferential tariffs in GTAP-based analysis and is the main cause of the smaller estimated gains in recent Doha analyses. There are several versions of the MAcMap database of which only the most recent database for 2004 at the 6-digit level (MAcMapHS6v2) is freely available (since June 2008 it can be accessed through WITS). A limited version (including ad valorem and AVEs computed using world unit values) of the 2001 6-digit database used for GTAP version 6 has been made available to GTAP consortium members (among which LEI). There is also a MAcMap for GTAP version of the 2001 which is freely available but contains tariffs aggregated to GTAP products and regions and is therefore of limited interest to non-GTAP uses.

The MAcMap database is compiled using about all available data on tariffs and quota. It integrates data from TRAINS, AMAD, WTO notifications and (in the 2004 version) data from TARIC and the US tariff schedule are directly integrated as well. Where needed and possible national sources are approached to reconcile or update data. By reconciling data from different sources and providing AVEs at 6-digit level for global bilateral trade flows MAcMap is the most

consistent database for trade analysis. Availability to the community of trade policy analysts also led to additional checks and updates beyond those done during construction. Key distinguishing features of the MAcMap dataset are (Bouët, 2004):

- *Preferential tariffs:* exhaustive coverage of preferential trade agreements taking into account the schedules phasing tariff reductions.
- *AVEs of specific tariffs:* specific tariffs are translated into AVEs taking into account variation in unit export values across countries.
- *AVE and rents of TRQs:* impact of tariff rate quotas (TRQs) is translated to AVE based on protection at the margin and by calculating quota rents.
- *Reference group weighting scheme*: limiting the endogeneity bias in import-weighted average protection by using a weighting scheme based on a reference group of similar countries.

A key feature of the MAcMap dataset is that even at the 6-digit level protection data are specific for a bilateral trade flow (which significantly increases the total size of the database posing some technical challenges). Apart from the computations based on reference groups (for aggregation and in the computation of AVEs) the MAcMap dataset also contains alternative measures based on world unit values for AVEs and trade for aggregation. The dataset does not allow one to separate the contribution of specific tariff and TRQ to the AVE. The dataset that is available for 2001 is more limited in scope, excluding the TRQ rents and only having tariffs based on world unit values. The 2004 dataset has the full range of data.

Being the most exhaustive and detailed dataset currently available, MAcMap be the basis for the CATSEI dataset. To get a feel for the implications of the assumptions made in constructing the MAcMap dataset for some products traded between the EU and China we will explore in more detail the representation of tariffs in this dataset compared to more detailed data sources.

2.4. Product and regional definitions

The quantitative analysis of trade in the CATSEI project involves the combination of three models: CHINAGRO a detailed spatially explicit model of China's agriculture, GTAP – a global trade model and FEA-27 a model of EU agriculture. In order to be able to link the results form one model to the other a mapping or concordance between products and regions needs to be made.

Since both CHINAGRO and FEA-27 are net trade models the regional aggregation does not pose major challenges. Next to China and EU27 needed to link to the two other models, GTAP distinguishes major geographical regions to be able to assess changes in global trade patterns. See Annex 1 for an overview of regions and their constituting countries.

Establishing a concordance of products is a more challenging task. CHINAGRO and FEA27 use the same product classification derived from [### needs some more text here]. Annex 2 contains a detailed listing of the CHINAGRO products and a mapping to HS codes.

The CHINAGRO product groups are not directly compatible with those used in GTAP. GTAP distinguishes 57 sectors based on a combination of International Standard Industry Classification (ISIC) for all sectors apart from agriculture and food processing where ISIC does not provide the required detail. For these products the CPC classification developed by the Statistical Office of the United Nations is used. The global coverage of the GTAP database comes at the expense of

product detail, resulting in 12 primary agricultural sectors and 8 agro-food processing industries (see Annex 3 for a list of the sectors in the GTAP database).

We establish a link between CHINAGRO and GTAP by establishing a concordance to 6-digit HS-1996 (H1 classification) codes for each model. Linking through the HS codes reveals that there is no direct mapping possible between CHINAGRO and GTAP products. The more detailed product definition in CHINAGRO cannot be nested in the more aggregated GTAP sectors. Some CHINAGRO products therefore need to be linked to more than one GTAP sectors. [#### maybe add a bit more on how this is implemented or delete this whole paragraph on linking?].

3. Major trends in trade flows of China and EU

Data from BACI datasets from 2000 through 2005 have been aggregated to the model regions of GTAP and to the CHINAGRO products. The resulting database contains for the years 2000 through 2004 value (in thousand US$) as well as quantities (in tons). For 2005 only value data are available. Care should be taken when using the quantity data since for all years some flows have only value data and no quantity data. The explorations of the data below are based on the value data.

3.1. Trends in total trade of China and EU27

For China we first assess developments in total exports and imports (table 3.1). Overall China's agricultural exports have grown with 62 percent from 2000 to 2005 and agricultural imports with 140 percent. Since exports started from a higher base China is still a net exporter of agricultural products in 2005. For non-agricultural products developments are more similar with exports rising by 179 percent and imports by 186 percent. Since exports started from a higher base in 2000 the net export of non-agricultural products in value terms is much higher in 2005.

The high growth rates of especially non-agricultural trade for China reflect the growth of the Chinese economy. For the EU we find for agricultural exports a growth rate of 64 percent while imports grow with 71 percent. Already being a net importer of agricultural products in 2000 the importance of imports increased even more in 2005. For non-agricultural products exports increase slightly more than imports (67 versus 65 percent), but being net importer in 2000 the importance of imports of non-agricultural products also increased for the EU.

Both CHINAGRO and FEA are net trade models. To get a better view of developments in the net trade position figure 3.1 and 3.2 present the net exports for China and EU27.

For the majority of agricultural products China has a clear position as a net importer or exporter. Exceptions are products with a limited difference between imports and exports where limited fluctuations change the net trade positions (ruminant meat and sugar). Notably several products have a consistent trade position despite a limited difference between imports and exports (animal fats, carbohydrate feed, eggs, maize, rice, soybean meal and flour).

Table 3.1: Total exports and imports of China (million US $, 2000-2005)

	Exports						*Imports*					
	2000	2001	2002	2003	2004	2005	2000	2001	2002	2003	2004	2005
Animal fats	15	10	12	12	22	26	158	119	124	152	250	174
Carbohydrate feed	210	219	225	276	310	359	110	79	67	75	92	103
Eggs	50	55	58	62	72	72	1	1	1	1	1	1
Fish	4178	4430	4749	5466	6686	7743	1218	1158	1421	1866	2241	2567
Fruits: fresh or dried	594	624	742	934	1105	1264	471	430	609	552	657	794
Fruits: preserved or prepared	499	555	614	759	860	1040	20	11	21	30	34	39
Maize	1075	565	1167	1894	414	1164	1	10	4	1	5	7
Milk	54	48	65	58	64	88	190	219	363	414	503	484
Other oilseeds	411	419	450	613	528	650	507	361	126	140	161	244
Pork	445	523	612	707	941	935	208	226	217	126	184	195
Poultry meat	1012	1064	966	825	656	928	259	230	616	322	209	398
Protein feed	134	168	284	233	272	205	554	403	512	497	672	1038
Rice	675	365	464	565	297	229	120	85	100	98	234	201
Roots, tubers, minor	207	191	200	275	301	322	352	473	486	496	656	948
Ruminant meat	201	193	167	151	243	300	160	176	215	314	323	177
Soybean meal and flour	3	6	13	15	14	12	1	0	0	0	0	0
Soybeans	106	112	125	131	193	227	1943	2428	2266	5218	5326	6021
Sugar	205	202	220	181	189	289	104	307	178	178	245	373
Vegetable oil	114	101	93	113	126	236	697	620	1326	2641	3317	2805
Vegetables: fresh, dried or frozen	1884	2006	2077	2308	2619	3007	53	54	48	45	49	87
Vegetables: preserved or prepared	783	853	984	1115	1378	1571	48	61	51	55	62	53
Wheat flour	52	61	65	75	95	100	20	20	14	12	14	15
Wheat grain	5	48	86	264	137	37	179	191	143	127	1187	843
Wheat products	411	455	514	603	717	843	64	70	144	152	204	251
Nonfood excl feed	324669	339669	399485	522134	697867	905729	184359	197752	243705	333527	434285	526610

Source: BACI (Gaulier et al., 2007), authors' calculations

Table 3.2: Total exports and imports of EU27 (million US $, 2000-2005)

	Exports						*Imports*					
	2000	2001	2002	2003	2004	2005	2000	2001	2002	2003	2004	2005
Animal fats	707	754	948	1223	1442	1465	697	746	906	1156	1337	1346
Carbohydrate feed	2901	3154	3322	3753	4239	4657	3314	3601	3468	3874	4462	4443
Eggs	827	855	979	1244	1316	1444	729	767	835	1140	1188	1280
Fish	10862	11759	12294	14470	16154	17410	19126	20692	21218	25219	27483	30497
Fruits: fresh or dried	9660	10374	11540	14582	15853	17133	15907	16918	18575	23116	25965	29300
Fruits: preserved or prepared	1404	1472	1611	1918	2183	2399	2009	2086	2255	2787	3276	3663
Maize	1613	1564	1860	2061	2419	2678	1802	1782	2047	2441	2893	2889
Milk	19298	20153	20063	24665	28810	29634	15051	15761	15923	19854	23282	24009
Other oilseeds	1267	1267	1503	1676	2066	2035	2161	2212	2289	2678	3164	3054
Pork	10138	11018	11006	12490	16179	18210	7349	8547	8451	9738	12412	14325
Poultry meat	5039	5707	5768	6709	7900	8580	4661	5641	5490	6713	7778	8826
Protein feed	2144	2290	2431	2521	3061	3066	5529	6255	6461	6691	7785	8063
Rice	745	709	790	900	1040	1050	1069	1045	1068	1277	1421	1374
Roots, tubers, minor	5389	5147	5369	6530	7000	7075	3355	3641	3863	4492	5652	5115
Ruminant meat	11175	9271	11164	13676	16061	17228	12242	10374	12644	15442	18211	19961
Soybean meal and flour	41	46	77	80	85	80	37	42	72	77	85	77
Soybeans	334	296	358	300	463	402	3250	3626	3744	4502	4453	4211
Sugar	3916	4286	4389	4972	5633	6986	3388	3593	4448	5139	6146	6886
Vegetable oil	6023	6050	7378	8725	10008	11099	5892	6198	7653	9299	11432	12818
Vegetables: fresh, dried or frozen	8721	9443	10518	12765	13602	14943	9459	10311	11213	13519	14811	16589
Vegetables: preserved or prepared	5021	5322	6041	7197	8098	8334	4424	4652	5268	6347	7202	7366
Wheat flour	1041	993	1009	1158	1268	1157	381	367	398	487	513	594
Wheat grain	4128	4113	3912	4961	4770	5086	3020	3308	3744	3913	4229	4566
Wheat products	10208	11132	12501	15209	17922	19127	8008	8618	9853	12193	14600	15422
Nonfood excl feed	2111681	2150905	2287054	2700712	3227461	3519797	2208858	2196898	2307606	2733900	3297480	3640646

