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Konstantins Benkovskis[1], Julia Wörz[2]

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JEL : C43, F12, F14, L15
Keywords: non-price competitiveness, quality, relative export price, emerging countries

Authors

[1] Monetary Policy Department, Latvijas Banka, konstantins.benkovskis@bank.lv
[2] Foreign Research Division, Oesterreichische Nationalbank, julia.woerz@oenb.at

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[1] Monetary Policy Department, Latvijas Banka, konstantins.benkovskis@bank.lv

[2] Foreign Research Division, Oesterreichische Nationalbank, julia.woerz@oenb.at

1. Introduction

Emerging economies attain a continuously growing share in world trade. In 1999, the share of emerging and developing countries in total world exports amounted to 35% while this share has risen to 49% in 2011 (CPB World Trade Monitor February 2011). The gain in global export market share was a consequence of the substantial growth differential between the two groups of countries. Average annual real export growth of emerging markets amounted to 8.4% over the period 1999-2011, more than twice the 3.2% per annum growth performance recorded for advanced countries' exports (CPB World Trade Monitor February 2011). This greatly increased importance at the world market reflects a rise in competitiveness of emerging relative to advanced economies. One of the first studies to notice this competitive strength is Durand et al. (1998). They focus on East Asian economies in the wake of the Asian crisis and note that the sharp depreciations in those countries have resulted in substantial gains in nominal price competitiveness. They find that Asian countries, in particular China, have emerged as important competitors to OECD countries, altering also the overall pattern of competition in the three major OECD regions – USA, EU and Japan. However, they also notice that nominal competitiveness gains through currency devaluations were often offset by cost and price inflation in those countries, thus yielding a smaller influence on patterns of real competitiveness. In the same vein, the observation of real effective exchange rates of Central and Eastern European catching-up economies would even reveal a loss in pure price competitiveness, given the long-run real appreciation trend during their transformation process. However, as argued by Benkovskis and Wörz (2012), even this trend does not necessarily reflect losses in competitiveness, once price developments are calculated net of quality improvements.

We derive our methodological framework from an analysis of costs and price differentials. However, relative price movements may arise for different reasons such as underlying changes in production costs, technological change, changes in consumers' valuation and quality. Certainly, measurement especially of the latter factors is difficult if not impossible, thus one has to resort to indirect estimation methods in order to control for such factors.

In this paper, we illustrate price and non-price competitiveness of a range of globally important emerging markets over the period 1999-2010. Taken together our sample of nine emerging economies – Argentina, Brazil, Chile, China, India, Indonesia,

Mexico, Russia and Turkey – represents roughly one fifth of total world exports. The existing literature on these countries focuses largely on price competitiveness. As emerging economies, their productivity and hence wage levels are clearly below those of their industrialized competitors. This would give them a natural cost advantage which should result in strong price competitiveness. However, at the same time their catching-up experience induces rising price levels thus curbing this cost advantage in real terms over time. Further, the catching-up process makes them attractive locations for foreign capital inflows which further creates an appreciation pressure.[3] Finally, their integration into global value chains may impact positively on productions processes or product quality. Clearly, these factors – while weighing negatively on price competitiveness as measured through the real (effective) exchange rate – may also have a positive influence on competitiveness in a more comprehensive way through (human) capital upgrading and increased productivity.

Our approach allows us to indirectly take account of non-price aspects of competitiveness. We measure the evolution of competitiveness by relative export prices, whereby we allow for entry and exit of competitors in narrowly defined goods markets and we control for changes in non-price aspects (such as quality) of exported goods over time. This enables us to assess to what extent the outstanding export performance of these major emerging economies over the past decade is explained by their ability to produce cheaply and thus exploit their cost advantage and to what extent they have improved the quality of their exported products in a broad sense (encompassing physical characteristics as well as labelling and meeting consumer's tastes).

For our analysis we use the approach developed in Benkovskis and Wörz (2012). This approach builds on the framework developed by Feenstra (1994) and Broda and Weinstein (2006) for the calculation of variety-adjusted import prices, applies it to export prices and extends it to incorporate changes in the quality of goods and the set of competitors. By quality we mean both, physical properties as well as changes in consumers' evaluation of goods, i.e. tastes and labelling.

The paper proceeds as follows: The next section summarizes conventional wisdom with respect to price competitiveness as described by the real effective exchange rate. It further explains why the real effective exchange rate gives an insufficient

[3] See for example Ibarra (2011) for supporting evidence of this effect in Mexico.

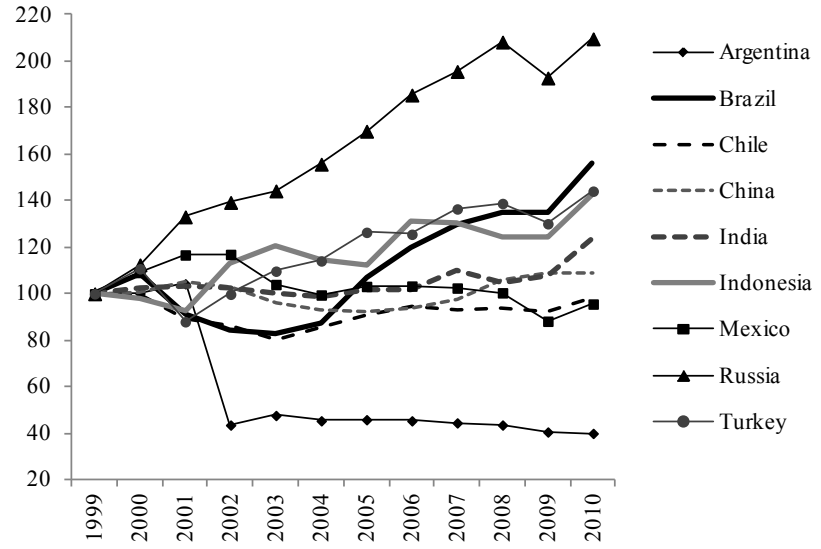
picture of a country's competitiveness, as it conceals non-price elements of competitiveness. Section 3 outlines our methodological approach to reveal these non-price aspects, section 4 describes the data base and section 5 reports the results. Conclusions are given in section 6.

2. From Price to Non-Price Competitiveness

International competitiveness of a country is often assessed by looking at its real exchange rate, which reflects relative changes in nominal exchange rates net of differences in inflation rates. Inflation can be measured in terms of consumer price inflation (i.e. CPI-based), by producer prices (PPI-based) or by unit labour costs. Apart from bilateral comparisons, competitiveness can also easily be measured more generally through the real effective exchange rate (REER) index which is a trade-weighted average of all bilateral real exchange rates. While these calculations are tedious, they are nevertheless attractive as the necessary data – exchange rates and inflation rates – are usually easily available.

Figure 1 below shows CPI-based real effective exchange rates for our nine countries over the entire observation period (see Darvas, 2012 for the description of calculations). An increase reflects a real appreciation and is thus associated with a loss in international competitiveness. We see that apart from Argentina, Mexico and Chile, most countries experienced such a loss in price competitiveness as measured through the CPI-based REER. The increase in relative prices was especially pronounced for Russia, Brazil, Turkey and Indonesia. In Russia, this is clearly related to the dominance of energy products in exports. High oil revenues lead to higher incomes with a consequent upward pressure on inflation and hence the real effective exchange rate. In Turkey, the disinflation process after the 2001 crisis has supported the long-term appreciation trend with an adverse effect on external price competitiveness. India and China show no clear development, only in the most recent years a trend towards rising relative prices can be distinguished. All countries show signs of improving or stable price competitiveness in 2009, the year when the financial and economic crisis was felt globally.

Figure 1. CPI-based real effective exchange rates of emerging countries (172 trading partners, 1999=100)



Source: Darvas (2012)

Notes: Compared to Darvas' (2012) original results, the base year is changed here from 2007 to 1999 for ease of comparison with results reported below. An increase denotes a real appreciation of the national currency which can be interpreted as a loss of competitiveness.

