Globalization, Import Prices and Producer Prices in Austria

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The growing theoretical and empirical literature suggests that globalization may have reduced inflation, particularly in high-income countries. Austria's integration in the world economy has made a quantum leap over the past decade. Has this development dampened inflation in Austria? This paper first offers a broad overview of six channels through which one could expect globalization to reduce inflation. Then, two specific channels are investigated empirically for Austria. First, the effects from the increasing share of imports from low-cost countries on import prices are estimated. It is found that overall import prices were slightly dampened by the rising, and meanwhile substantial, share of imports from the new EU Member States. By contrast, China and other emerging economies play a negligible role for Austrian import price developments. Second, the effect of global competition on producer prices in Austria is studied. It is found that globalization has moderately dampened relative producer prices in the Austrian manufacturing sector, while increases in labor productivity had a larger effect. A rationale for the rather modest globalization effects on import and producer price inflation in Austria is that the country's foreign trade and FDI links are still − despite the surge of links with central and eastern European countries − mainly with other high-income European countries.

1 Worldwide Disinflation, Globalization and Austria's Increasing Integration in the World Economy

Inflation has fallen sharply worldwide over the past two decades, both in industrial countries and in emerging economies (chart 1).[2] Various reasons for this trend have been put forward: the deregulation and liberalization of markets both within and across countries; faster productivity growth prompted by stronger domestic and foreign competition and by important technological advances; a decline in wage pressure due to abundant labor and eroding trade union influence;

improved governance of monetary authorities;[3] and sounder fiscal policies. There are also indications that inflation is now less influenced by domestic output gap developments, while worldwide capacity constraints seem to play a more important role. Recently, prompted by the vigorous expansion of the Chinese and Indian economies and their progressing integration into the world economy, globalization has frequently been mentioned as a source of changes in the inflation process.

For this study, (economic) globalization is defined as the growing economic interdependence of countries

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[2] *The fall in inflation has been accompanied by lower inflation persistence, which means that after a price shock it takes shorter for inflation to return to its long-run value. Furthermore, the pass-through of exchange rate fluctuations and shocks to energy and other raw material prices to consumer price inflation seems to have declined.*

[3] *Some of the policy changes that have contributed to better governance are central bank independence, the shift to price stability as a primary objective, prohibition of monetary financing and monetary policy strategies that are more directed toward stabilizing inflation expectations at low levels.*

Chart 1

Inflation

%

1970−1974   1975−1979   1980−1984   1985−1989   1990−1994   1995−1999   2000−2004

Industrial countries   Asian emerging markets   Latin American emerging markets
Other emerging markets   Austria

Source: IMF, Statistics Austria.