Source: BACI (Gaulier et al., 2007), authors' calculations

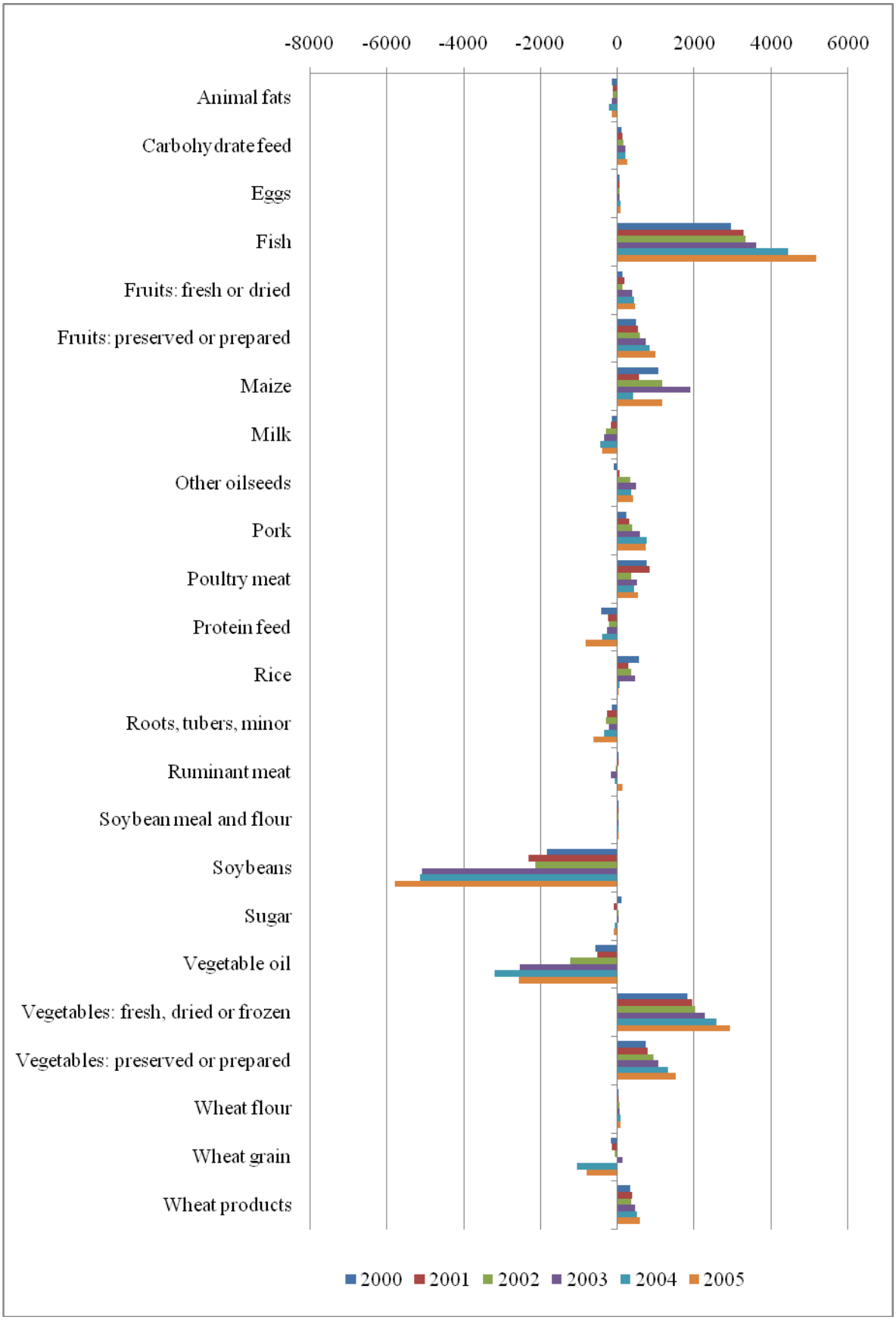

Figure 3.1: Net agricultural exports of China (million US $, 2000-2005)

Source: BACI (Gaulier et al., 2007), authors' calculations

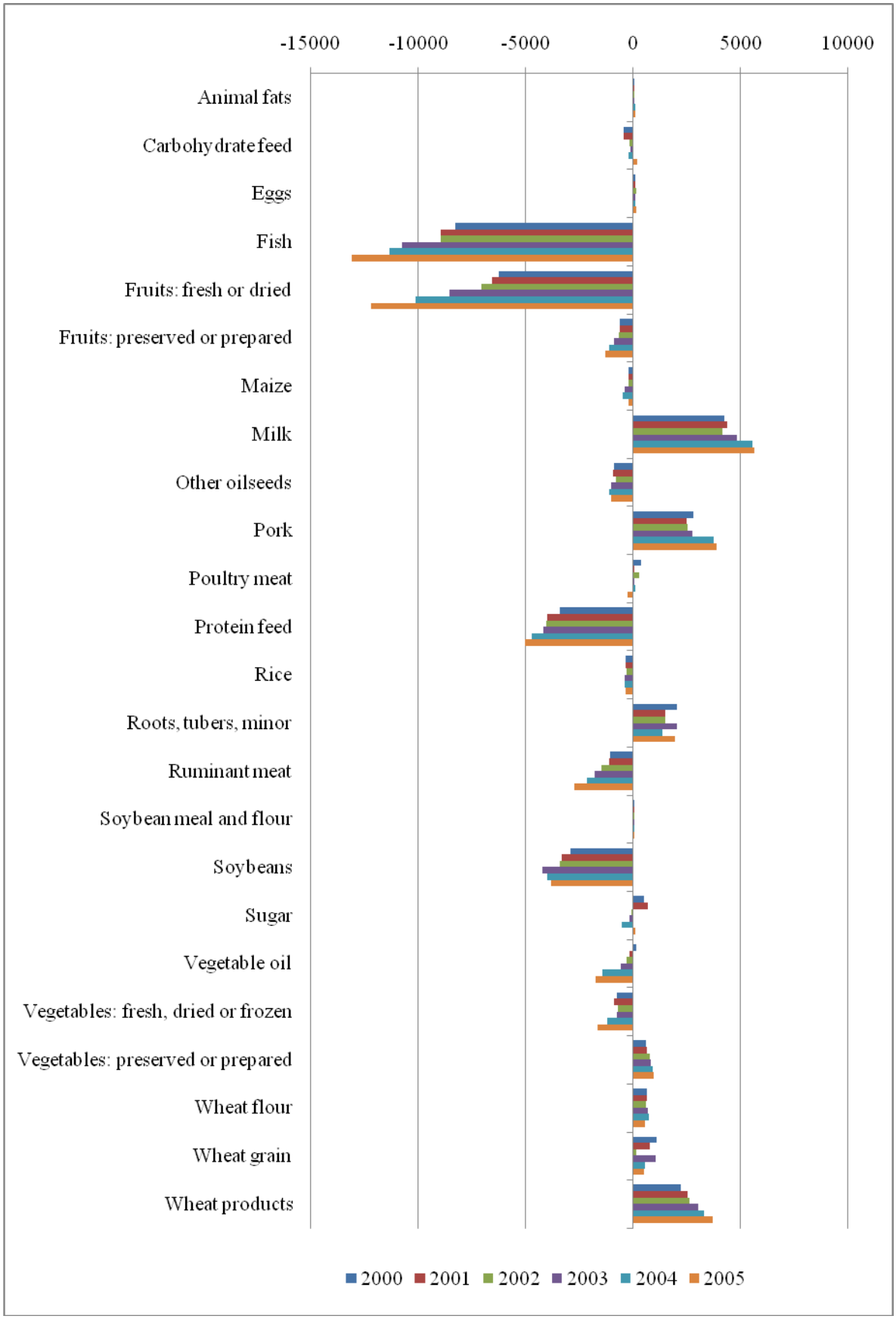

Figure 3.2: Net agricultural exports of EU27 (million US $, 2000-2005)

Source: BACI (Gaulier et al., 2007), authors' calculations

There are some products for which the net trade position has changed between 2000 and 2005. For other oilseeds China shifted from limited net imports (95 million US $) to an export of 406 million US $ in 2005. Figure 3.1 indicates that this transition was not smooth, exports jump between 2001 and 2002. For wheat grain there are limited imports from 2000 to 2002, some exports in 2003 and then a jump to imports of 1050 US $ in 2004 which drops again in 2005.

Finally, there are some products for which the net trade position remains the same but the value of trade fluctuates between years as opposed to a pattern of growth observed for other products. For maize China is a net exporter throughout the whole period, but the value of export appears rather volatile. This volatility may be caused by either fluctuations in quantities or prices. We therefore checked the quantities of maize exported by China. These show similar fluctuations as those found for the export value. Rice also does not display a consistent pattern in trade despite consistent net exports throughout the period analyzed. After a drop in exports in 2001 there is a steady increase in exports until 2003 after which in 2004 exports drop to 63 million US $. In 2005 there is a further decline to 28 million US $ suggesting that China's net trade position may change. At the same time the volatility in the previous years suggests care should be taken with such an extrapolation.