However, the above analysis can easily be criticized for not illustrating competitiveness adequately. First, changes in consumer prices may not approximate relative export price dynamics well, as domestic and export prices are a result of often largely distinct demand and supply conditions. Second, the CPI-index is subject to changes in indirect taxes (i.e. VAT) which does not affect export prices directly. While the PPI-index would be a better measure for purely production related price dynamics, it usually refers primarily to production for the domestic sector. In most cases, data on purely export oriented producer prices is not available. Similar caveats apply for unit labour costs as a price measure. Further these often refer to the whole economy including services, especially for developing and emerging countries. An obvious solution is then to construct an index for export prices which however needs to be calculated at the most detailed product level available in order to take account of different export structures across countries. Otherwise, different goods will be compared for different countries.

Even when the correct prices are used for deflating exchange rate movements, a second problem arises from the use of real effective exchange rates: they only measure the price competitiveness of exports, but ignore other important factors

such as changes in the quality of exported products (Flam and Helpman, 1987). Quality can be related to both, objective factors such as physical properties and new technological features but also subjective factors such as changes in tastes, branding or labelling.

A third caveat lies in the fact that consumers gain utility also simply from increased product variety through international trade. Thus, while for example the CPI or the PPI are adjusted for changes in product variety, they cannot take account of changes in the number of products which are available in each year.

Therefore we chose to employ a new quality- and set of competitors-adjusted index which improves on existing measures and allows us to disentangle changes in pure price competitiveness from changes in non-price competitiveness. By non-price competitiveness we refer to changes in variety and quality. Variety is defined following the Armington assumption (Armington, 1969) as products from different origins within the same product category. Quality is defined as tangible and intangible attributes of a product that changes consumer's valuation of it (Hallak and Schott, 2008) and thus refers to physical attributes of the product as well as tastes.

3. Disaggregated approach to measure price and non-price competitiveness

In this section we will apply the disaggregated approach proposed by Benkovskis and Wörz (2012) to measure price and non-price competitiveness of emerging countries' exports. This approach is based on the methodology developed by Feenstra (1994) and Broda and Weinstein (2006), while the evaluation of unobserved quality or taste parameter is based on work of Hummels and Klenow (2005). The main idea is that consumers are not focused just on physical quantities, but they also value variety (i.e. the set of exporters in line with the Armington assumption). Moreover, consumers' utility also depends on quality or taste of a product. By solving the consumers' maximization problem it is possible to introduce the abovementioned non-price factors into a measure for relative export prices (see Appendix, sections A1-A4 for technical derivations). Having derived a formula for a variety- and quality-adjusted import price index, we use the mirror image of trade flows to apply this formula to export prices. In other words, we interpret imports of product *g* originating from country *c* as country *c*'s export of product *g* to the importing market.

According to Benkovskis and Wörz (2012), changes in the relative export price of good g exported to a particular market are defined in the following way

$$RXP_{gk,t} = \prod_{c \in C_g^{-k}} \left(\frac{p_{gk,t}}{p_{gc,t}} \frac{p_{gc,t-1}}{p_{gk,t-1}} \right)^{w_{gc,t}^{-k}} \left(\frac{\lambda_{g,t}^{-k}}{\lambda_{g,t-1}^{-k}} \right)^{\frac{1}{1-\sigma_g}} \prod_{c \in C_g^{-k}} \left(\frac{d_{gk,t}}{d_{gc,t}} \frac{d_{gc,t-1}}{d_{gk,t-1}} \right)^{\frac{w_{gc,t}^{-k}}{1-\sigma_g}} \quad (1)$$

where k denotes a particular emerging country, $p_{gc,t}$ is the price of good g imported from country c, $d_{gc,t}$ is the unobservable quality or taste parameter of a product, C_g^{-k} is the set of countries exporting particular product in both periods (excluding emerging country k), $w_{gc,t}^{-k}$ represents the shares of emerging country's k rivals competitors on a particular market, $\lambda_{g,t}^{-k}$ shows the share of new/disappearing exporters (excluding emerging country k).

The index of adjusted relative export price in (1) can be divided into three parts:

- The first term gives the traditional definition of changes in relative export prices which are driven by changes in relative export unit values weighted by the importance of competitors on a given market (represented by $w_{gc,t}^{-k}$). An increase in relative export unit values is interpreted as a loss in price competitiveness.
- The second term represents Feenstra's (1994) ratio capturing changes in varieties (i.e. the set of exporters of this product in our case). This term is calculated excluding exports coming from emerging country k. It can be interpreted as the effect from changes in the set of competitors – more competitors for the same product lower minimum unit-costs and give thus higher utility for consumers while at the same time the market power of each emerging country's producer is lowered. Therefore, additional competitors for a specific product imply a positive contribution to the adjusted relative export price index and they are associated with a loss in non-price competitiveness.
- The third term is simply the change in relative quality or taste of exports. If the quality or taste of emerging country's exports is rising faster than that of its rivals, the contribution to the adjusted relative export price index is negative, thus signalling improvements in non-price competitiveness. Although relative quality or taste is unobservable, it is possible to evaluate it using information on relative unit values and real market shares (see Appendix, section A3).

Finally, we need to design an aggregate relative export price as the index in (1) describes relative export prices only for one specific product which is exported to one particular country. The aggregate adjusted relative export price index can be defined as a weighted average of specific market indices, where weights are given by shares of those markets in emerging country's exports.

4. Description of the database

For the empirical analysis in this paper we use trade data from UN Comtrade. The main reason for using this data source is its global country coverage. Although the data reported in UN Comtrade has a lower level of disaggregation and a longer publication lag as compared to Eurostat's COMEXT, the world-wide coverage of the UN database is a significant advantage. We use the most detailed level reported by UN Comtrade, which is the six-digit level of the HS (Harmonized System, 1996). This gives us 5132 different products, which still ensures a reasonable good level of disaggregation. While this is lower than the 8-digit CN (Combined Nomenclature) level available through Eurostat's COMEXT (yielding more than 10000 different products), it is still well sufficient to calculate unit values.

Notwithstanding our final goal, which is to evaluate competitiveness of exports from emerging countries, we use import data of partner countries for the analysis. The reason for focusing on partners' imports rather than on emerging countries' exports is driven by the theoretical framework on which our evaluation of price and non-price competitiveness is based. The methodology used in this paper starts from the consumers' utility maximization problem, as outlined above. In this case, import data is clearly to be preferred as imports are reported in CIF (cost, insurance, freight) prices and thus include transportation costs until the importers' border. Hence, import data provide a better comparison of prices from a consumers' point of view. On the other hand, the usage of import data implies some drawbacks. Obviously, the data on imports from emerging countries does not fully coincide with emerging countries' reported exports due to differences in valuation, timing, sources of information and incentives to report. However, in general and especially with respect to emerging economies, which are still subject to import tariffs for a considerable range of their product, import data are well reported as the authorities have an interest in the proper recording of imports for they collect a tariff revenue.

Our import dataset contains annual data on imports of 75 countries at the six-digit HS level between 1999 and 2010.[4] The list of reporters (importers) can be found in Appendix, Table A1. By collecting data on imports of abovementioned 75 countries we a covering more than 96% of world imports in 2010. Several importer countries (like the United Arab Emirates, Vietnam, Egypt, and Kazakhstan) were not included in the dataset due to lack of detailed data or missing information for 2010. To avoid calculation burdens we restrict the list of partners (exporters) to 75 countries as well. The list of exporters can also be found in Table A1 (note that the list of exporters is not fully coinciding with the list of importers). These 75 most important exporter countries are responsible for roughly 93% of world imports in 2010; therefore, our database is a representative reflection of global trade flows.