Chart 2

Indicators of Globalization

% of world BIP

Exports of goods and services (left-hand scale): 16.9, 27.1
World FDI inflows (right-hand scale): 0.6, 1.6
Average daily total foreign exchange turnover (net of local interdealer double-counting, right-hand scale): 1.4, 5.8
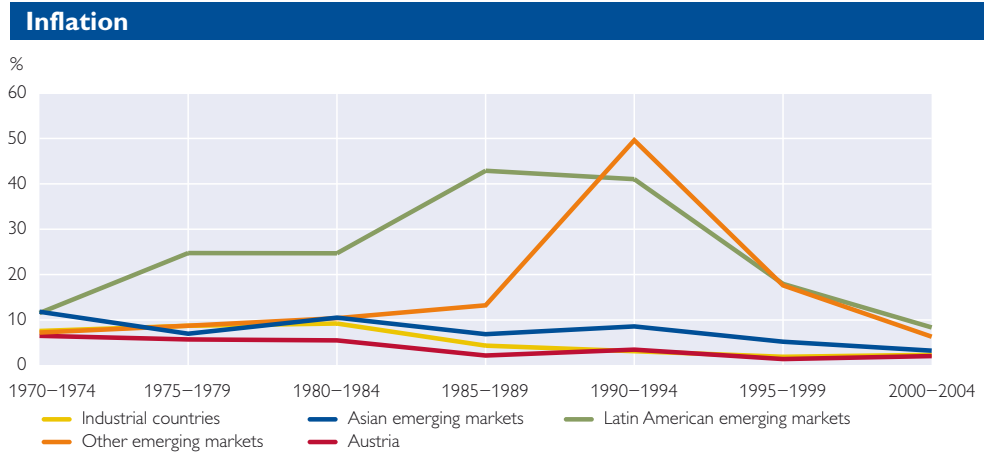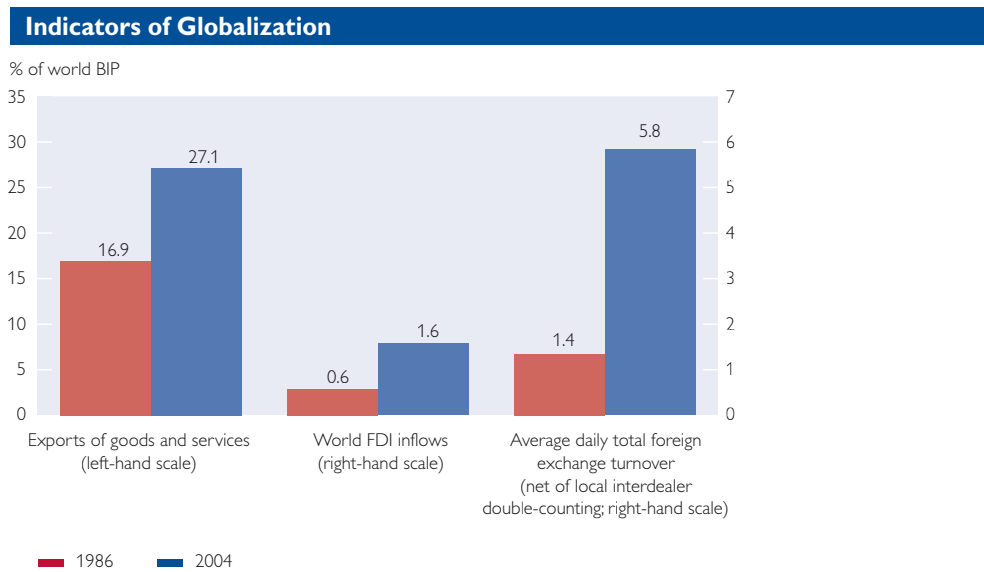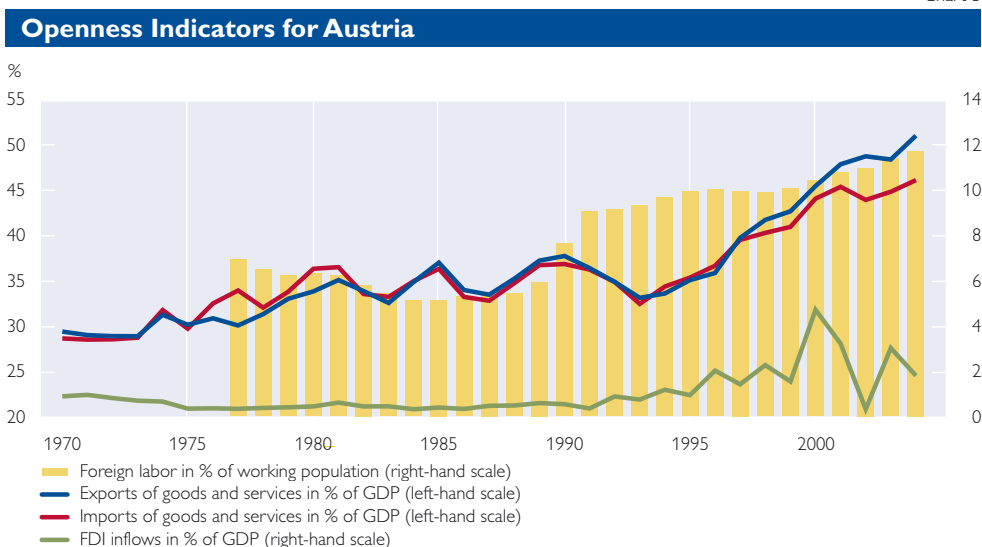
1986   2004

Source: BIS, IMF, UNCTAD.

worldwide, brought about by an increasing volume and variety of cross-border transactions in goods and services as well as by the higher mobility of factors of production, including a more rapid and widespread international diffusion of technology (Wagner, 2001; IMF, 2006).[4] While globalization is by no means a new phenomenon, the scope and rate of change of the globalization process seems to have increased over recent years (Taylor, 2006). For instance, over the past two decades, world trade has increased more than one and a half times as fast as world GDP,

[4] *Other authors distinguish e.g. between "globalization" and "integration" or "neighborhood globalization," with the former referring to links between "regions very different not only with respect to distance, but culture, economic system, and income level" (Aiginger, 2006). In this paper, this distinction is not pursued further as it is difficult to distinguish between the two concepts and because, in economic terms, possible differences seem to be more of a gradual than of a principal nature.*

Chart 3

Openness Indicators for Austria

Foreign labor in % of working population (right-hand scale)
Exports of goods and services in % of GDP (left-hand scale)
Imports of goods and services in % of GDP (left-hand scale)
FDI inflows in % of GDP (right-hand scale)

Source: Eurostat, IMF.
Note: Series on foreign labor starts in 1977 only.

while world FDI has gone up more than two and a half times as fast and daily world foreign exchange turnover roughly four times as fast as world GDP (chart 2).

For Austria, economic globalization as defined above encompasses a number of developments: Austria's full liberalization of capital movements in 1991; the country's accession to the European Economic Area in 1994, to the European Union (EU) in 1995 and to the European Monetary Union (EMU) in 1999; the fall of the iron curtain in the late 1980s; the ensuing gradual opening-up of Austria's eastern neighbor countries; their accession to the EU in May 2004 and their ongoing – or expected – monetary integration into EMU; and the broader effects on Austria of the General Agreement on Tariffs and Trade (GATT), the General Agreement on Trade in Services (GATS) and the World Trade Organization (WTO). All these developments form part of the overall move toward economic globalization.

This paper first briefly summarizes current thoughts on the channels through which globalization can affect inflation (section 2). Sections 3 and 4 undertake empirical estimates of the direct and indirect effect of globalization on Austrian import prices and on Austrian producer prices in the manufacturing sector. The authors show that the price effects of globalization for the manufacturing sector have so far been rather limited. Section 5 concludes.