We then turn to the patterns in net trade for the EU27 displayed in figure 3.2. Similar to China there are several products with limited net trade and fluctuating trade positions (carbohydrate feed, poultry meat and sugar). At the same time there are products with limited net exports but a consistent trade position in 2000 to 2005 (animal fats, eggs, maize, rice and soybean meal and flour). For vegetable oil the position of the EU seems to have shifted from a small net exporter in 2000 (131 million US $) to significant imports in 2005 (1719 million US $).

Also for the EU most products display a consistent increase in either import or exports over the 2000 to 2005. Fluctuations in values of trade are however observed for roots and tubers and wheat grain. For the latter a trend towards a shift from net exporting to importing appears to be occurring, although the fluctuations between years make such an extrapolation risky.

3.2. Trends in bilateral trade of China and EU27

Apart from trends in total trade that can be incorporated in the CHINAGRO and FEA models, the data also allow an analysis of changes in bilateral trade between 2000 and 2005. Here we focus on bilateral trade between EU and China for agricultural products.

We start by analyzing the share of EU in China's exports (figure 3.3) and imports (figure 3.4). Europe is an important destination for China's exports of other oilseeds (41 percent on average), vegetables preserved or prepared (26 percent) and non-agricultural products (non-food excluding feed, 21 percent). For protein feed there is a dramatic decline in share of exports to the EU from 25 percent in 2000 to an average share of 0.7 percent in the 2001- 2005 period. Analysis of the bilateral data indicates that the exports of protein feed from shifted 2001 from the EU towards the Rest of Asia. As a result exports of protein feed to the Rest of Asia ranges between 93 to 99 percent in the 2001 – 2005 period.

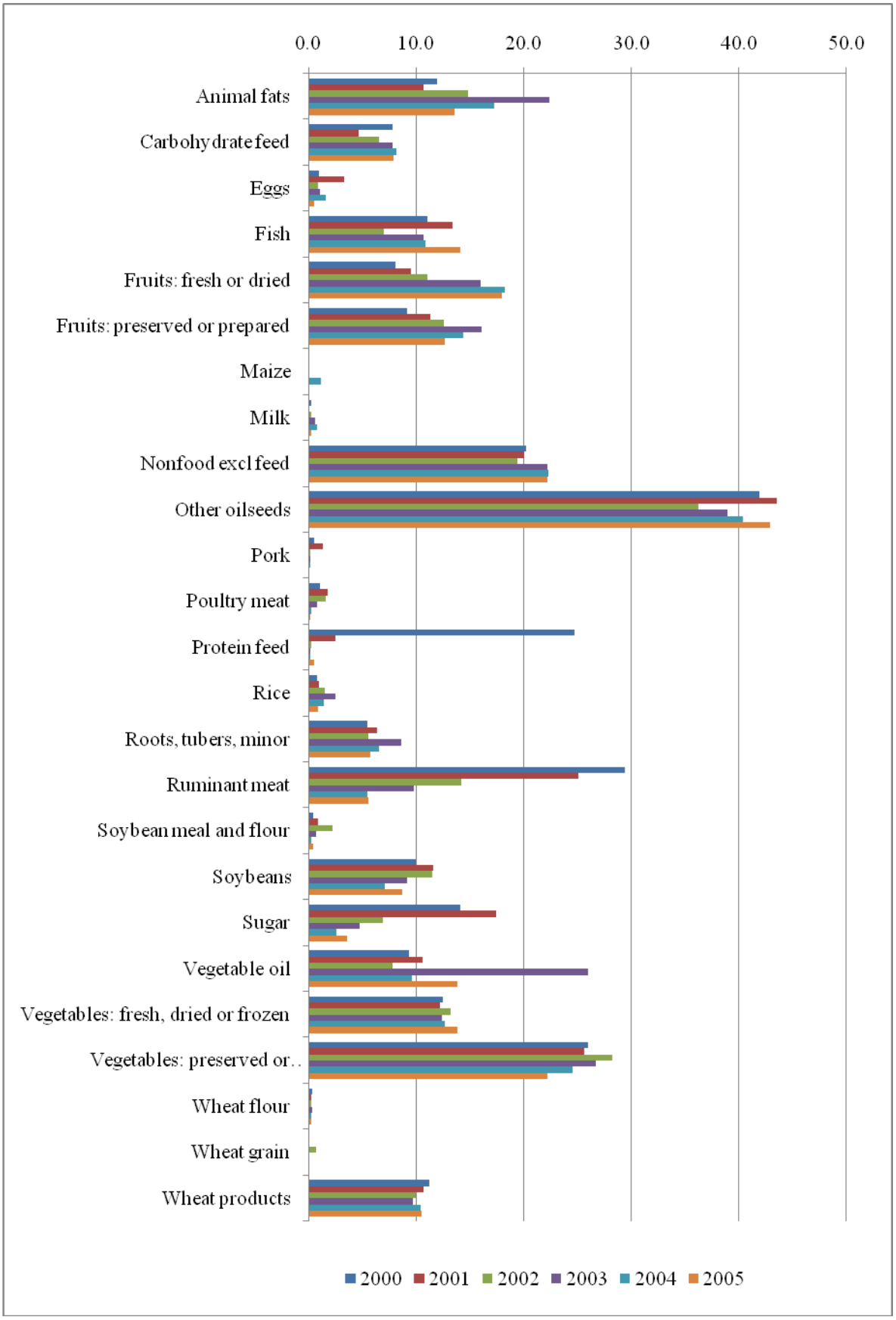

Figure 3.3: Share of EU in China's exports (%, 2000-2005)

Source: BACI (Gaulier et al., 2007), authors' calculations

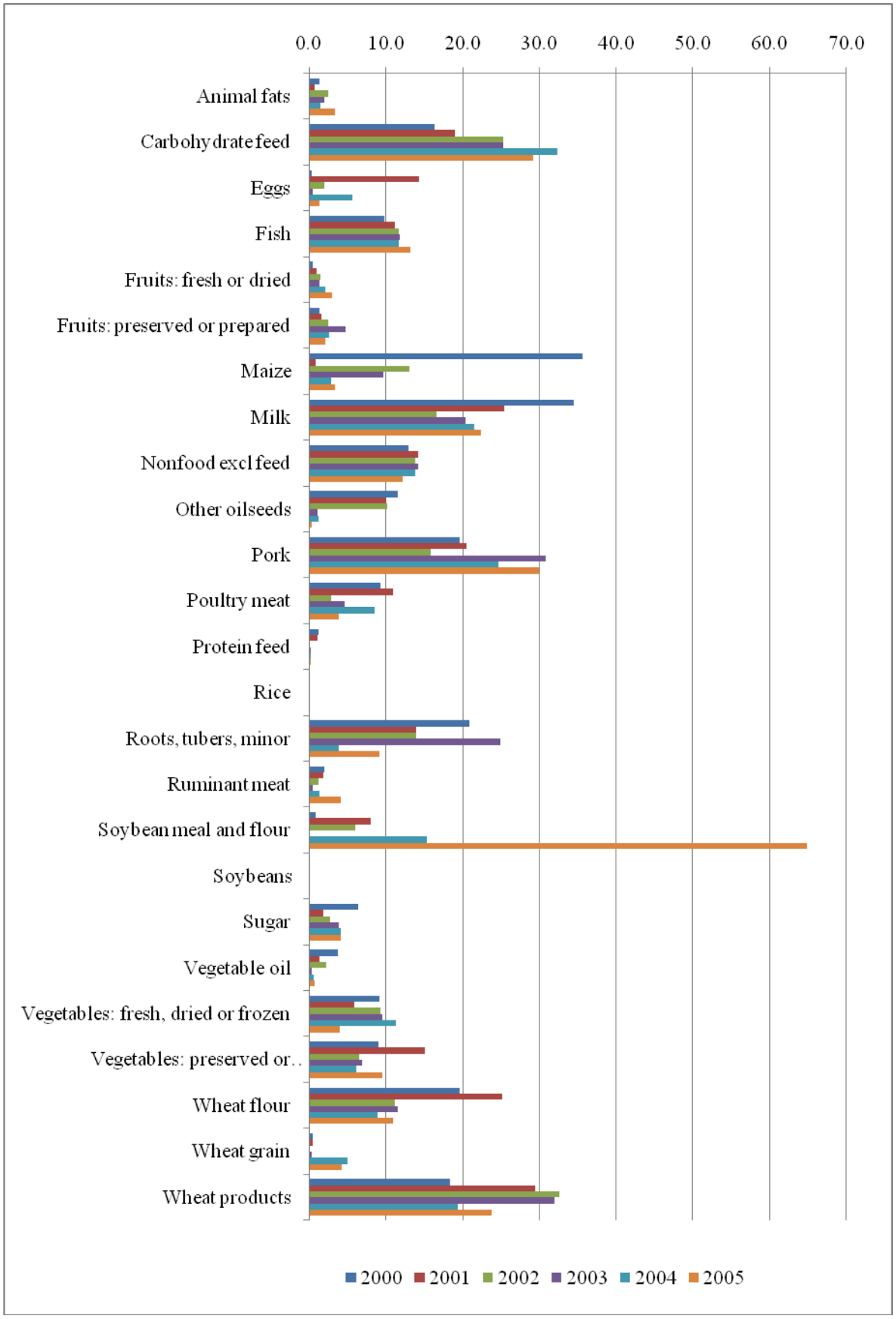

Figure 3.4: Share of EU in China's imports (%, 2000-2005)

Source: BACI (Gaulier et al., 2007), authors' calculations

We find a second spike in the Chinese export share to the EU for vegetable oil in 2003. After 2003 the EU share returns to a level comparable to the 2000 to 2002 period, therefore no structural shift in trading partners seems to occur at first sight. Again looking at the bilateral trade data the one-off increase in export share of the EU is at the expense of exports to the Rest of Asia. After 2003 exports to Rest of Asia increase again but do not reach the same level as before 2003. Instead exports to North Africa and Western Asia start accounting for a growing share of Chinese vegetable exports, suggesting a more structural shift in trading partners after all.

Turning to the share of Chinese imports originating from the EU (figure 3.4) we find several sudden increases. For eggs the importance of imports from the EU seems rather volatile, varying between 0.4 and 14 percent of Chinese imports. For maize there is a sudden drop from 36 percent in 2000 to 0.9 percent in 2001 after which the relative importance of maize imports from the EU recover in 2002 only to decrease again in the following years. An analysis of the shares of the different regions indicates that maize imports jump between EU, North America, Latin America and Rest of Asia resulting in highly volatile shares in total imports.