We use unit value indices (dollars per kg) as a proxy for prices and trade volume (in kg) as a proxy for quantities. If data are missing for either values or volumes, or data on volumes is not observed directly but is estimated by statistical authorities, no unit value index can be calculated. Unfortunately, the possibility to estimate unit values is relatively scarce for many reporting countries. Even for the US– the world's major importer – the available import data allows the calculation of unit values for only about 70% of all imports in 2010 (in value terms). The situation is much better for the EU countries, China, Japan, but for some countries (e.g. Canada, Mexico, Australia) the coverage is only around 50% or even less. In addition, the coverage is usually worse for the first half of the sample period. This problem makes the analysis of non-price competitiveness more challenging and our results should be treated with a pinch of salt. However, the sometimes low coverage of available unit values in several countries is rather homogenous across different product groups and we can argue that this problem should not affect our results significantly. The other adjustment we made to the database is related to structural changes within the categories of goods. Although we use the most detailed classification available, it is still possible that sometimes we are comparing apples and oranges within one particular category. One indication of such a problem is given by large price level

[4] For some countries data is not available for several years at the beginning or in the middle of the sample period: import data for South Africa, Philippines, Oman and Tunisia is not available in 1999, for Ukraine and Ethiopia in 1999-2000, for Malaysia, Bahrain and the Dominican Republic in 1999-2001, for Pakistan and Bosnia Herzegovina in 1999-2002, for Serbia in 1999-2004, for Sri Lanka in 2000, for Panama in 2004, and for Nigeria in 2004-2005.

differences within a product code. Consequently, all observations with outlying unit value indices were excluded from the database.[5]

Finally, for construction of aggregated relative export price index we use export data of our nine emerging countries. We need export data to reflect the structure of exports adequately. Export dataset contains annual value data on exports to abovementioned 75 importer countries at the six-digit HS level between 1999 and 2010.

5. Empirical results for emerging countries' exports

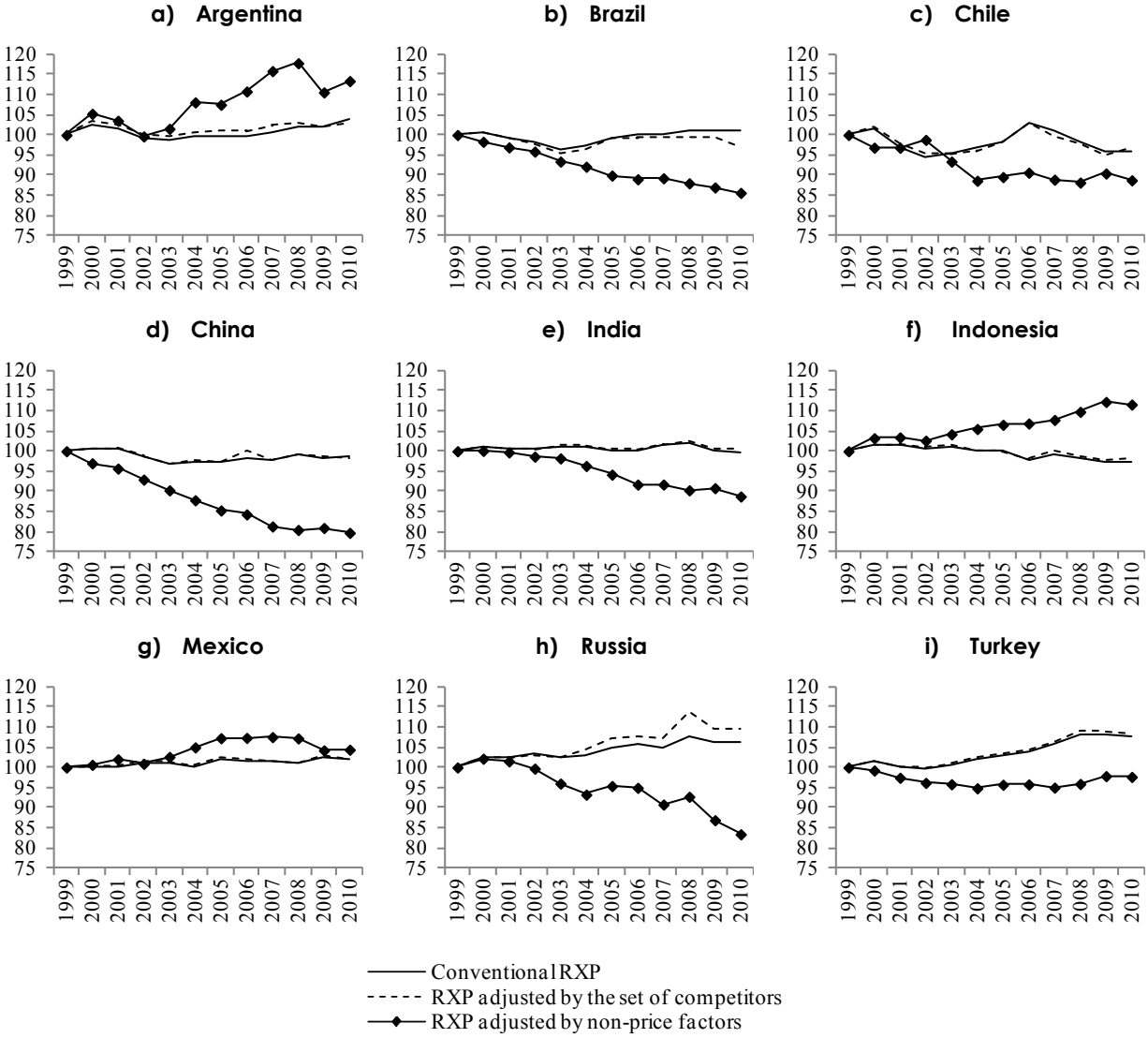
We start by calculating a rather conventional export price index, which ignores changes in the set of competitors and in non-price factors. This index is given by the solid line in Figure 2 below. We then augment this index to take account of exit and entry of competitors in each narrowly defined goods market (dashed line). Finally, we adjust the export price index for non-price competitiveness including quality and tastes (indicated by the line marked with diamonds).

Compared to the findings based on real effective exchange rates, we do not observe any strong gains or losses in price competitiveness for these countries when we use the conventional export price index. Most countries have neither experienced notable gains, nor great losses in international price competitiveness. The line representing this index in figure 2 is almost flat for most emerging countries and fluctuates narrowly around the initial level. Only Chile shows notable signs of improving price competitiveness since 2006. Further Indonesia, China and India record a small gain in price competitiveness. In fact, we would have expected to see stronger evidence of rising price competitiveness in China, given the often cited undervaluation of the Chinese currency.[6]

[5] An observation is treated as an outlier if the absolute difference between the unit value and the median unit value of the product category in the particular year exceeds four median absolute deviations. The exclusion of outliers does not significantly reduce the coverage of the database. In the majority of cases only less than 2% of total import value was treated as an outlier.

[6] Coudert and Couharde (2007) relate this undervaluation to the absence of the Balassa-Samuelson effect in China which can be inferred from the limited degree of currency appreciation despite the strong catching-up performance. The issue of China's currency undervaluation is not only strongly debated because of its effects on advanced countries – most prominently the large US trade deficit – but also within the context of competition among emerging markets. Pontimes and Siregar (2012) observe a great concern in East Asian countries with respect to relative appreciation mainly against the Chinese Renminbi and much less so against the US dollar which points to strong intraregional price competition. Gallagher et al. (2008) mention Chinese undervaluation as one potential detrimental effect on Mexico's export performance besides other, also domestic factors.

Figure 2. Export prices of emerging countries relative to their competitors' export prices (1999=100)



Source: *UN Comtrade*, authors' calculations.

Notes: Relative export prices are calculated by cumulating RXP changes from equations (1), (A9) and (A10). Increase denotes losses in competitiveness.