2 Globalization Can Influence Inflation through Multiple Channels

The current debate on the effects of globalization on inflation distinguishes six main channels.

The *first* channel operates directly through import prices. Low price levels or inflation rates on imports from low-income countries, combined with these countries' rising import shares in high-income countries' overall imports, have been shown to have noticeably dampened import

prices and consumer price inflation in the United States and in other high-income countries (IMF, 2006, and Chen et al., 2004).

The *second* channel, also known as the global competition effect, refers to the indirect effects on inflation from the integration of the goods and services markets. Price dampening effects emanate from comparative advantage, technological progress and stronger competition. As a result, profit margins are squeezed, productivity goes up and price increases in the sectors concerned are dampened (IMF, 2006, and OECD, 2006).

The *third* channel works through labor markets. The rise in labor supply available for the world economy puts pressure on wages in richer countries. So does increased cost-cutting pressure, which arises from stiffened product market competition. New labor institutions, whose change was in turn partly triggered by globalization, weaken unions' wage negotiating power. Lower wages imply lower production costs and thus, other things being equal, lower prices for goods and services.

The *fourth* channel works through capital markets. Liberalized capital movements and the global integration of financial institutions and markets can affect inflation in various ways. For one thing, they can facilitate access to credit, reduce borrowing costs and affect saving behavior (better portfolio choice; reduced need for precautionary savings as credit constraints might be reduced). Aggregate price effects are e.g. conceivable via changes in the cost of capital and through effects on aggregate demand.[5] On the other hand, financial liberalization and integration act as

"catalysts" for the integration of goods and labor markets. Foreign direct investment (FDI) in low-cost countries drives up competitive pressure in the global goods and services markets. It can also dampen wage claims as production relocates to low-cost destinations (or the mere threat production might relocate). The free flow of capital also imposes a "sanctioning" mechanism on monetary and fiscal policies that are considered destabilizing or unsustainable (threat of devaluation; risk premiums; Tytell and Wei, 2004).

This leads to the *fifth* group of channels: changes in policy incentives due to globalization. Globalization can – through various mechanisms – reduce the ability (Romer, 1993) and incentives (Rogoff, 2003, Borio and Filardo, 2006) for monetary policy to temporarily stimulate output through "surprise inflation." This effect can support central bank credibility and thus facilitate the achievement of low inflation. Furthermore, the trend toward central bank independence can in itself be seen as an expression of globalization in the sense that a global benchmarking process has taken place among legislators. As regards fiscal policy, more open economies themselves benefit less from expansionary domestic fiscal policy; while financing budget deficits might initially be made easier in internationally integrated capital markets, the consequences of unsustainable macroeconomic policies may be all the more severe. Globalization also drives structural policies toward deregulation and liberalization in the attempt of boosting the attractiveness of business locations.

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[5] *Possible effects on global interest rates are discussed in Crespo Cuaresma et al. (2005).*

Sixth, globalization can affect the balance between the global demand and supply of goods and services. As long as emerging economies' production expands vigorously and faster than their demand, inflation would be expected to be dampened globally. As emerging economies' demand catches up with production over time, globalization might also accelerate inflation (Gamber and Hung, 2001).

The above channels are interlinked. Many of the effects in fact only concern the relative prices of the sectors involved. The overall price level is ultimately anchored by central banks' monetary policies. However, to the extent that the objectives of the central banks are influenced by globalization, globalization may ultimately also influence the overall price level and inflation (Rogoff, 2003; Borio and Filardo, 2006).

This study takes a microeconomic view on goods market effects and thus focuses on the effects of globalization on the Austrian economy via the first two channels.

3 Did Globalization Dampen Import Prices for Austria?

3.1 Prices in High-Cost Countries May Be Dampened by Low Import Price Inflation and by Low-Cost Countries' Rising Share in Imports

Globalization implies that many emerging economies, where wages and prices for other factors of production are low, become more integrated into world trade.[6] Increased trade with low-cost countries should dampen import prices — and eventu-

ally consumer price inflation — in high-cost countries. This can happen through two effects.[7] *First*, when the share of imports from low-cost countries in overall imports to a high-cost country increases, this dampens the level of *average* import prices, given that the price level in low-cost countries is lower than in high-cost countries. This phenomenon should, in turn, help dampen consumer price inflation in the high-cost country ("*import share effect*"). *Second*, if price increases of imports from low-cost countries were smaller than those from high-cost countries; this would dampen overall import price inflation. To the extent that import price inflation is lower than price increases in domestically produced goods, this development would dampen overall inflation in a high-cost country ("*import price effect*").

To assess the empirical relevance of these effects for Austria, we first consider the development of the share of imports of manufacturing goods from emerging economies to Austria over the past ten years. Then we verify whether import price developments and emerging economies' higher import share have dampened import prices in Austria. The analysis distinguishes between high-cost countries[8] and low-cost countries. The latter are in turn split into China, the new EU Member States and other low-cost countries.