In figure 3.4 the spike in the import share of the EU in 2005 for import of soybean meal and flower stands out. The share of the EU in Chinese imports fluctuates between 0 and 15 percent in 2000 to 2004 and then jump to 65 percent in 2005. Analysis of the bilateral flows does not yield a consistent pattern. Sourcing of soybean meal and flower imports jumps between EU27, Rest of Europe, Rest of Asia and North America.

We then turn to the importance of China in EU's imports and exports (figure 3.5 and 3.6). The first thing to note is that we exclude intra-EU trade from the analysis. The majority of trade by EU member states is within the EU, reducing the importance of trade with the China to about 4 percent for exports and 9 percent for imports. Excluding intra-EU trade China has a more significant part of EU trade, albeit still limited to a share of less than 5 percent for most products.

As a destination of European exports China only has a significant share of other oilseeds in 2000 and 2001. In 2002 exports shift from China to North America after which they increasingly concentrate in North Africa and Western Asia and the Rest of Europe. Apart from oilseeds only exports of fish exceed 5 percent. For fish the market share of China shows a steady increase throughout the 2000-2005 period.

China is more important as a source of imports for the EU (figure 3.6). Especially for the two categories of vegetable products China is a key player: about 32 percent of the preserved or prepared vegetables and 13 percent of fresh, frozen or dried vegetables originate in China. Other oilseeds and wheat products are other products where China holds a considerable share of EU agricultural imports. For non-agricultural imports there is a steady rise in China's share reaching 15% in 2005. In quantity terms (i.e. measured in tons) the share of imports of non-agricultural goods from China is much lower (growing from 1.6 to 2.5 percent in 2004). In quantity terms more imports originate the rest of Europe, North Africa and Western Asia and Latin America but these are apparently less valuable than those coming from China

In terms of sudden peaks or drops in China's share of EU imports there are less extreme variations than found above. For pork there is a sudden increase in imports from China in 2001, after which there is a drop to below 2000 levels followed by a steady decline. The data do not show a clear shift in EU imports between countries in 2001.

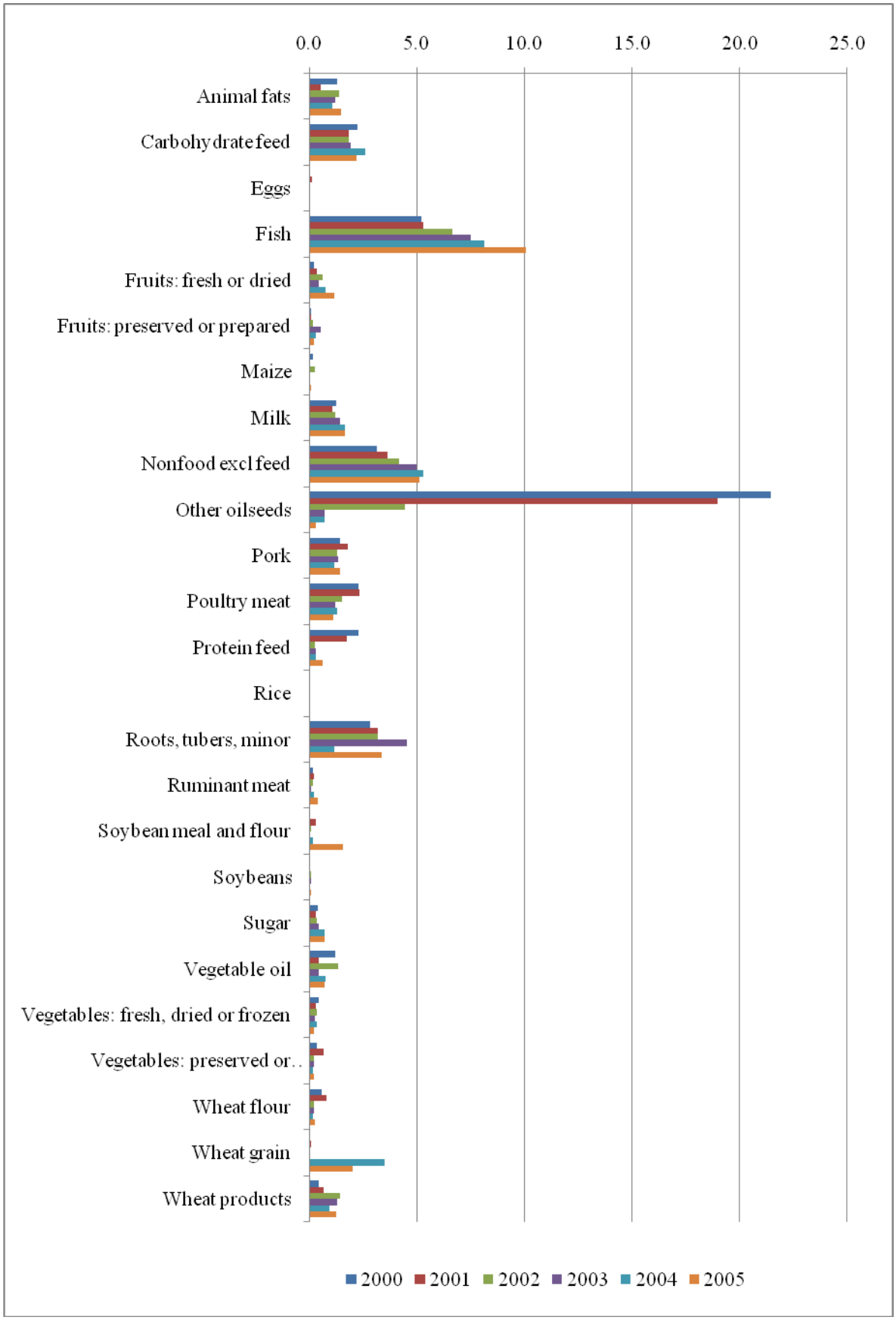

Figure 3.5: Share of China in EU's exports (%, 2000-2005, excluding intra-EU trade)

Source: BACI (Gaulier et al., 2007), authors' calculations

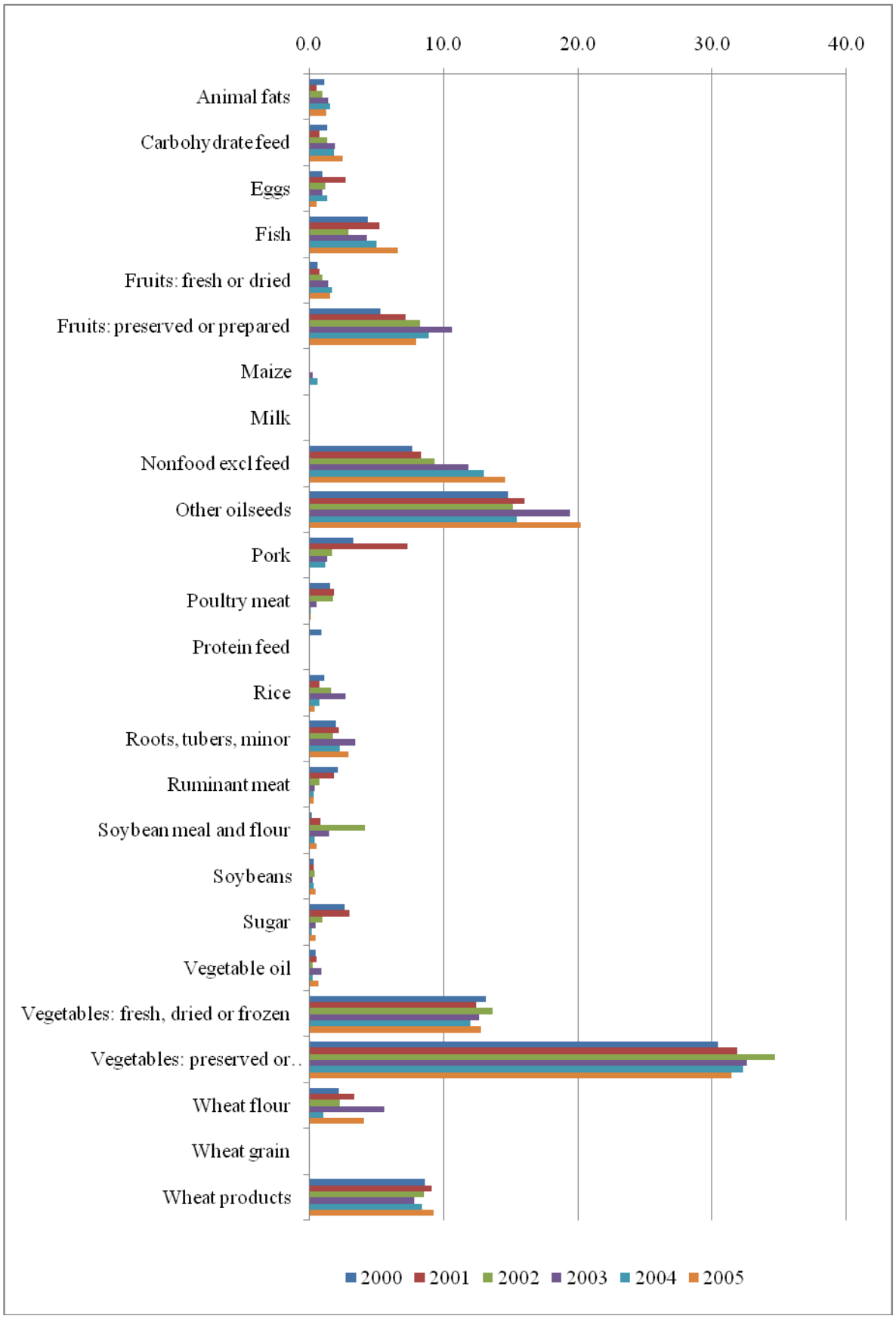

Figure 3.6: Share of China in EU's imports (%, 2000-2005, excluding intra-EU trade)

Source: BACI (Gaulier et al., 2007), authors' calculations

For soybean meal and flower there is a peak in share of imports from China in 2002 after which the share drops to around 0.5 percent. A main driver of the decline in Chinese imports share (which also affects the main sources North America and Latin America) is the increasing importance of imports from the rest of Europe which peaks at 35 percent of EU's imports in 2005.