In line with our expectations the majority of the countries in our sample have continuously lost price competitiveness over the entire period. As these are catching-up countries, we would expect the convergence in income levels to be accompanied by convergence in price levels, a fact that is strongly observed for central- and eastern European emerging countries (Benkovskis and Wörz, 2012, Oomes, 2005). This trend of falling price competitiveness was strongest in Russia up until 2008 and is likely related to Russia's oil income. For example, Égert (2005) finds

some evidence for a Dutch Disease pattern in Russia which explains the real appreciation trend and Égert (2003) further points towards exchange rate pass through, oil price shocks and cyclical factors as determinants of inflation in Russia. As an observation from our data, when oil prices were greatly reduced in the beginning of the global economic crisis, prices for Russian exports fell considerably.[7] Similarly Turkey shows a continuous trend of decreasing price competitiveness until 2008 and some stabilization since. Adjusting the index for changes in the set of competitors does not lead to any worthwhile changes - the two lines are almost identical for all countries.

However, as soon as we adjust for non-price factors such as quality improvements, the results become more differentiated between countries. The majority of countries in our sample show clear improvements in non-price competitiveness (as reflected in a falling double-adjusted export price index). In particular China is standing out, prices of Chinese goods on international markets fell by more than 20% when correcting for quality improvements and other non-price factors. No other emerging economy in our sample comes close to realizing such a large gain in competitiveness. Only some of the small and highly open transformation countries in Central-, Eastern- and Southeastern Europe have shown comparable improvements in non-price adjusted competitiveness over the same period of time (see Benkovskis and Wörz, 2012). Thus, the rise of China as a trading power - in 2009 China has overtaken Germany and become the world's largest exporter - is based to a great extent on non-price factors in addition to its abundance of (relatively cheap) labour. Our finding corroborates the earlier results by Fu et al. (2012) who observe weakening price competition and rising importance of non-price factors such as quality and variety for China over the period 1989-2006. They analyze unit prices of imports into the EU, Japan and the US (thus looking at a smaller and more homogenous market than in our analysis) and conclude that this trend – if sustained – poses a serious threat to high income-countries. Our findings also support the view that a revaluation of the exchange rate would only be of limited impact to China's competitiveness (Mazier et al., 2008, Coudert and Couharde, 2007).

[7] Given the relatively inelastic demand for oil products in normal times, this deterioration in Russian price competitiveness up until 2008 did not impact notably on Russia's global market share, a fact that is well documented in the empirical literature (Ahrend, 2006, Cooper, 2007, Porter, 2007, Robinson, 2009 and 2011) and which we discuss below.

These enormous improvements in China's international non-price competitiveness have raised various discussions already. Kaplinsky and Morris (2008) note that the dominance of China in sectors which serve traditionally as early sectors for industrialization (such as textiles and clothing) precludes other emerging but even more so developing countries from embarking on a successful export-led growth strategy in these sectors. Indeed our results show that China's competitiveness in textiles – representing one fifth of total Chinese exports – has risen particularly strongly due to a high contribution of non-price factors.[8]

The notable improvement in Russia's non-price competitiveness which is observed in our non-price adjusted index since the Russian crisis is uniquely related to exports of oil, Russia's prime export good.[9] When oil is excluded from the analysis, a small deterioration in non-price competitiveness is observed for Russia (see figure A1 in the Appendix). The global financial crisis along with falling demand for oil interrupted this trend in 2008 which however became noticeable again in the two most recent years. This is line with the empirical literature on Russia's competitiveness. Ahrend (2006) finds that Russia has experienced great increases in labour productivity in its major export sectors, but at the same time he observes that these increases in competitiveness remain limited to a small number of primary commodity and energy-intensive sectors. Robinson (2009) also stresses Russia's dependence on oil exports which entails some risk of a Dutch Disease problem in the future (even if this has not materialized so far). He further emphasizes the role of current Russian policies and a need for political reform in order to abate this risk (Robinson, 2011). Finally, Ferdinand (2007) observes similarities between Russia and China in their orientation towards building on and further promoting national industrial champions which consequently foster specialization.

Brazil, Chile, and India also show worthwhile improvements in their non-price adjusted competitiveness, a finding which is robust to excluding oil products from the analysis. In line with our results, Brunner and Cali (2006) also observe rising unit values for South Asia in their analysis of technology upgrading in this regions. However, they report a closing of the technology gap by the South Asian countries only with respect to Southeast Asia and not with respect to OECD countries. Interestingly our detailed

[8] These detailed results by sector (as well as by trading partner) are not reported in the paper but are available from the authors upon request.

[9] In 2010, mineral products accounted for 71% of Russia's exports.

results for India by trading partners[10] show the same pattern for the first half of our observation period, while the picture becomes more differentiated in more recent years: the increase in non-price competitiveness on the U.S. market accelerated considerably from 2005 onwards, we further observe strong rises in price competitiveness vis-á-vis France and the U.K. The results for Turkey also suggest some marginal improvements in non-price factors, a finding which is again robust to excluding oil exports. These competitiveness improvements were most pronounced in 2001, the year of the major currency and banking crisis.

Thus, while the majority of emerging countries in our sample (5 out of 9) experienced a loss in price competitiveness, the ratio is exactly opposite for non-price competitiveness.[11] However, we also observe some apparent losses in non-price competitiveness in Argentina and Indonesia. In both cases the finding is not robust to excluding oil exports.[12] Figure A1 in the appendix shows that when oil is excluded, both countries show no apparent positive or negative trend. Finally, Mexico shows some clear signs of weakening export competitiveness in all three versions of our indicator, the results are invariant to excluding oil products. The deterioration is particularly pronounced in the indicator which is adjusted for non-price factors, thus raising serious concerns about Mexico's global competitiveness. With respect to price competitiveness, this is most likely explained by peso appreciation. Ibarra (2011) relates this appreciation trend to strong capital inflows with a resulting upward pressure on the exchange rate. Gallagher at al. (2008) mention additional factors, such as the decline in public and infrastructure investment in Mexico, limited access to bank credit for export purposes and the lack of a government policy to spur technological innovation.

Interestingly, the crisis in 2009 is not visible in these indices in contrast to the findings based on real effective exchange rates. This is to be expected, since changes in non-price factors are driven more strongly by structural and thus longer-term factors, while exchange rates and also consumer prices react much faster to changes in global demand conditions.

[10] These results are available from the authors on request.

[11] Taking the sensitivity of the results with respect to oil exports into account, we do not include Russia into the group of countries that experienced a gain in non-price competitiveness.

[12] Mineral products are the most important export category for Indonesia, representing 36% of all exports in 2010. With a share of 7% they are considerably less important for Argentina.

Conclusions

In this paper we illustrate an aspect of international competitiveness that is often overlooked, especially in the literature on emerging economies. When assessing competitiveness in context with emerging markets, the emphasis is often on price competitiveness. Especially when applied to developing and emerging markets, the effects of sharp (or sometimes forced) devaluations are frequently discussed – given the long and also recent history of currency crisis in such economies - as is the abundance of relatively cheap labour in those markets which should give them considerable cost advantages. To our knowledge, there is no study that explicitly analyses non-price competitiveness in emerging economies within the rather narrowly defined concept of competitiveness as "a country's ability to sell goods internationally".

We attempt to fill this gap and go beyond pure price competitiveness. We measure the evolution of competitiveness by relative export prices, whereby we allow for entry and exit of competitors in narrowly defined goods markets and we control for changes in non-price aspects (such as quality or taste) of exported goods over time. This builds on the approach developed by Feenstra (1994), Broda and Weinstein (2006) and extended by Benkovskis and Wörz (2011, 2012). We use a highly disaggregated data set of (almost) global imports and exports at the detailed 6-digit HS level (yielding more than 5000 products) over the period 1999-2010. This period is more or less free of any country-specific economic crises in any of the countries covered in our sample. The sample consists of nine large emerging economies (Argentina, Brazil, Chile, China, India, Indonesia, Mexico, Russia and Turkey). Together they represent roughly one fifth of total world exports. The observation period starts right after the Russian and Asian crisis, it thus excludes at large domestically important crisis (apart from Turkey's 2001 crisis). However, it includes the current global financial and economic crisis, which is likely to affect the nine emerging markets in a highly similar fashion.