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[6] *This implies an increase of the world supply curve.*

[7] *These effects are similar to what the OECD labels the import penetration effect and the imported disinflation effect (see box I.5, OECD, 2006).*

[8] *EU members plus Australia, Canada, Japan, New Zealand, Norway and the United States.*

3.2 Rising Share of Low-Cost Countries in Austrian Manufacturing Imports

The share of manufacturing imports from low-cost countries has nearly doubled, from 9.7% of total imports in 1995 to 18.4% by 2005. In 1995 the import share of China and the new EU Member States were 1% and 4.9%, respectively; these figures roughly doubled to 2.5% and 8.6% by 2005. Thus, China's share in total Austrian imports continues to be rather low, while the new Member States – as was to be expected owing to their geographical and cultural proximity – have become important trading partners. The import share of low-cost countries has mostly gone up at the expense of the import share of the EU-15 countries,[9] which declined from 80% in 1995 to 72% in 2005. With an import share of 67.6% in 2005,[10] the euro area countries remain Austria's most important trading partners by far.

The strong rise in emerging countries' share in imports is particular to the manufacturing sector: the share of low-cost countries in *total* imports to Austria increased much less markedly, from 19.2% in 1995 to 25.6% in 2005. Total imports from the new Member States increased proportionally more from 6.4% in 1995 to 10.2% in 2005. Thus, roughly 60% of the increase in the import share of low-cost countries was attributable to higher imports from the new EU Member States. This development also occurred at the expense of imports from the EU-15 countries.

3.3 Marked Differences among Average Import Unit Values of Low-Cost Countries

Chart 5 shows the development of the unit value of manufacturing imports from different regions.[11] The average import unit value for high-cost countries is around four times higher than that for the new Member States and about twice as high as the average value of imports from China. This may reflect price competitiveness and/or quality competitiveness (Aiginger, 1997), i.e. prices may indeed be higher in high-cost countries and/or a higher price per kilogram of goods imported from high-cost countries may reflect better quality or technology.

Interestingly, the unit value of imports of manufacturing goods from China was almost twice as high as the unit values of imports from the new
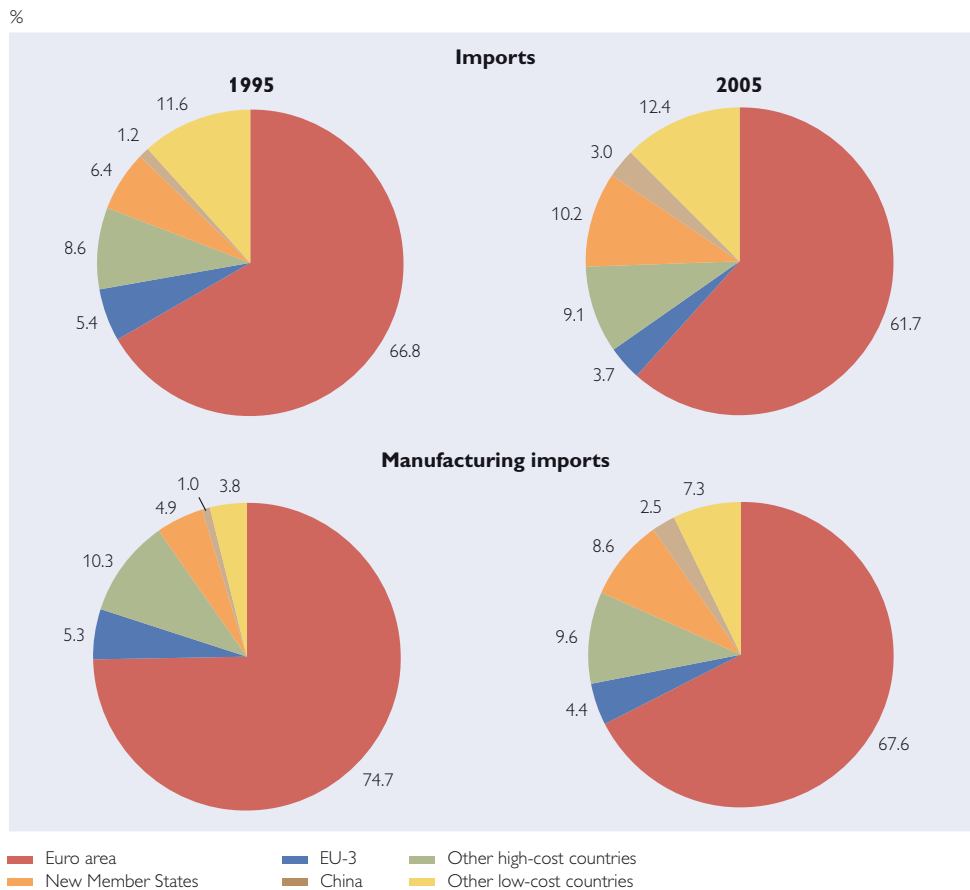
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[9] *EU 15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.*

[10] *These figures are influenced by non-euro area imports being brought to Austria via other euro area countries (e.g. through Rotterdam). Such imports are considered imports from euro area countries in the above statistics. Adjusting for such effects yields higher shares – and higher increases in shares in recent years – for imports from overseas, in particular from low-cost countries such as China. For example, China's manufacturing import share according to these adjusted import statistics went up from 1.4% to 3.9% between 1995 and 2005, and the share of other low-cost countries climbed from 5.1% to 9%. There is no marked difference between the two statistics for the new EU Member States; their import shares according to the adjusted statistics augmented from 5.3% to 8.4% between 1995 and 2005. Also the share of the EU-3 (Denmark, Sweden and United Kingdom) is not much affected; it decreased from 5.8% to 4.5% according to the adjusted data. By contrast, the manufacturing import share of euro area countries declined from 70.3% to 63.8%, and the share of other high-cost countries from 12.1% to 10.5%. However, for lack of plausibility of import unit values derived from these adjusted statistics, all further calculations presented in section 3 of this paper are based on the unadjusted import statistics as contained in the Eurostat Comext database.*