3.3. Analyzing bilateral trade flows from a GTAP perspective

Since CHINAGRO and FEA are net trade models they do not model bilateral trade flows. GTAP however does track bilateral trade. Here we therefore analyze bilateral trade flows in the 2000 to 2005 period from a GTAP perspective. In addition we compare the trade data from BACI to the trade data incorporated in GTAP version 7 which we use in CATSEI. Given that the trade data in GTAP are not derived from BACI and are subject to a need to balance the overall database (that encompasses next to trade flow full descriptions of the 113 economies) we expect differences with the BACI data. These differences may be relevant for the modeling in CATSEI since the transmission of changes in trade flows between the models is done in value terms. If GTAP has different (implied) values of net trade than used in CHINAGRO or FEA this may affect the effect to be expected from the trade shocks. A second reason for analyzing the differences between GTAP and BACI is the computation of aggregate tariffs subject of the next part of this paper. We base our computations on the BACI trade flows whereas the GTAP rates are based on the GTAP trade data. Differences in relative trade flows can affect the computation of tariffs. A key difference with the analysis above is that we switch to the product specification as used in the GTAP model for CATSEI (see Annex 4 for a list of sectors and how these map to the 57 GTAP sectors).

We start by an assessment of the data as they are included in the November 21th, 2008 GTAP version 7 release (this is the official and public Version 7 of the GTAP database). This dataset describes the world economy in 2004 for 113 regions and 57 sectors (all in value terms measured in 2004 million US $). Our focus here is on how the trade data in GTAP compare to those in the BACI dataset. The value flows in the BACI dataset are based on FOB prices (see description of the construction of the BACI dataset above). We therefore need to compare these with the data on bilateral exports at world prices (or VWXD in GTAP database terms). We compare the GTAP data to BACI data for 2004 and to an average of 2003-2005 BACI data. The MAcMap database of tariffs uses such a three-year average to reduce the impact of sudden peaks or dips in trade flows. Such an approach makes sense given the sudden peaks we found in several instances in the analysis above.

We start by analyzing total exports of China according to the GTAP and BACI databases (table 3.3). Two major differences between the databases are immediately clear: the BACI data do not include date for trade in services and GTAP includes non-zero trade for sugar cane and beet and for raw milk that are both effectively nontradable due to product characteristics. The latter seems partly due to the absence of zeros in the GTAP database (these are replaced by small numbers) to aid the solving of applied CGE models. Summing over many regions and products these small numbers start to add up, although remaining small relative to the other trade flows.

Table 3.3: Comparing total exports and imports data of China from GTAP and BACI databases

	Exports (million US $)			*Difference GTAP (%)*		*Imports (million US $)*			*Difference GTAP (%)*	
	GTAP V7	BACI 03-05	BACI 2004	BACI 03-05	BACI 2004	GTAP V7	BACI 03-05	BACI 2004	BACI 03-05	BACI 2004
Rice	417	364	297	-13	-29	235	178	234	-24	0
Wheat	139	146	137	5	-2	1350	719	1187	-47	-12
Other cereals	440	1243	501	183	14	240	275	219	15	-8
Vegetables, fruits, nuts	2832	2681	2645	-5	-7	937	959	943	2	1
Oil seeds	607	742	679	22	12	5365	5696	5479	6	2
Sugar cane and beet	1	0	0	-94	-95	2	0	0	-88	-83
Plan-based fibers	21	64	24	197	12	2447	2446	2657	0	9
Other crops	1428	1632	1716	14	20	402	575	517	43	29
Cattle, sheep, goats, horses	19	22	21	17	11	149	106	173	-29	16
Other animal products	1756	1533	1629	-13	-7	1712	1972	1768	15	3
Raw milk	3	0	0	-100	-100	10	0	0	-100	-100
Wool, silk-worm cocoons	55	148	94	167	70	761	938	1010	23	33
Meat: cattle,sheep,goats,horse	65	87	98	33	49	513	373	375	-27	-27
Other meat products	1426	1495	1433	5	1	282	413	325	46	15
Vegetable oils and fats	418	415	420	-1	0	3799	3071	3484	-19	-8
Dairy products	83	103	100	24	21	448	510	547	14	22
Sugar	24	61	27	156	15	235	230	204	-2	-13
Other food products	13075	12784	12715	-2	-3	3906	3924	3936	0	1
Beverages and tobacco	903	1026	1018	14	13	525	498	422	-5	-20
Fishing	1128	895	939	-21	-17	255	325	377	28	48
Mining and Extraction	7321	8748	8581	19	17	46546	48426	46017	4	-1
Textiles and Clothing	101744	110600	106896	9	5	23370	16811	16706	-28	-29
Light Manufacturing	137711	150402	143068	9	4	46269	47025	46730	2	1
Heavy Manufacturing	363617	444383	444796	22	22	371185	317081	322389	-15	-13
Utilities and Construction	1959	663	634	-66	-68	1826	199	184	-89	-90
Transport and Communication	28805	0	0	-100	-100	36595	0	0	-100	-100
Other Services	14769	0	0	-100	-100	21212	0	0	-100	-100

Source: GTAP version 7 release of November 21st, 2008 and BACI (Gaulier et al., 2007), authors' calculations

Table 3.4: Comparing total exports and imports data of EU27 from GTAP and BACI databases

	Exports (million US $)			*Difference GTAP (%)*		*Imports (million US $)*			*Difference GTAP (%)*	
	GTAP V7	BACI 03-05	BACI 2004	BACI 03-05	BACI 2004	GTAP V7	BACI 03-05	BACI 2004	BACI 03-05	BACI 2004
Rice	126	172	162	36	28	718	560	566	-22	-21
Wheat	1478	1901	1729	29	17	1389	1260	1287	-9	-7
Other cereals	492	995	616	102	25	1127	863	1016	-23	-10
Vegetables, fruits, nuts	2905	3526	3448	21	19	15102	17218	17193	14	14
Oil seeds	276	362	380	31	37	5810	5778	5786	-1	0
Sugar cane and beet	7	8	6	11	-13	23	0	0	-99	-99
Plan-based fibers	444	408	434	-8	-2	1229	994	1125	-19	-8
Other crops	3297	3730	3736	13	13	11163	12233	12002	10	8
Cattle, sheep, goats, horses	813	888	960	9	18	545	530	529	-3	-3
Other animal products	2418	2415	2591	0	7	2604	2418	2487	-7	-4
Raw milk	40	0	0	-100	-100	92	0	0	-100	-100
Wool, silk-worm cocoons	67	78	84	17	26	812	888	819	9	1
Meat: cattle,sheep,goats,horse	1246	1114	1240	-11	0	3057	3155	3265	3	7
Other meat products	4677	4725	5065	1	8	2244	2293	2140	2	-5
Vegetable oils and fats	2841	3271	3323	15	17	7360	8873	9292	21	26
Dairy products	7086	7230	7505	2	6	1330	1413	1461	6	10
Sugar	1045	1584	1210	52	16	1647	1821	1852	11	12
Other food products	22947	24532	24874	7	8	25478	27024	26777	6	5
Beverages and tobacco	19227	20209	20113	5	5	5829	5858	6138	0	5
Fishing	470	513	533	9	13	2730	2691	2563	-1	-6
Mining and Extraction	18327	32028	31858	75	74	204871	234453	224112	14	9
Textiles and Clothing	44337	44062	45491	-1	3	88724	98578	100308	11	13
Light Manufacturing	301111	323146	328855	7	9	230846	251839	257124	9	11
Heavy Manufacturing	659783	749349	763443	14	16	585636	663261	682554	13	17
Utilities and Construction	16328	2172	2289	-87	-86	15738	2640	2159	-83	-86
Transport and Communication	131203	0	0	-100	-100	158190	0	0	-100	-100
Other Services	224874	0	0	-100	-100	197538	0	0	-100	-100

Source: GTAP version 7 release of November 21st, 2008 and BACI (Gaulier et al., 2007), authors' calculations

Note that the GTAP database also follows this practice for internal trade within regions, e.g. in the case of China there are small trade flows within China (of 1 dollar) in the GTAP database which are absent from the BACI database. In table 3.3 and 3.4 we excluded these internal flows (which are again large for the EU27 aggregate region) from the total exports and imports.

Trade in services is not included in COMTRADE and therefore not present in BACI either. The GTAP database uses a bilateral services trade database build database provided by the Netherlands Bureau for Economic Policy Analysis (CPB). Since these data refer to nonagricultural products not covered in any detail in CHINAGRO nor FEA we do not further explore these data.

In terms of deviations of the BACI data from the GTAP data we do not find a clear pattern. There seems to be a slightly better match with the data for 2004 indicating that the data in GTAP reflect a single year as opposed to a three-year average around 2004. At the export side of both China we deviations of more than 100 percent for the three-year average for other cereals, plant based fibers, wool and sugar. For the EU this only occurs for other cereals.

Exploring in more detail China's bilateral exports of other cereals (figure 3.7) we find large fluctuations in total exports in the 2000-2005 period. The two years for which a GTAP database is constructed (2001 in GTAP version 6 and 2004 in version 7) correspond to the two years with the lowest level of exports. In all other years trade flows are at least twice as high. The 2004 data also do not represent well the growing importance of exports to North Africa and West Asia.