While we also observe some losses in price competitiveness for the majority of countries in our sample when we base our conclusions on the traditional export price index, these losses are far less pronounced compared to the conclusions from the CPI-based real effective exchange rate. Taking changes in the global set of competitors into account does not alter the picture, which shows that the set of competitors is not rapidly changing during one year.

However, as soon as we allow for non-price factors such as changes in the (physical or felt) quality of exported products we observe more pronounced developments in individual emerging markets. As a first and important result, non-price factors contribute strongly to increases in China's international competitiveness. This corroborates China's strong position at the global market as it further adds to various other factors such as the size and structure of the labour force. Our results suggest that the role of the exchange rate for China's competitive position may be overstressed. Further, Brazil, Chile and India show discernible improvements in their competitive position. The surprisingly strong non-price related improvement of Russia's export position is entirely related to developments in the oil sector, which however accounted for roughly 70% of Russia' exports in 2010. Further, also Turkey showed some modest improvements in non-price competitiveness. The rather pronounced losses in non-price competitiveness for Argentina and Indonesia are again fully due to developments in the oil sector, whereby oil exports are far less important for these countries compared to Russia (36% for Indonesia and 7% for Argentina). Finally, our results confirm earlier findings in the literature for Mexico: We observe a loss in Mexican price as well as non-price competitiveness.

Although our analysis is based on highly disaggregated data and separates price- from non-price-effects, it cannot give a comprehensive idea of competitiveness alone. Clearly competitiveness continues to be a vague concept, and therefore multiple approaches have to be combined before drawing any firm conclusions. However, our analysis points towards important factors that are often ignored, mostly because data sources are missing. Our methodology offers a simple, but theoretically sound way to look explicitly at price- versus quality-adjustments in international competitiveness. Bearing all methodological and data-related caveats in mind, the results have to be interpreted with care.

Another important issue is increasing global integration of production and shifts in geographical patterns of production chains. Internationalization of production implies a diminishing domestic component of exports, therefore data on gross trade flows is no more an adequate representative of a country's competitiveness. Combining trade data with information from input-output tables is a potential solution and can lead the direction of further research to investigate the value added components of exports.

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Appendix

A1. Import price index

We define a nested, constant elasticity of substitution (CES), utility function of a representative household which consists of three nests. On the upper level a composite import good and the domestic good are consumed:

$$U_t = \left(D_t^{\frac{\kappa-1}{\kappa}} + M_t^{\frac{\kappa-1}{\kappa}} \right)^{\frac{\kappa}{\kappa-1}}; \quad \kappa > 1 \tag{A1}$$

where D_t is the domestic good, M_t is composite imports, and κ is the elasticity of substitution between domestic and foreign good. At the second level of the utility function, composite imported good consists of individual imported products:

$$M_t = \left(\sum_{g \in G} M_{gt}^{\frac{\gamma-1}{\gamma}} \right)^{\frac{\gamma}{\gamma-1}}; \quad \gamma > 1 \tag{A2}$$

where M_{gt} is the subutility from consumption of imported good g, γ is elasticity of substitution between different import goods, while G denotes the set of imported goods. The third level utility function is the place where variety and quality are introduced into the model. Each imported good consists of various varieties (is imported from different countries of origins, therefore product variety is indicating the set of competitors on the particular market). The taste or quality parameter denotes the subjective or objective quality that consumers attach to a product. M_{gt} is defined by a non-symmetric CES function:

$$M_{g,t} = \left(\sum_{c \in C} d_{gc,t}^{\frac{1}{\sigma_g}} m_{gc,t}^{\frac{\sigma_g - 1}{\sigma_g}} \right)^{\frac{\sigma_g}{\sigma_g - 1}}; \quad \sigma_g > 1 \quad \forall \quad g \in G \tag{A3}$$

where $m_{gc,t}$ denotes quantity of imports g from country c, C is a set of all partner countries, $d_{gc,t}$ is a taste or quality parameter, and σ_g is elasticity of substitution among varieties of good g.

After solving the utility maximization problem subject to the budget constraint, the minimum unit-cost function of import good g is represented by

$$\phi_{g,t} = \left(\sum_{c \in C} d_{gc,t} p_{gc,t}^{1-\sigma_g} \right)^{\frac{1}{1-\sigma_g}} \quad \text{(A4)}$$

where $\phi_{g,t}$ denotes minimum unit-cost of import good g, $p_{gc,t}$ is the price of good g imported from country c.

The price indices for good g could be defined as a ratio of minimum unit-costs in current period to minimum unit-costs in previous period ($P_g = \phi_{g,t} / \phi_{g,t-1}$). The conventional assumption is that quality or taste parameters are constant over time for all varieties and products, ($d_{gc,t} = d_{gc,t-1}$) and the price index is calculated over the set of product varieties $C_g = C_{g,t} \cap C_{g,t-1}$ available both, in periods t and $t-1$, where $C_{gt} \subset C$ is the subset of all varieties of goods consumed in period t. Sato (1976) and Vartia (1976) proved that for a CES function the exact price index will be given by the log-change price index

$$P_g^{conv} = \prod_{c \in C_g} \left(\frac{p_{gc,t}}{p_{gc,t-1}} \right)^{w_{gct}} \quad \text{(A5)}$$

whereby weights $w_{gc,t}$ are computed using cost shares $s_{gc,t}$ in the two periods as follows:

$$w_{gc,t} = \frac{\left(s_{gc,t} - s_{gc,t-1}\right) / \left(\ln s_{gc,t} - \ln s_{gc,t-1}\right)}{\sum_{c \in C_g} \left(\left(s_{gc,t} - s_{gc,t-1}\right) / \left(\ln s_{gc,t} - \ln s_{gc,t-1}\right) \right)}; \; s_{gc,t} = \frac{p_{gc,t} x_{gc,t}}{\sum_{c \in C_g} p_{gc,t} x_{gc,t}}$$

and $x_{gc,t}$ is the cost-minimizing quantity of good g imported from country c.

Import price index in (A5) ignores possible changes in quality and variety (set of partner countries). The underlying assumption that variety is constant was relaxed by Broda and Weinstein (2006). According to them, if $d_{gc,t} = d_{gc,t-1}$ for $c \in C_g = \left(C_{g,t} \cap C_{g,t-1}\right)$, $C_g \neq \emptyset$, then the exact price index for good g is given by

$$P_g^{bw} = \prod_{c \in C_g} \left(\frac{p_{gc,t}}{p_{gc,t-1}} \right)^{w_{gc,t}} \left(\frac{\lambda_{g,t}}{\lambda_{g,t-1}} \right)^{\frac{1}{\sigma_g - 1}} = P_g^{conv} \left(\frac{\lambda_{g,t}}{\lambda_{g,t-1}} \right)^{\frac{1}{\sigma_g - 1}} \quad \text{(A6)}$$

where $\lambda_{g,t} = \dfrac{\sum_{c \in C_g} p_{gc,t} x_{gc,t}}{\sum_{c \in C_{g,t}} p_{gc,t} x_{gc,t}}$ and $\lambda_{g,t-1} = \dfrac{\sum_{c \in C_g} p_{gc,t-1} x_{gc,t-1}}{\sum_{c \in C_{g,t-1}} p_{gc,t-1} x_{gc,t-1}}$

Therefore, the price index derived in (A5) is multiplied by an additional term which captures the role of new and disappearing variety.