[11] *Unit values are measured as euro per kilogram of manufacturing imports. Unit values are used because of a lack of import price data for Austria.*

Chart 4

Austrian Goods Imports by Region

%

Imports

1995

11.6
1.2
6.4
8.6
5.4
66.8

2005

12.4
3.0
10.2
9.1
3.7
61.7

Manufacturing imports

1.0 3.8
4.9
10.3
5.3
74.7

7.3
2.5
8.6
9.6
4.4
67.6

- Euro area
- New Member States
- EU-3
- China
- Other high-cost countries
- Other low-cost countries

Source: Statistics Austria, Eurostat.

Chart 5

Austrian Manufacturing Import Unit Values

EUR per kilogram of manufacturing imports

25
20
15
10
5
0

1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005

- Total
- New Member States
- High-cost countries
- Other low-cost countries
- China
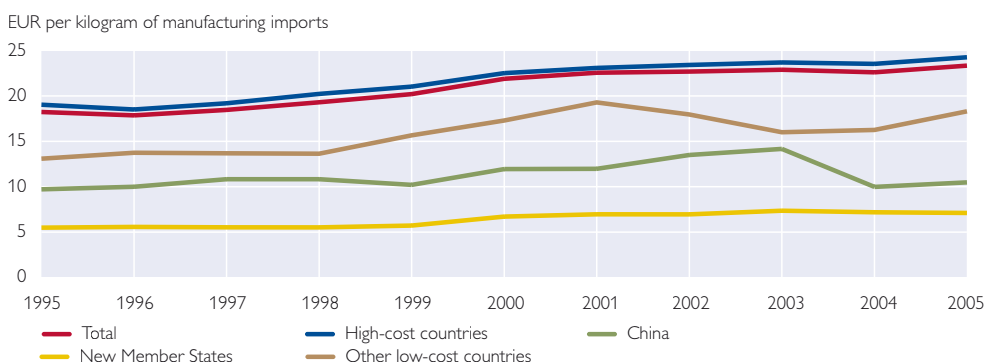
Source: Eurostat (Comext), OeNB.

Member States between 1995 and 2003. Although unit values of Chinese manufacturing imports fell strongly in 2004, they still remain higher, on average, than those from the new Member States. In general, compared to all other low-cost countries, the unit values of imports from

the new Member States are significantly lower. Moreover, unit values not only for China but also for the other low-cost countries increased from 1998 onward, while the unit value of manufacturing goods imported from the new Member States remained almost unchanged for the entire period.

3.4 Increasing Import Share of Low-Cost Countries and Their Slower Price Increases Dampen Inflation in Austria

According to table 1, the unit value inflation of imported manufacturing goods was 2.05% on average during the ten years ending in 2005. The contribution to this value from high-cost countries was 2.72% on average, while the contribution of low-cost countries caused a fall in import unit values by 0.66%: The shift of import shares toward low-cost countries and the slower rise of prices of imports from these countries exerted an overall small dampening effect on Austrian import prices. The largest contribution to this decrease came from manufacturing imports from

the new Member States, whose contribution to the unit value inflation was –0.46% on average. The remainder of the negative contribution to import price inflation is almost equally split between China and the other low-cost countries.

We now distinguish between the price decline caused by an increase in the share of imports from low-cost countries ("import share effect") and the price decline caused by a decrease (or smaller increase) in prices of manufacturing goods in these countries ("import price effect"). In the last ten years, two-thirds (–0.44%) of the decline in prices of imports from low-cost countries were caused by a rise in the share of imports from these countries, especially from the new Member States. The remaining decline originated from the fact that the price change of manufacturing imports from these countries was smaller, on average, than the price change of high-cost country imports. This results in a contribution of low-cost countries to import unit value inflation of –0.22% (table 1). Of this decrease, more than three-quarters

Table 1

Average Annual Import Unit Value Inflation and Its Contributions			
Manufacturing price inflation, %	2.05		
High-cost effect (pp)		2.72	
Low-cost effect (aggregate direct effect, pp)		−0.66	
of which:			
China			−0.11
New EU Member States			−0.46
Other low-cost countries			−0.09
Low-cost effect (aggregate direct effect, pp)	−0.66		
Share effect (pp)		−0.44	
of which:			
China			−0.06
New EU Member States			−0.29
Other low-cost countries			−0.09
Price effect (pp)		−0.22	
of which:			
China			−0.04
New EU Member States			−0.17
Other low-cost countries			−0.01

Source: Eurostat (Comext); OeNB calculations: see Kamin et al. (2004).