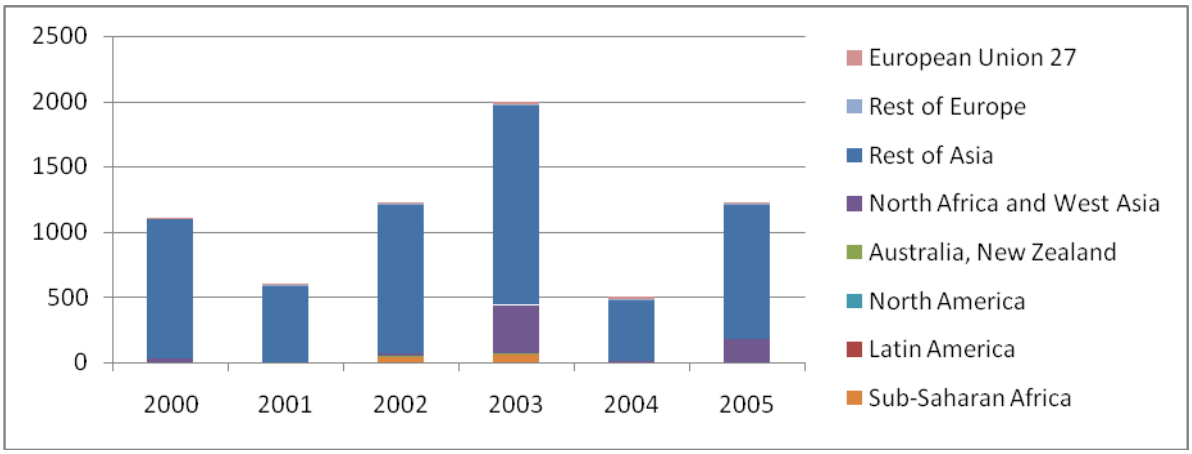

Figure 3.7: China exports of other cereals (million US $, 2000-2005)

Source: BACI (Gaulier et al., 2007), authors' calculations

In the case of plant-based fibers (figure 3.8) there seems to be a structural change with China's exports declining to almost zero from 2004 on. The average over 2003-2005 includes the higher levels of exports in the previous years. For wool and silk-worm cocoons (figure 3.9) we again find another pattern where 2004 seems not a bad representation of the 2000-2005 period. Here exports in 2003 and 2005 are relatively high compared with the other years. The bilateral data also indicate a shifting of exports between the EU and Rest of Asia between years.

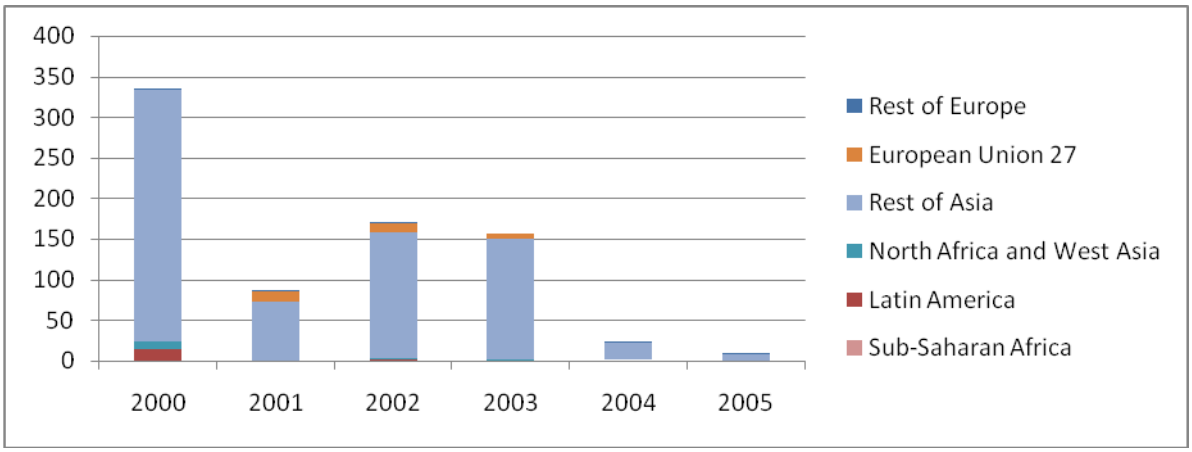

Figure 3.8: China exports of plant-based fibers (million US $, 2000-2005)

Source: BACI (Gaulier et al., 2007), authors' calculations

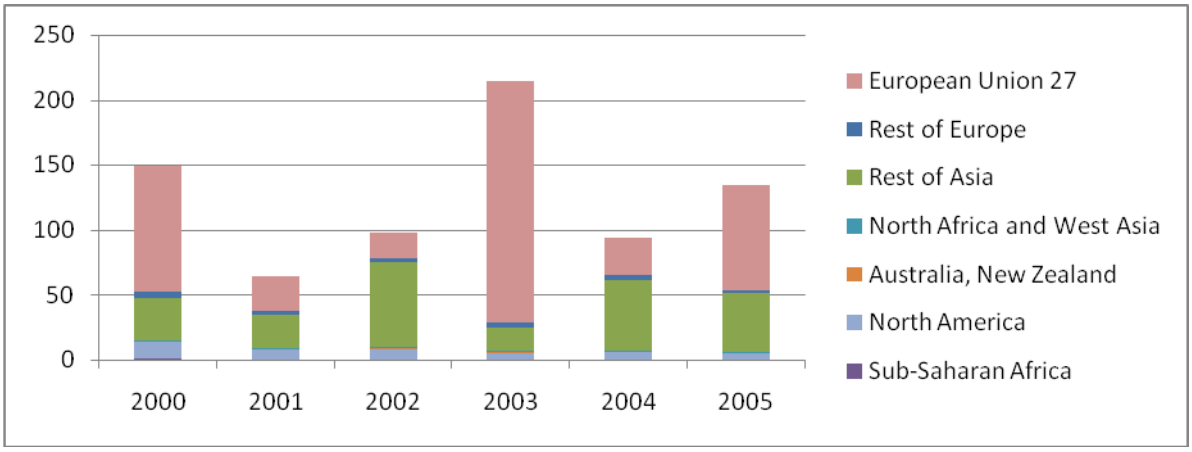

Figure 3.9: China exports of wool and silk-worm cocoons (million US $, 2000-2005)

Source: BACI (Gaulier et al., 2007), authors' calculations

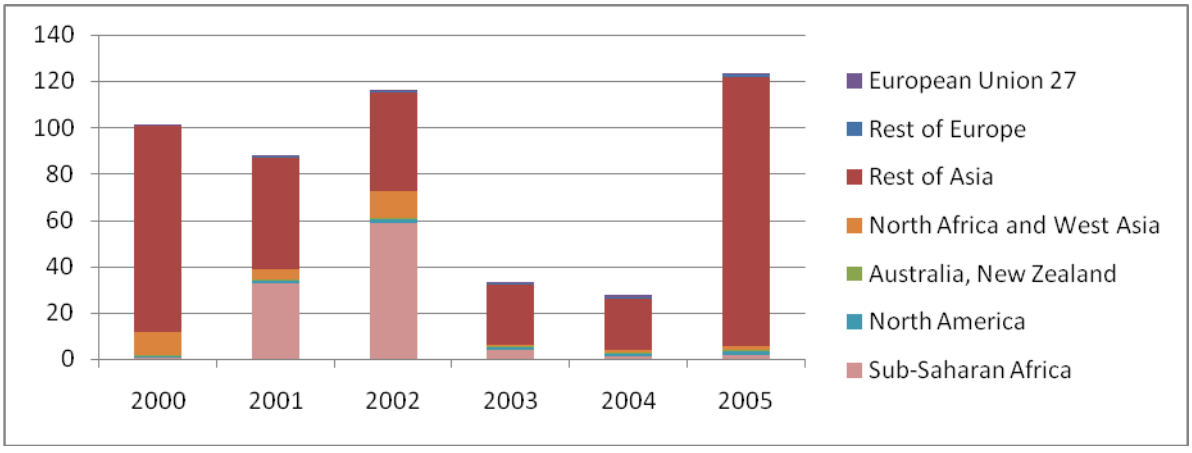

Figure 3.10: China exports of sugar (million US $, 2000-2005)

Source: BACI (Gaulier et al., 2007), authors' calculations

For sugar (figure 3.10) the data for 2000-2005 suggest that 2003 and 2004 had significantly lower exports than the other years. The data for sugar also indicate that sizeable exports to Sub-Saharan exports have been redirected to the Rest of Asia which becomes the single most important destination of sugar exports.

The clear message from this more detailed analysis of trade flows over time is the difficulty of accurately representing patterns in trade flow with a database for a single year. In the case of other cereals the two years for which GTAP databases are constructed happen to be ones with relatively low exports by China. Basing the analysis on these data only does not properly reflect the pattern of trade in this period. Overall there are different causes for each sector where we find a large divergence between the GTAP and BACI databases preventing a general approach to assuring that the data for a single year properly represents trends in trade flows.

3.4. Implications for model-based analysis in CATSEI

The analysis of trade flows provides several clues for the implementation of the model-based analysis in CATSEI, and more specifically the way in which the different models are linked.

Because of the manner in which the two net trade models (CHINAGRO and FEA) will be linked to GTAP the net trade position of China and EU are important. GTAP models bilateral trade flows using the Armington assumption which leads to a distinction of for example rice exports from China from rice imports by China (effectively these are treated as different commodities). As a result the impact of increasing imports or decreasing exports by the same amount (which is equivalent from a net trade perspective) on world market prices varies in the GTAP simulations. In case of products that are consistently imported or exported the choice of whether to shock imports or exports is straightforward. For both China and the EU we however found several products with changing trade positions or net trade positions that are close to switching. For these products a procedure for translating changes from the net trade models to GTAP needs to be devised.

The analysis of the relative importance of bilateral trade between the EU and China indicate that for some products the sourcing of products varies strongly between years. These fluctuations may be caused by sudden changes in barriers to trade. These can originate from preferential trade agreements changing the relative attractiveness of trade partners, or the imposition of tariffs or other barrier to trade by specific trade partners. Another possibility is that the products concerned are so uniform that even limited changes in relative prices have a strong impact on bilateral trade flows. The latter would imply that the Armington assumption used by GTAP would not be appropriate for these products. Determining which combination of causes was at play requires a study of tariff line and country level which is beyond the scope of the current paper.

The comparison between trade data from GTAP and those from BACI indicated significant differences for some products and some trade flows. Analyzing in more detail large difference in bilateral exports of China we found a variety of causes boiling down to the difficulty of representing fluctuating trade flows with data for a single year. These divergences have implications for the linking of GTAP to CHINAGRO and FEA. So far the models exchange changes in trade in value terms which are then translated in percentage changes in GTAP using the GTAP data as a base. Depending on which source of data is used for quantifying the trade flows in CHINAGRO and FEA these percentage shocks relative to GTAP trade data may be of a

different size than if computed relative to the trade flows in the two net trade m[1]odels. Since the relative change in trade will be the key determinant of changes in prices it may be advisable to exchange not values of trade but changes in trade in percentage terms. This would avoid the need to assure that levels of trade flows are identical in all three models , which will be hard to achieve in any case since for example CHINAGRO will be use 2005 as its reference year whereas for GTAP 2004 is the most recent available year.