Broda and Weinstein (2006) assume that taste or quality parameters are unchanged for all varieties of all goods ($d_{gc,t} = d_{gc,t-1}$), namely, vertical product differentiation is ignored. Benkovskis and Wörz (2011) introduced an import price index that allows also for changes in taste or quality:

$$P_g^q = \left(\frac{\sum_{c \in C_{g,t}} d_{gc,t} p_{gc,t}^{1-\sigma_g}}{\sum_{c \in C_{g,t-1}} d_{gc,t-1} p_{gc,t-1}^{1-\sigma_g}} \right)^{\frac{1}{1-\sigma_g}} = P_g^{conv} \left(\frac{\lambda_{g,t}}{\lambda_{g,t-1}} \right)^{\frac{1}{\sigma_g - 1}} \prod_{c \in C_g} \left(\frac{d_{gc,t}}{d_{gc,t-1}} \right)^{\frac{w_{gc,t}}{1-\sigma_g}} \quad \text{(A7)}$$

Equation (A7) could be seen as a modified version of equation (A6) whereby the additional term captures changes in the quality and taste parameter.

A2. Relative export price index

Equation (A7) gives us a formula for a variety- and quality-adjusted import price index. However, we can easily interpret $x_{gc,t}$ – which are imports of product g originating from country c – as country's c exports of a product g to the importing market (for the moment let's assume that for all exporting countries there exists only one destination of exports – the importing country where the representative household resides). Another problem arises from the need to compare the performance of one particular country relative to its competitors, while equation (A7) gives the aggregate import price from all suppliers. According to Benkovskis and Wörz (2012) changes in the relative export price of good g exported by emerging country k could be defined in the following way:

$$RXP_{gk,t} = \frac{\phi_{g,t}^k / \phi_{gt-1}^k}{\phi_{g,t}^{-k} / \phi_{g,t-1}^{-k}} = \frac{\left(p_{gk,t} / p_{gk,t-1} \right) \left(d_{gk,t} / d_{gk,t-1} \right)^{\frac{1}{1-\sigma_g}}}{\phi_{g,t}^{-k} / \phi_{g,t-1}^{-k}} \quad \text{(A8)}$$

where $\phi_{g,t}^k$ denotes minimum unit-cost of good g when exported by (imported from) emerging country k, while $\phi_{g,t}^{-k}$ is minimum unit-cost of good g when exported by (imported from) all countries except emerging country k. After combining (A7) and (A8) we obtain

$$RXP_{gk,t} = \prod_{c \in C_g^{-k}} \left(\frac{p_{gk,t}}{p_{gc,t}} \frac{p_{gct-1}}{p_{gk,t-1}} \right)^{w_{gc,t}^{-k}} \left(\frac{\lambda_{g,t}^{-k}}{\lambda_{g,t-1}^{-k}} \right)^{\frac{1}{1-\sigma_g}} \prod_{c \in C_g^{-k}} \left(\frac{d_{gk,t}}{d_{gc,t}} \frac{d_{gc,t-1}}{d_{gk,t-1}} \right)^{\frac{w_{gc,t}^{-k}}{1-\sigma_g}} \quad (1)$$

where C_g^{-k} is set of product varieties available in both periods, excluding varieties coming from emerging country k, $w_{gc,t}^{-k}$ and $\lambda_{g,t}^{-k}$ are calculated similar to $w_{gc,t}$ and $\lambda_{g,t}$, again excluding emerging country k from the set of exporters (varieties).

Finally, one needs to design an aggregate relative export price as the index in (4) describes relative export prices only for one specific product which is exported to one particular market. The assumption of only one destination for exports is relaxed and we allow for various importing countries. In all these countries consumers are maximizing their utility. All parameters and variables entering the three-layered utility function can be different across countries. If we denote the export price, export volume and relative export price index of a product g exported by emerging country k to country i as $p(i)_{gk,t}$, $x(i)_{gk,t}$ and $RXP(i)_{gk,t}$ accordingly, the aggregate adjusted relative export price index can be defined as

$$RXP_{k,t} = \prod_{i \in I} \prod_{g \in G} RXP(i)_{gk,t}^{W_{ig,t}} \quad (A9)$$

where $W_{ig,t} = \frac{\left(S_{ig,t} - S_{ig,t-1}\right) / \left(\ln S_{ig,t} - \ln S_{ig,t-1}\right)}{\sum_{i \in I} \sum_{g \in G} \left(\left(S_{ig,t} - S_{ig,t-1}\right) / \left(\ln S_{ig,t} - \ln S_{ig,t-1}\right)\right)}$; $S_{ig,t} = \frac{p(i)_{gk,t} x(i)_{gk,t}}{\sum_{i \in I} \sum_{g \in G} p(i)_{gk,t} x(i)_{gk,t}}$.

Equation (A9) shows that the aggregated index is just another Sato (1976) and Vartia (1976) log-change index and its weights are computed using the share of product g exports to country i out of total emerging country's k exports.

A3. Evaluation of relative quality

The calculation of the adjusted relative export price index in (4) is a challenging task due to the fact that relative quality is unobservable. As in Hummels and Klenow (2005) we evaluate unobserved quality from the utility optimization problem in the following way: after taking first order conditions and transformation into log-ratios we can express relative quality in terms of relative prices, volumes and the elasticity of substitution between varieties as

$$\ln\left(\frac{d_{gc,t}}{d_{gk,t}}\right) = \sigma_g \ln\left(\frac{p_{gc,t}}{p_{gk,t}}\right) + \ln\left(\frac{x_{gc,t}}{x_{gk,t}}\right) \quad (A10)$$

where k denotes a benchmark country.

A4 Estimation of elasticities

To derive the elasticity of substitution, one needs to specify demand and supply equations. The demand equation is defined by re-arranging the minimum unit-cost function in terms of the market shares, taking first differences and ratios to a reference country:

$$\frac{\Delta \ln s_{gc,t}}{\Delta \ln s_{gk,t}} = -(\sigma_g - 1)\frac{\Delta \ln p_{gc,t}}{\Delta \ln p_{gk,t}} + \varepsilon_{gc,t} \quad \text{(A11)}$$

where $\varepsilon_{gc,t} = \Delta \ln d_{gc,t}$, therefore we assume that the log of quality is a random walk process. The export supply equation relative to country k is given by:

$$\frac{\Delta \ln p_{gc,t}}{\Delta \ln p_{gk,t}} = \frac{\omega_g}{1+\omega_g}\frac{\Delta \ln s_{gc,t}}{\Delta \ln s_{gk,t}} + \delta_{gc,t} \quad \text{(A12)}$$

where $\omega_g \geq 0$ is the inverse supply elasticity assumed to be the same across partner countries. The unpleasant feature of the system of (A11) and (A12) is the absence of exogenous variables which would be needed to identify and estimate elasticities. To get these estimates one needs to transform the system of two equations into a single equation by exploiting Leamer's (1981) insight and the independence of errors $\varepsilon_{gc,t}$ and $\delta_{gc,t}$. This is done by multiplying both sides of equations. After such transformations, the following equation is obtained:

$$\left(\frac{\Delta \ln p_{gc,t}}{\Delta \ln p_{gk,t}}\right)^2 = \theta_1\left(\frac{\Delta \ln s_{gc,t}}{\Delta \ln s_{gk,t}}\right)^2 + \theta_2\left(\frac{\Delta \ln p_{gc,t}}{\Delta \ln p_{gk,t}}\right)\left(\frac{\Delta \ln s_{gc,t}}{\Delta \ln s_{gk,t}}\right) + u_{gc,t} \quad \text{(A13)}$$

where

$$\theta_1 = \frac{\omega_g}{(1+\omega_g)(\sigma_g - 1)};\ \theta_2 = \frac{1-\omega_g(\sigma_g - 2)}{(1+\omega_g)(\sigma_g - 1)};$$

$$u_{gc,t} = \varepsilon_{gc,t}\delta_{gc,t}$$

Broda and Weinstein (2006) argue that one needs to define a set of moment conditions for each good g, by using the independence of the unobserved demand and supply disturbances for each country over time:

$$G(\beta_g) = E_t(u_{gc,t}(\beta_g)) = 0 \quad \forall c$$

where $\beta_g = (\sigma_g, \omega_g)$ represents the vector of estimated elasticities. For each good g the following GMM estimator is obtained:

$$\hat{\beta}_g = \arg\min_{\beta \in B} G^*(\beta_g)' W G^*(\beta_g) \quad \text{(A14)}$$

where $G^*(\beta_g)$ is the sample analog of $G(\beta_g)$ and B is the set of economically feasible values of β ($\sigma_g > 1$ and $\omega_g \geq 0$). W is a positive definite weighting matrix, which weights the data such that the variance depends more on large shipments and becomes less sensitive to measurement error.