Chart 6

Country Shares in Austrian Manufacturing Imports by Sector

%

Low-cost countries   New Member States   China

— 1995   — 2005

51 Organic chemicals
52 Inorganic chemicals
53 Dyeing|tanning and colouring materials
54 Medical and pharmaceutical products
55 Essential oils and perfume materials
56 Fertilizers manufactured (other than those of
    group 272)
57 Plastics in primary forms
58 Plastics in non-primary forms
59 Chemical materials and products not
    elsewhere classified
61 Leather manufactures not elsewhere
    classified and dressed furskins
62 Rubber manufactures not elsewhere classified
63 Cork and wood manufactures

64 Paper|paperboard and articles of paper pulp
65 Textile yarn fabrics made-up articles not
    elsewhere classified
66 Non-metallic mineral manufactures not
    elsewhere classified
67 Iron and steel
68 Non-ferrous metals
69 Manufactures of metals not elsewhere
    classified
71 Power generating machinery and equipment
72 Machinery specialized for particular industries
73 Metal working machinery
74 General industrial machinery and equipment
    not elsewhere classified
75 Office machines and automatic data-
    processsing machines
76 Telecommunications|sound recording,
    reproduction apparatus and equipment

77 Electronic machinery and appliances|appliances
    not elsewhere classified and electrical parts thereof
78 Road vehicles (including air-cushion vehicles)
79 Other transport equipment
81 Prefabricated buildings
82 Furniture and parts thereof
83 Travel goods|handbags and similar containers
84 Articles of apparel and clothing accessories
85 Footwear
87 Professional scientific and controlling instruments
88 Photographic apparatus, equipment and supplies
    and optical goods
89 Miscellaneous manufactured articles not elsewhere
    classified

Source: Eurostat (Comext), OeNB.

were attributable to price develop-
ments of manufacturing imports from
the new Member States. For a de-
tailed decomposition formula of im-
port unit value inflation, see appen-
dix 1.

3.5 Low-Cost Countries Gained Import Shares across Most Sectors

How did import prices develop by
sector? Since the units used here are
weights, an increase in the unit value
could e.g. be caused either by an in-

crease in prices or by a decline in ki-
lograms due to quality improve-
ments.[12] Considering individual sec-
tors helps understand developments
in import unit values more fully and
avoid gross misinterpretations of data.
Turning to chart 6, for all but two
types of goods the share of imports
from low-cost countries in total
imports augmented. For 15 out of
35 types of goods this rise was more
than 5 percentage points, and for
6 groups it was more than 10 percent-
age points. Thus, the origin of manu-

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[12] *For example, technological progress in electronic goods has reduced the average weight of these goods.*

facturing imports in Austria has shifted markedly from high-cost to low-cost countries for most sectors.

Within the group of low-cost countries there are considerable differences: The import share of manufacturing goods from China went up by more than 5 percentage points for 3 out of 35 sectors; for the new Member States the same applied for 9 out of the 35 sectors. For China and the new Member States, there were even losses of import share in some sectors. Thus, within the low-cost countries there was a shift in the origin of imports. In particular, China's import share is above 5% for only five sectors, with the highest, albeit decreasing, share of 15% for travel goods, handbags and similar containers. The import share of the new Member States is above 5% for 26 out of the 35 groups.[13]

The increase of low-cost countries' import share is not confined to low-tech goods: Their import share in electronic goods[14] has more than doubled (almost tripled in sector 77) over the last ten years. This higher import share comes mostly from the other low-cost countries; the import share of electronic goods from China and from the new Member States changed on average by less than 4 and 8 percentage points, respectively.

If imports from low-cost countries exerted downward pressure on import prices, import price inflation could be expected to have fallen more strongly in sectors in which the import share of low-cost countries in-creased most. However, this is not the case.

Indeed, turning once again to the example of electronic goods, the increase in import share had a mixed effect on inflation (see table 2). For the first of the relevant sectors (75 — office machines and automatic data-processing machines), the increase in the share of imports from low-cost countries was inflationary, due mostly to the rise in import prices of the other low-cost countries. By contrast, for sector 76 (telecommunications, sound recording, reproduction apparatus and equipment), imports from the new EU Member States exerted a strong price dampening effect, which in turn resulted mainly from an increase in the share of imports and to a lesser extent from falling import prices. For sector 77 (electronic machinery and appliances, appliances not elsewhere classified and electrical parts thereof), the highest dampening effect on inflation stemmed from falling prices for imports from high-cost countries, while the higher share of imports from low-cost countries dampened prices only negligibly.

Similarly, low-cost countries' import share in textiles (sectors 65 — textile yarn fabrics, made-up articles not elsewhere classified and related products, 84 — articles of apparel and clothing accessories and 85 — footwear) went up by an average of 10 percentage points in the last ten years. This increase is mainly attributable to a rise in imports from the

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[13] *For further details see table A1 in appendix 1. The results are qualitatively similar when based on trade statistics adjusted for imports coming through other euro area countries (see footnote 10); as with aggregate import figures, sectoral import shares of low-cost countries including China are also somewhat larger and have developed more dynamically.*

[14] *Sectors 75 to 77: office machines and automatic data-processing machines; telecommunications, sound recording, reproduction apparatus and equipment; and electronic machinery and appliances, and appliances not specified as well as electrical parts thereof.*