4. Data on distortions to agricultural incentives

The World Bank has recently released a dataset of distortions to agricultural incentives (Anderson and Valenzuela, 2008). The aim of the dataset is to provide time-series estimations of agricultural distortions from 1955 to 2007. The data encompass estimated of nominal rates of assistance (NRA) both for specific products as well as aggregate levels of assistance (referred to as the "general" in the database). The dataset covers 75 countries among which China and 22 of the EU member states (Belgium, Luxembourg, Greece, Cyprus and Malta are not included). Table 4.1 provides an overview of the country and product coverage, indicating for each product the earliest year with data. For China data are available from 1981 on, for the European countries earliest data are from 1956 but availability varies strongly between country-product combinations. The CATSEI trade database includes the full World Bank dataset.

[maybe add analysis of the parts of the dataset that are relevant for CHINAGRO and FEA?]

[1] See for a description of the project, the database and background papers http://go.worldbank.org/YAO39F35E0

Table 4.1: Availability of data for CATSEI countries in World Bank dataset on agricultural distortions

	China	Austria	Bulgaria	Czech republic	Denmark	Estonia	Finland	France	Germany	Hungary	Ireland	Italy
General[a)]	1981	1956	1992	1992	1956	1992	1956	1956	1956	1992	1956	1956
Barley	-	1956	1992	1992	1956	1992	1956	1956	1956	1992	1956	1956
Beef	-	1986	1992	1992	1956	1992	1956	1956	1956	1992	1973	1956
Cotton	1981	-	-	-	-	-	-	-	-	-	-	-
Eggs	-	1986	1992	1992	1956	1992	1986	1956	1956	1992	1973	1956
Fruits	1981	-	-	-	-	-	-	-	-	-	-	-
Maize	1981	1956	1992	2005	-	-	-	1956	1962	1992	-	1956
Milk	1981	1986	1992	1992	1956	1992	1956	1956	1956	1992	1956	1956
Oat	-	1956	2007	2005	1956	1992	1956	1956	1956	2005	1956	1956
Oilseed	-	-	-	-	-	1992	-	-	-	-	-	-
Other grains	-	-	-	-	-	-	-	-	-	-	-	-
Pigmeat	1981	1986	1992	1992	1956	1992	1956	1956	1956	1992	1956	1956
Potato	-	1956	2007	2005	1956	2005	1956	1972	1972	1992	1961	1972
Poultry	1981	1986	1992	1992	1956	1992	1986	1956	1956	1992	1973	1956
Rapeseed	-	1956	2007	1992	1956	-	-	1956	1956	2005	1975	1956
Rice	1981	-	2007	-	-	-	-	1956	-	2005	-	1956
Rye	-	-	-	-	-	1992	-	-	-	-	-	-
Sheepmeat	-	1986	1992	2005	1973	2005	1986	1956	1956	1992	1973	1956
Soybean	1981	-	2007	2005	-	-	-	1973	1989	2005	-	1956
Sugar	1981	1956	1992	1992	1956	-	1956	1956	1956	1992	1956	1956
Sunflower	-	1956	1992	2005	-	-	-	1956	1987	1992	-	1956
Tomato	-	-	2007	2005	1973	2005	-	1961	1962	2005	1973	1956
Vegetables	1981	-	-	-	-	-	-	-	-	-	-	-
Wheat	1981	1956	1992	1992	1956	1992	1956	1956	1956	1992	1956	1956
Wine	-	1956	2007	-	-	-	-	1956	1956	2005	-	1956

a) Aggregated measure of protection.

Table 4.1: Availability of data for CATSEI countries in World Bank dataset on agricultural distortions (continued)

	Latvia	Lithuania	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom	Latvia
General[a)]	1992	1992	1956	1992	1956	1992	1992	1992	1956	1956	1956	1992
Barley	1992	1992	1956	2005	1986	1992	1992	1992	1956	1956	1956	1992
Beef	1992	1992	1956	1992	1960	1992	1992	1992	1986	1956	1956	1992
Cotton	-	-	-	-	-	-	-	-	-	-	-	-
Eggs	1992	1992	1956	1992	1986	1992	1992	1992	1986	1986	1956	1992
Fruits	-	-	-	-	-	-	-	-	-	-	-	-
Maize	-	2005	1962	1992	1960	1992	1992	1992	1956	-	-	-
Milk	1992	1992	1956	1992	1960	1992	1992	1992	1986	1956	1956	1992
Oat	1992	1992	1956	2005	1986	1992	1992	-	1956	1956	1956	1992
Oilseed	1992	1992	-	1992	-	-	-	-	-	-	-	1992
Othergrains	-	-	-	1992	-	-	-	-	-	-	-	-
Pigmeat	1992	1992	1956	1992	1986	1992	1992	1992	1956	1956	1956	1992
Potato	2005	2005	1972	2005	1986	2007	2005	-	1986	1956	1956	2005
Poultry	1992	1992	1956	1992	1986	1992	1992	1992	1986	1956	1956	1992
Rapeseed	-	-	1962	-	-	1992	1992	-	1986	1956	1968	-
Rice	-	-	-	-	1960	2007	-	-	1956	-	-	-
Rye	1992	1992	-	-	-	-	1992	-	-	-	-	1992
Sheepmeat	2005	2005	1956	1992	1960	1992	2005	1992	1986	1956	1956	2005
Soybean	-	-	-	2005	-	1992	2005	-	1970	-	-	-
Sugar	1992	1992	1956	1992	1956	1992	1992	1992	1956	1956	1956	1992
Sunflower	-	-	-	2005	1971	1992	1992	-	1956	-	-	-
Tomato	2005	2005	1956	2005	1960	2007	2005	-	1956	-	1956	2005
Vegetables	-	-	-	-	-	-	-	-	-	-	-	-
Wheat	1992	1992	1956	1992	1960	1992	1992	1992	1956	1956	1956	1992
Wine	-	-	-	-	1956	2007	2005	-	1956	-	-	-

a) Aggregated measure of protection.

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Annex 1. Regional classification for trade analysis (with mapping from GTAP)

Code	Description	GTAP regions
Oceania	Australia, New Zealand	Australia; New Zealand; Rest of Oceania.
CHN	China	China.
RestOfAsia	Rest of Asia	Hong Kong; Japan; Korea; Taiwan; Rest of East Asia; Cambodia; Indonesia; Lao People's Democratic Republ; Myanmar; Malaysia; Philippines; Singapore; Thailand; Viet Nam; Rest of Southeast Asia; Bangladesh; India; Pakistan; Sri Lanka; Rest of South Asia; Kazakhstan; Kyrgyztan; Rest of Former Soviet Union.
NAmerica	North America	Canada; United States of America; Mexico; Rest of North America.
LatinAmer	Latin America	Argentina; Bolivia; Brazil; Chile; Colombia; Ecuador; Paraguay; Peru; Uruguay; Venezuela; Rest of South America; Costa Rica; Guatemala; Nicaragua; Panama; Rest of Central America; Caribbean.
EU_27	European Union 27	Austria; Belgium; Cyprus; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Latvia; Lithuania; Luxembourg; Malta; Netherlands; Poland; Portugal; Slovakia; Slovenia; Spain; Sweden; United Kingdom; Bulgaria.
RestEurope	Rest of Europe	Switzerland; Norway; Rest of EFTA; Albania; Belarus; Croatia; Romania; Russian Federation; Ukraine; Rest of Eastern Europe; Rest of Europe.
NAfr_WAsia	North Africa and West Asia	Armenia; Azerbaijan; Georgia; Iran Islamic Republic of; Turkey; Rest of Western Asia; Egypt; Morocco; Tunisia; Rest of North Africa.
SSA	Sub-Saharan Africa	Nigeria; Senegal; Rest of Western Africa; Central Africa; South Central Africa; Ethiopia; Madagascar; Malawi; Mauritius; Mozambique; Tanzania; Uganda; Zambia; Zimbabwe; Rest of Eastern Africa; Botswana; South Africa; Rest of South African Customs .

Annex 2. Commodity classification for trade analysis (with mapping from HS)

Extended Chinagro		HS
1a.	Paddy	100610
1b.	Milled or husked rice	100620-100630
2a.	Wheat grain	1001
2b.	Wheat flour	1101, 1109
2c.	Wheat products	1901-1902, 1904-1905
3.	Maize	1005
4a.	Roots, tubers and their flour	0701, 071420-017490 1903
4b.	Minor grains and their flour	1002-1004, 1007-1008 1102-1108
4c.	Soybeans	1201 210310
4d.	Other oilseeds	1202-1207
5.	Vegetable oil	1507-1515, 151620, 151710
6.	Cane and beet sugar	121291 1701
7a.	Fruits: fresh or dried	0801-0813
7b.	Fruits: preserved or prepared	2008
8a.	Vegetables: fresh, dried or frozen	0702-0713
8b.	Vegetables: preserved or prepared	2001-2005 210320
9.	Ruminant meat	0101-0102, 0104-0106 0201-0202, 0204-0205, 020610-020629, 020680-020690, 0208, 0210 160250, 160290
10.	Pork	0103 0203, 020630-020649 160100, 160210-160220, 160241-160249
11.	Poultry meat	0105 0207 160231-160239
12a.	Milk	0401-0404
12b.	Butter	0405
12c.	Cheese	0406
13.	Eggs	0407-0408
14.	Fish	0301-0307 1604-1605

(continued on next page)

15a.	Other food	0209
		0409
		0901-0910
		1501-1506, 151610, 151790
		1702, 1704
		1801-1806
		2006-2007, 2009
		2101-2102, 210330-210390, 2104-2106
		2201-2209
15b.	Nonfood excl feed	0410
		0501-0511
		0601-0604
		1209-1211, 121210-121230, 121299
		1301-1302
		1401-1404
		1518-1522
		1603
		2307, 230910
		2401-2403
		Chapters 25-97
16.	Carbohydrate feed	071410
		0814
		1213-1214
		1703
		2303, 2308, 230990
17.	Protein feed	1208
		2301-2302, 2304-2306