The elasticity of substitution between varieties is estimated using (A14) for all products where data on at least 3 countries of origin were available. Table A2 displays the main characteristics of estimated elasticities of substitution between varieties. For easier interpretation one can calculate the median mark-up, which equals $\sigma_g / (\sigma_g - 1)$.

Table A1. Share of 75 exporters and 75 importers from our database in World imports in 2010

Importers (reporters)	Share in World imports, %	Exporters (partners)	Share in World imports, %
United States	13.51	China	12.71
China	9.59	United States	8.18
Germany	7.33	Germany	8.03
Japan	4.76	Japan	5.15
France	4.12	France	3.56
United Kingdom	3.86	Korea	2.98
Italy	3.35	Netherlands	2.88
Hong Kong	3.03	Italy	2.87
Netherlands	3.02	Russia	2.69
Korea	2.92	Canada	2.64
Canada	2.69	United Kingdom	2.63
Belgium	2.68	Mexico	2.15
India	2.40	Belgium	2.07
Spain	2.17	Malaysia	1.70
Singapore	2.14	Switzerland	1.62
Mexico	2.07	Spain	1.61
Russia	1.71	Saudi Arabia	1.57
Australia	1.30	India	1.47
Turkey	1.27	Brazil	1.41
Thailand	1.25	Singapore	1.41
Brazil	1.24	Australia	1.39
Switzerland	1.21	Thailand	1.34
Poland	1.20	Indonesia	1.16
Malaysia	1.13	Ireland	1.06
Austria	1.03	United Arab Emirates	1.06
Sweden	1.02	Sweden	1.02
Indonesia	0.93	Poland	0.98
Czech Republic	0.86	Austria	0.96
Saudi Arabia	0.73	Norway	0.92
Hungary	0.60	Czech Republic	0.82
Denmark	0.58	Turkey	0.70
South Africa	0.55	South Africa	0.64
Norway	0.53	Denmark	0.60
Portugal	0.52	Hungary	0.60
Finland	0.47	Nigeria	0.55
Slovakia	0.44	Vietnam	0.51
Greece	0.44	Finland	0.49
Romania	0.43	Philippines	0.48
Ukraine	0.42	Chile	0.47
Ireland	0.42	Hong Kong	0.46
Israel	0.41	Argentina	0.45
Philippines	0.40	Qatar	0.45
Argentina	0.39	Venezuela	0.42
Chile	0.39	Kuwait	0.42
Nigeria	0.30	Algeria	0.40
Algeria	0.28	Slovakia	0.40
Colombia	0.28	Israel	0.38
Pakistan	0.26	Ukraine	0.37
Morocco	0.24	Kazakhstan	0.33
Belarus	0.24	Romania	0.32
Venezuela	0.22	Portugal	0.30
New Zeeland	0.21	Colombia	0.28
Peru	0.21	Peru	0.22
Slovenia	0.18	Oman	0.21
Bulgaria	0.17	New Zeeland	0.20
Lithuania	0.16	Costa Rica	0.18

Tunisia	0.15	Egypt	0.17
Ecuador	0.14	Slovenia	0.16
Luxembourg	0.14	Greece	0.15
Croatia	0.14	Azerbaijan	0.15
Oman	0.14	Pakistan	0.14
Lebanon	0.12	Belarus	0.13
Panama	0.11	Ecuador	0.13
Serbia	0.11	Bulgaria	0.13
Jordan	0.10	Morocco	0.13
Dominican	0.10	Luxembourg	0.12
Costa Rica	0.10	Lithuania	0.11
Guatemala	0.10	Tunisia	0.11
Estonia	0.09	Trinidad and Tobago	0.10
Sri Lanka	0.08	Sudan	0.07
Kenya	0.08	Estonia	0.07
Latvia	0.08	Croatia	0.07
Bahrain	0.07	Cote d'Ivoire	0.06
Bosnia Herzegovina	0.06	Latvia	0.06
Ethiopia	0.06	Panama	0.05
Total	96.25	Total	93.01

Source: *UN Comtrade*, author's calculations.

Notes: Share of exporters and share of importers are calculated relative to total World imports.