Table 2

Import Unit Values

Overall, Import share and Import price Effects by Sector

Average annual change 1995–2005

Sector	All coun-tries	High-cost coun-tries	Low-cost countries											
			Overall effect				Import share effect				Import price effect			
			All low-cost coun-tries	China	New Mem-ber States	Other low-cost coun-tries	All low-cost coun-tries	China	New Mem-ber States	Other low-cost coun-tries	All low-cost coun-tries	China	New Mem-ber States	Other low-cost coun-tries
	%	percentage points												
51	4.09	5.72	−1.63	−0.19	−0.54	−0.90	−0.36	−0.06	0.07	−0.38	−1.27	−0.14	−0.61	−0.52
52	−25.68	0.36	−26.05	−21.20	−2.56	−2.29	−8.02	−5.74	−2.73	0.45	−18.03	−15.46	0.18	−2.74
53	−2.41	−2.13	−0.28	0.05	−0.12	−0.21	−0.13	0.02	−0.17	0.02	−0.15	0.04	0.05	−0.24
54	5.58	5.51	0.08	0.00	−0.08	0.15	0.11	0.02	0.07	0.03	−0.04	−0.01	−0.15	0.13
55	−0.91	−1.55	0.65	−0.03	−0.15	0.83	−0.05	−0.03	−0.15	0.13	0.69	0.00	0.00	0.70
56	2.84	46.60	−43.76	−0.08	−29.39	−14.29	−18.04	0.02	−7.83	−10.24	−25.72	−0.10	−21.56	−4.05
57	−19.20	−19.98	0.78	0.01	0.51	0.26	0.21	0.00	0.13	0.07	0.57	0.01	0.38	0.18
58	−10.49	−10.65	0.16	0.02	0.01	0.12	−0.28	0.02	−0.22	−0.07	0.43	0.00	0.24	0.19
59	−5.86	−4.67	−1.19	0.05	−1.18	−0.06	−1.37	−0.01	−1.27	−0.09	0.17	0.05	0.10	0.03
61	16.52	20.43	−3.91	0.00	−1.59	−2.32	−0.06	0.03	−1.50	1.42	−3.85	−0.03	−0.09	−3.74
62	5.77	5.87	−0.10	−0.01	0.02	−0.10	0.24	−0.01	0.36	−0.11	−0.34	0.00	−0.34	0.00
63	−11.61	−14.16	2.55	0.07	1.88	0.61	−1.32	0.02	−1.32	−0.03	3.87	0.04	3.20	0.63
64	−6.99	−5.66	−1.33	0.08	−1.25	−0.16	−0.82	0.16	−0.95	−0.02	−0.51	−0.08	−0.29	−0.14
65	−4.94	−4.37	−0.57	−0.01	−0.74	0.18	−1.02	−0.01	−0.79	−0.23	0.45	0.00	0.05	0.41
66	−5.66	−6.35	0.69	0.07	0.52	0.11	−0.22	0.02	−0.16	−0.07	0.91	0.05	0.68	0.18
67	−6.33	−6.81	0.48	0.00	0.00	0.48	−0.46	−0.01	−0.40	−0.05	0.94	0.01	0.40	0.53
68	−9.21	−8.68	−0.53	0.09	−0.75	0.12	−0.34	−0.10	−0.82	0.58	−0.19	0.19	0.07	−0.45
69	−1.25	−1.29	0.05	0.03	−0.18	0.19	−0.31	−0.07	−0.31	0.07	0.36	0.11	0.13	0.13
71	−3.02	−2.61	−0.41	0.04	−0.04	−0.41	−0.63	−0.04	−0.10	−0.49	0.22	0.08	0.07	0.07
72	−4.83	−4.88	0.05	0.00	0.08	−0.03	−0.37	−0.01	−0.33	−0.03	0.42	0.01	0.41	0.00
73	27.94	27.54	0.40	−0.11	0.57	−0.06	3.03	−0.01	2.52	0.51	−2.62	−0.11	−1.95	−0.57
74	−1.85	−1.01	−0.84	−0.06	−0.65	−0.14	−0.81	−0.08	−0.67	−0.06	−0.03	0.02	0.02	−0.07
75	0.37	−0.65	1.02	0.04	0.19	0.79	0.33	0.17	0.27	−0.11	0.69	−0.13	−0.08	0.90
76	0.97	6.06	−5.09	−0.05	−4.98	−0.07	−3.58	0.16	−3.37	−0.38	−1.51	−0.21	−1.61	0.31
77	−3.74	−3.49	−0.25	−0.03	−0.83	0.60	−1.86	−0.11	−1.65	−0.09	1.60	0.09	0.82	0.69
78	−2.00	−1.95	−0.05	−0.01	−0.21	0.16	−0.33	−0.01	−0.44	0.12	0.28	0.00	0.23	0.04
79	30.71	31.08	−0.37	−0.14	1.60	−1.83	1.65	−0.12	3.08	−1.31	−2.02	−0.02	−1.48	−0.52
81	−0.57	2.15	−2.72	−0.53	−1.78	−0.42	−2.26	−0.28	−1.95	−0.03	−0.46	−0.25	0.17	−0.38
82	−4.34	−4.43	0.08	−0.11	0.04	0.15	−0.81	0.03	−0.77	−0.07	0.89	−0.14	0.81	0.22
83	−15.48	−20.07	4.59	3.41	0.09	1.09	−2.15	−1.34	−0.28	−0.53	6.74	4.75	0.37	1.62
84	−18.38	−22.12	3.74	0.96	0.51	2.27	−1.47	−0.22	−0.89	−0.35	5.20	1.19	1.40	2.62
85	4.10	2.89	1.22	−0.55	−0.33	2.10	−0.69	−0.47	−0.16	−0.06	1.91	−0.08	−0.18	2.16
87	−6.14	−6.35	0.21	−0.08	0.09	0.20	−0.22	−0.13	−0.02	−0.08	0.43	0.06	0.10	0.28
88	1.43	1.59	−0.16	0.03	−0.02	−0.17	0.19	0.04	0.07	0.08	−0.34	−0.01	−0.09	−0.25
89	2.46	3.17	−0.71	−0.20	−0.90	0.38	−0.90	−0.17	−0.73	0.00	0.19	−0.03	−0.17	0.38