(further explanations on next page)

Further explanation

Other food (15a) consists of

Animal fats	0209
	1501-1506, 151610, 151790
Honey, sauces, sugar confectionary	0409
	1702, 1704
	2006-2007
	2102, 210330-210390, 2104-2106
Coffee, tea, spices, cocoa	0901-0910
	1801-1806
	2101
Beverages and juices	2009
	2201-2209

Carbohydrate feed (16) consists of

Cassava	071410
Citrus or melon peel	0814
Prepared cereal straw and husks	1213
Fodder roots and crops	1214
Molasses	1703
Food processing residuals	2303, 2308, 230990

Protein feed (17) consists of

Bran	2302
Fish and meat meal	2301
Oilseed cake	2304-2306
Oilseed meal and flour	1208

Additional note

To derive baseyear trade values in Chinagro classification, we should follow the mapping above (from HS into the 17 Chinagro commodities), but with the following remarks:

- part of wheat products to nonfood (viz. the processing addition)
- part of minor grains to carbohydrate feed (viz. direct feed use)
- largest part of soybeans to vegetable oil, nonfood and protein feed (Chinagro does not consider processing of imports)
- part of preserved/prepared fruit to nonfood (viz. the processing addition)
- part of preserved/prepared vegetables to nonfood (viz. the processing addition)
- part of preserved/prepared ruminant meat, pork, poultry meat and fish to nonfood (viz. the processing addition in the products of HS, chapter 16)

Annex 3. Commodity classification in GTAP

Code	*Description*
pdr	Paddy Rice: rice, husked and unhusked
wht	Wheat: wheat and meslin
gro	Other Grains: maize (corn), barley, rye, oats, other cereals
v_f	Veg & Fruit: vegetables, fruitvegetables, fruit and nuts, potatoes, cassava, truffles,
osd	Oil Seeds: oil seeds and oleaginous fruit; soy beans, copra
c_b	Cane & Beet: sugar cane and sugar beet
pfb	Plant Fibres: cotton, flax, hemp, sisal and other raw vegetable materials used in textiles
ocr	Other Crops: live plants; cut flowers and flower buds; flower seeds and fruit seeds; vegetable seeds, beverage and spice crops, unmanufactured tobacco, cereal straw and husks, unprepared, whether or not chopped, ground, pressed or in the form of pellets; swedes, mangolds, fodder roots, hay, lucerne (alfalfa), clover, sainfoin, forage kale, lupines, vetches and similar forage products, whether or not in the form of pellets, plants and parts of plants used primarily in perfumery, in pharmacy, or for insecticidal, fungicidal or similar purposes, sugar beet seed and seeds of forage plants, other raw vegetable materials
ctl	Cattle: cattle, sheep, goats, horses, asses, mules, and hinnies; and semen thereof
oap	Other Animal Products: swine, poultry and other live animals; eggs, in shell (fresh or cooked), natural honey, snails (fresh or preserved) except sea snails; frogs' legs, edible products of animal origin n.e.c., hides, skins and furskins, raw , insect waxes and spermaceti, whether or not refined or coloured
rmk	Raw milk
wol	Wool: wool, silk, and other raw animal materials used in textile
frs	Forestry: forestry, logging and related service activities
fsh	Fishing: hunting, trapping and game propagation including related service activities, fishing, fish farms; service activities incidental to fishing
col	Coal: mining and agglomeration of hard coal, lignite and peat
oil	Oil: extraction of crude petroleum and natural gas (part), service activities incidental to oil and gas extraction excluding surveying (part)
gas	Gas: extraction of crude petroleum and natural gas (part), service activities incidental to oil and gas extraction excluding surveying (part)
omn	Other Mining: mining of metal ores, uranium, gems. other mining and quarrying
cmt	Cattle Meat: fresh or chilled meat and edible offal of cattle, sheep, goats, horses, asses, mules, and hinnies. raw fats or grease from any animal or bird.
omt	Other Meat: pig meat and offal. preserves and preparations of meat, meat offal or blood, flours, meals and pellets of meat or inedible meat offal; greaves
vol	Vegetable Oils: crude and refined oils of soya-bean, maize (corn),olive, sesame, ground-nut, olive, sunflower-seed, safflower, cotton-seed, rape, colza and canola, mustard, coconut palm, palm kernel, castor, tung jojoba, babassu and linseed, perhaps partly or wholly hydrogenated,inter-esterified, re-esterified or elaidinised. Also margarine and similar preparations, animal or vegetable waxes, fats and oils and their fractions, cotton linters, oil-cake and other solid residues resulting from the extraction of vegetable fats or oils; flours and meals of oil seeds or oleaginous fruits, except those of mustard; degras and other residues resulting from the treatment of fatty substances or animal or vegetable waxes.
mil	Milk: dairy products
pcr	Processed Rice: rice, semi- or wholly milled
sgr	Sugar
ofd	Other Food: prepared and preserved fish or vegetables, fruit juices and vegetable juices, prepared and preserved fruit and nuts, all cereal flours, groats, meal and pellets of wheat, cereal groats, meal and pellets n.e.c., other cereal grain products (including corn flakes), other vegetable flours and meals, mixes and doughs for the preparation of bakers' wares, starches and starch products; sugars and sugar syrups n.e.c., preparations used in animal feeding, bakery products, cocoa, chocolate and sugar confectionery, macaroni, noodles, couscous and similar farinaceous products, food products n.e.c.
b_t	Beverages and Tobacco products
tex	Textiles: textiles and man-made fibres
wap	Wearing Apparel: Clothing, dressing and dyeing of fur
Code	**Description**
lea	Leather: tanning and dressing of leather; luggage, handbags, saddlery, harness and footwear

lum	Lumber: wood and products of wood and cork, except furniture; articles of straw and plaiting materials
ppp	Paper & Paper Products: includes publishing, printing and reproduction of recorded media
p_c	Petroleum & Coke: coke oven products, refined petroleum products, processing of nuclear fuel
crp	Chemical Rubber Products: basic chemicals, other chemical products, rubber and plastics products
nmm	Non-Metallic Minerals: cement, plaster, lime, gravel, concrete
i_s	Iron & Steel: basic production and casting
nfm	Non-Ferrous Metals: production and casting of copper, aluminium, zinc, lead, gold, and silver
fmp	Fabricated Metal Products: Sheet metal products, but not machinery and equipment
mvh	Motor Vehicles: cars, lorries, trailers and semi-trailers
otn	Other Transport Equipment: Manufacture of other transport equipment
ele	Electronic Equipment: office, accounting and computing machinery, radio, television and communication equipment and apparatus
ome	Other Machinery & Equipment: electrical machinery and apparatus n.e.c., medical, precision and optical instruments, watches and clocks
omf	Other Manufacturing: includes recycling
ely	Electricity: production, collection and distribution
gdt	Gas Distribution: distribution of gaseous fuels through mains; steam and hot water supply
wtr	Water: collection, purification and distribution
cns	Construction: building houses factories offices and roads
trd	Trade: all retail sales; wholesale trade and commission trade; hotels and restaurants; repairs of motor vehicles and personal and household goods; retail sale of automotive fuel
otp	Other Transport: road, rail ; pipelines, auxiliary transport activities; travel agencies
wtp	Water transport
atp	Air transport
cmn	Communications: post and telecommunications
ofi	Other Financial Intermediation: includes auxiliary activities but not insurance and pension funding (see next)
isr	Insurance: includes pension funding, except compulsory social security
obs	Other Business Services: real estate, renting and business activities
ros	Recreation & Other Services: recreational, cultural and sporting activities, other service activities; private households with employed persons (servants)
osg	Other Services (Government): public administration and defense; compulsory social security, education, health and social work, sewage and refuse disposal, sanitation and similar activities, activities of membership organizations n.e.c., extra-territorial organizations and bodies
dwe	Dwellings: ownership of dwellings (imputed rents of houses occupied by owners)

Annex 4. Commodity aggregation use for GTAP in CATSEI

Code	Description	GTAP sectors included
ric	Rice	Paddy rice; Processed rice.
wht	Wheat	Wheat.
gro	Other cereals	Cereal grains nec.
v_f	Vegetables, fruits, nuts	Vegetables, fruit, nuts.
osd	Oil seeds	Oil seeds.
c_b	Sugar cane and beet	Sugar cane, sugar beet.
pfb	Plan-based fibers	Plant-based fibers.
ocr	Other crops	Crops nec.
ctl	Cattle, sheep, goats, horses	Cattle,sheep,goats,horses.
oap	Other animal products	Animal products nec.
rmk	Raw milk	Raw milk.
wol	Wool, silk-worm cocoons	Wool, silk-worm cocoons.
cmt	Meat: cattle,sheep,goats,horse	Meat: cattle,sheep,goats,horse.
omt	Other meat products	Meat products nec.
vol	Vegetable oils and fats	Vegetable oils and fats.
mil	Dairy products	Dairy products.
sgr	Sugar	Sugar.
ofd	Other food products	Food products nec.
b_t	Beverages and tobacco	Beverages and tobacco products.
fsh	Fishing	Fishing.
ext	Mining and Extraction	Forestry; Coal; Oil; Gas; Minerals nec.
txt	Textiles and Clothing	Textiles; Wearing apparel.
lmf	Light Manufacturing	Leather products; Wood products; Paper products, publishing; Metal products; Motor vehicles and parts; Transport equipment nec; Manufactures nec.
hmf	Heavy Manufacturing	Petroleum, coal products; Chemical,rubber,plastic prods; Mineral products nec; Ferrous metals; Metals nec; Electronic equipment; Machinery and equipment nec.
utl	Utilities and Construction	Electricity; Gas manufacture, distribution; Water; Construction.
trc	Transport and Communication	Trade; Transport nec; Sea transport; Air transport; Communication.
osr	Other Services	Financial services nec; Insurance; Business services nec; Recreation and other services; PubAdmin/Defence/Health/Educat; Dwellings.