Table A2. Elasticities of substitution between varieties

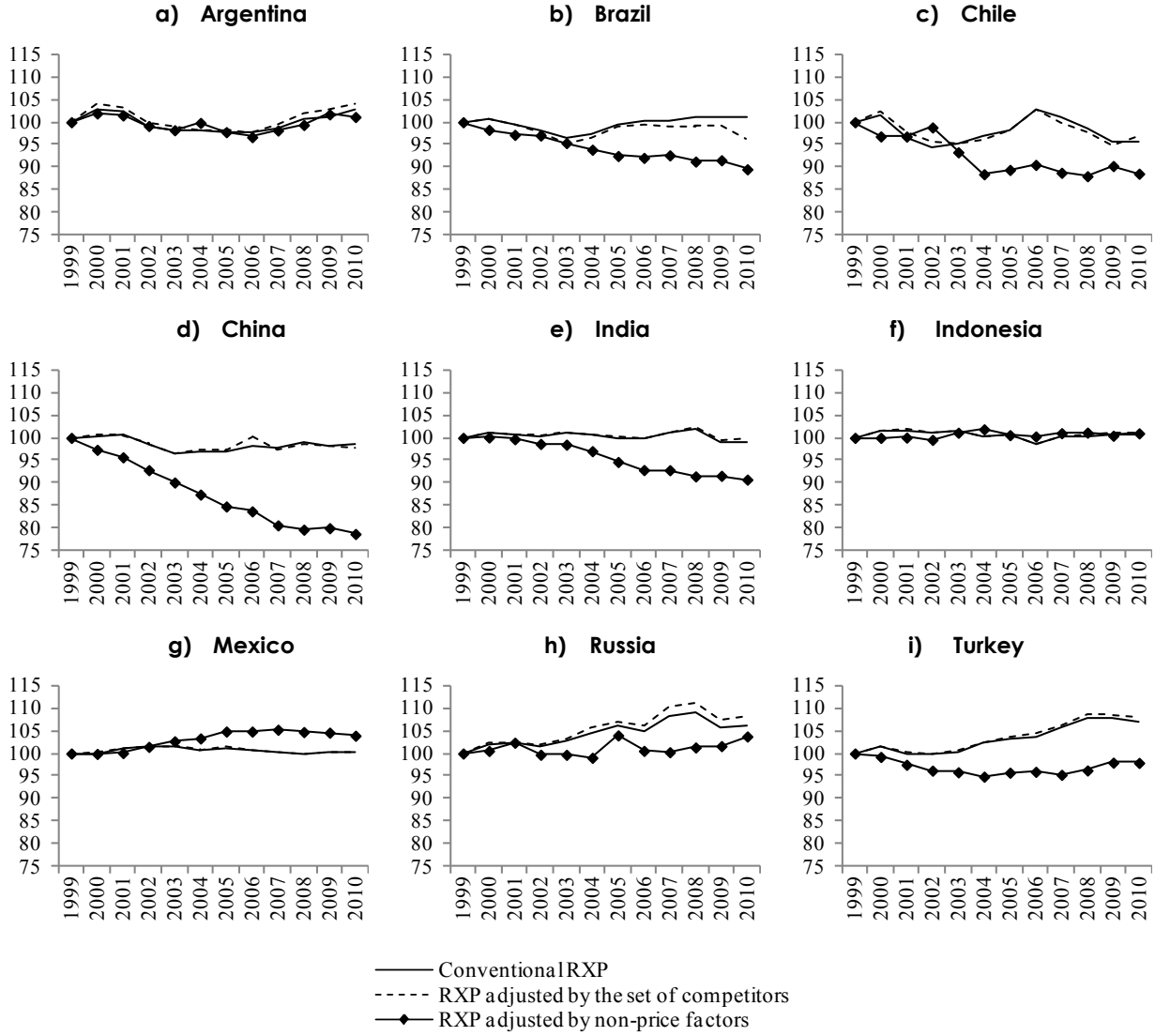
	No. of estimated elasticities	Mean	Standard Deviation	Maximum	Minimum	**Median**	**Median mark-up**
Algeria	3204	20.6	46.5	762.5	1.04	**6.28**	**18.9**
Argentina	2820	21.2	115.0	5374.6	1.03	**6.90**	**16.9**
Australia	2786	80.4	646.8	18180.6	1.01	**12.42**	**8.8**
Austria	4449	20.8	52.2	1518.6	1.05	**7.12**	**16.4**
Bahrain	2263	19.2	39.7	559.8	1.05	**5.60**	**21.7**
Belarus	3259	21.3	56.9	2023.7	1.09	**6.57**	**17.9**
Belgium	4818	19.1	45.4	1291.2	1.04	**7.23**	**16.0**
Bosnia Herzegovina	3206	22.4	55.9	1453.2	1.09	**6.81**	**17.2**
Brazil	3876	20.2	84.8	3745.5	1.09	**7.05**	**16.5**
Bulgaria	3826	18.9	39.5	848.2	1.07	**6.09**	**19.6**
Canada	3535	73.4	425.2	10404.7	1.00	**11.99**	**9.1**
Chile	3456	55.7	543.2	28249.1	1.01	**7.56**	**15.2**
China	4086	43.0	242.8	8726.3	1.01	**9.64**	**11.6**
Colombia	3654	17.5	39.8	1504.7	1.06	**6.30**	**18.9**
Costa Rica	3060	20.9	44.4	931.7	1.04	**6.41**	**18.5**
Croatia	3982	18.1	38.3	992.7	1.04	**6.09**	**19.6**
Czech Republic	4638	17.3	30.2	463.0	1.03	**7.05**	**16.5**
Denmark	4391	19.3	63.1	2662.3	1.07	**7.62**	**15.1**
Dominican	954	112.6	497.6	9915.4	1.01	**14.28**	**7.5**
Ecuador	3002	20.6	51.7	1368.1	1.04	**6.07**	**19.7**
Estonia	3397	18.1	34.1	493.1	1.03	**6.27**	**19.0**
Ethiopia	1711	18.2	36.6	860.7	1.02	**6.17**	**19.3**
Finland	4154	17.8	45.4	1271.3	1.03	**6.48**	**18.2**
France	4942	19.3	37.6	927.1	1.05	**7.14**	**16.3**
Germany	4710	18.1	34.5	978.0	1.02	**7.53**	**15.3**
Greece	4238	18.3	48.9	1248.6	1.06	**5.71**	**21.2**
Guatemala	2809	23.0	61.1	1374.3	1.05	**6.49**	**18.2**
Hong Kong	3491	46.5	245.2	6232.2	1.01	**9.77**	**11.4**
Hungary	4075	21.9	42.1	687.3	1.03	**6.89**	**17.0**
India	4228	19.0	44.7	849.6	1.07	**6.45**	**18.3**
Indonesia	3769	58.1	320.2	7432.2	1.01	**8.61**	**13.1**
Ireland	4103	25.3	123.2	4072.3	1.01	**6.45**	**18.4**
Israel	1339	108.2	512.3	8874.1	1.00	**24.33**	**4.3**
Italy	4900	17.1	30.3	503.1	1.11	**6.81**	**17.2**
Japan	4286	22.1	70.4	2296.6	1.01	**6.67**	**17.6**
Jordan	2065	21.3	49.2	790.5	1.05	**5.75**	**21.1**
Kenya	2339	42.3	363.4	15090.8	1.03	**5.97**	**20.1**
Korea	4452	18.6	53.7	1963.7	1.01	**6.88**	**17.0**
Latvia	3378	18.7	41.6	946.2	1.03	**6.07**	**19.7**
Lebanon	2940	21.5	58.4	1469.7	1.03	**5.73**	**21.1**
Lithuania	3616	17.8	37.9	727.7	1.06	**6.60**	**17.9**
Luxembourg	3517	26.1	113.7	5751.3	1.01	**7.20**	**16.1**
Malaysia	3879	79.8	687.1	24067.1	1.01	**6.73**	**17.5**
Mexico	3483	37.1	200.3	6927.5	1.01	**7.23**	**16.0**
Morocco	3329	20.0	50.7	1412.4	1.02	**6.34**	**18.7**
Netherlands	4140	47.1	320.1	12614.0	1.01	**7.37**	**15.7**
New Zeeland	3908	19.2	43.8	844.4	1.10	**6.42**	**18.4**
Nigeria	1490	28.4	138.5	4931.2	1.03	**5.41**	**22.7**
Norway	4290	16.4	40.0	1079.7	1.07	**5.78**	**20.9**
Oman	2239	22.2	64.0	1922.0	1.02	**5.86**	**20.6**
Pakistan	2333	66.6	431.6	9144.4	1.01	**11.31**	**9.7**
Panama	2415	18.9	39.8	661.5	1.00	**6.38**	**18.6**
Peru	3320	19.6	59.0	2359.3	1.02	**6.30**	**18.9**
Philippines	3521	22.2	71.6	2832.5	1.02	**5.61**	**21.7**
Poland	4522	17.4	32.5	777.6	1.06	**7.03**	**16.6**
Portugal	4263	21.6	56.5	1460.3	1.05	**6.52**	**18.1**

Romania	4187	19.0	96.6	5783.4	1.07	**6.53**	**18.1**
Russia	4230	18.0	32.9	997.8	1.07	**7.75**	**14.8**
Saudi Arabia	3879	18.5	40.2	1270.7	1.02	**5.96**	**20.1**
Serbia	3222	20.3	44.0	1024.1	1.06	**6.93**	**16.9**
Singapore	3020	99.6	547.7	10129.7	1.00	**10.01**	**11.1**
Slovakia	4060	22.2	110.3	4686.2	1.04	**6.92**	**16.9**
Slovenia	4194	19.9	56.5	1844.6	1.07	**6.83**	**17.2**
Southern Africa	4064	67.0	436.3	11358.9	1.01	**8.51**	**13.3**
Spain	4850	18.3	45.8	1640.5	1.07	**6.86**	**17.1**
Sri Lanka	2213	47.4	211.9	3549.3	1.00	**6.89**	**17.0**
Sweden	3901	22.5	59.7	2055.0	1.03	**7.53**	**15.3**
Switzerland	4645	19.0	44.1	1311.5	1.04	**7.27**	**15.9**
Thailand	3668	57.6	577.0	25465.1	1.01	**7.85**	**14.6**
Tunisia	3306	20.0	47.3	1018.2	1.03	**6.04**	**19.8**
Turkey	4170	16.7	36.0	1015.0	1.04	**6.45**	**18.3**
UK	4855	16.8	44.6	1144.8	1.03	**5.72**	**21.2**
Ukraine	3658	19.1	33.9	619.3	1.08	**7.34**	**15.8**
US	3928	33.8	171.5	6777.5	1.01	**8.27**	**13.7**
Venezuela	3463	21.9	77.9	2767.1	1.04	**6.24**	**19.1**

Source: *UN Comtrade*, author's calculations.

Notes: Elasticities of substitutions are estimated using equation (A14) for all products where data on at least 3 countries of origin are available.

Figure A1. Export prices of emerging countries relative to their competitors' export prices excluding oil-exports (1999=100)



Source: *UN Comtrade*, authors' calculations.

Notes: Relative export prices are calculated by cumulating RXP changes from equations (1), (A9) and (A10). Increase denotes losses in competitiveness.