Source: Eurostat (Comext), OeNB.
Note: For sector names see Chart 6.

other low-cost countries and not to a surge in imports from China or the new Member States. The average fall in import prices by 6.41% in these three sectors in the ten years to 2005 was mostly attributable to a very strong decline of prices in sector 84. Surprisingly, this price decline comes from a fall in prices of imports from the high-cost countries, while the

price of imports from the low-cost countries actually went up.

3.6 Modest Import Price Dampening from the New EU Member States

As we have seen above, the higher import share of manufacturing goods from low-cost countries dampened import price inflation a little. However, since the lion's share of Austria's imports still comes from euro area countries and since not all prices of goods from low-cost countries have gone down over the last ten years, the total dampening effect on inflation from low-cost countries is rather small. The effect of imports from China on Austrian inflation is negligible, while there was a larger, albeit still quite small, dampening effect from a rise in imports from the new Member States.[15]

4 Did Stiffer Global Competition[16] Dampen Producer Prices in Austria?

4.1 Trade, Competition, Productivity and Profit Margins

Apart from the direct effects on import prices described above, more integrated global markets for goods and services can exert downward pressure on prices in several further ways.

First, increased world trade allows better exploitation of countries' comparative advantages and of economies of scale. Thus, for the world as a whole, more can be produced with the same resources, which should eventually result in falling prices.

Second, lower barriers to trade intensify competition in the tradables sector. Stronger competition from foreign producers reduces individual firms' pricing power. Globalization also enhances the trend toward larger, internationally operating and more efficient retailers, which are able to put downward price pressure on their suppliers given their large-volume purchases. Other things being equal, such a trend should eventually result in lower profit margins and consequently lower prices.[17] Within a sector, the marginal (i.e. the least efficient) firms will exit the industry, thus driving up average productivity and lowering average cost. As a result of these two effects (lower mark-up and higher productivity), producer prices should decline. Other things being equal, such a development should dampen overall price inflation.

Third, firms facing increased competition will have strong incentives to innovate: New products temporarily reestablish some monopoly pricing power. New production technologies increase productivity and reduce production costs. Again, such a trend should eventually dampen prices. Globalization also facilitates positive technological spillovers, thus speeding up the diffusion of technological innovations. This development supports technological catching up and further spurs the race for innovations,

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[15] *The OECD (2006) arrives at a similar conclusion for China's effect on the euro area.*

[16] *See IMF (2006) or OECD (2006) for further aspects of this "global competition effect."*

[17] *This reasoning is based on the idea that markets are not perfectly competitive because consumers' preference for variety makes every good unique. Under monopolistic competition, producers enjoy some market power, i.e. they apply mark-up pricing, which will depend on the elasticity of demand for a particular good. This, in turn, will depend first on how "unique" consumers find a product and, second, on the degree of competition in an industry (Chen et al., 2004).*

boosting global productivity growth and dampening prices.

It is impossible to disentangle the effects of globalization from the price dampening effects that (domestic) deregulation, liberalization and technological progress could have exerted without globalization. Some price dampening could also have occurred without globalization; however, globalization seems to have intensified these forces, e.g. by building up pressure on governments to improve their economies' efficiency and their countries' attractiveness as a business location. Globalization and deregulation may in fact have reinforced each other (Rogoff, 2003).

4.2 Did Rising Trade Openness Dampen Producer Prices in Austria?

Let us now investigate empirically how globalization has affected producer prices in the Austrian manufacturing industry. More specifically, has increased trade openness (measured as import penetration) over the past 10 to 15 years affected Austrian manufacturers' productivity and pricing power?

Our empirical estimation is based on sectoral data of a sample of medium-sized and large Austrian manufacturing firms for the years 1990 to 2002, where all variables[18] except aggregate consumer price inflation are allowed to vary across sectors.[19] The classification of industrial sectors is based on the two-digit level NACE classification, which means that a total of 15 sectors are considered.[20] Appendix 2 includes a list of variables and their sources as well as details on the panel data estimation technique used.

To study this question further, table 3 presents the results of variants of a single equation model. As outlined above, one would expect that changes in labor productivity and trade openness are inversely related to changes in producer prices, while changes in the mark-up ratio are positively related to producer prices. The first two columns present a simple model in which changes in relative producer prices[21] depend only on changes in productivity, inflation and its own lagged values. In this first specification, productivity carries the expected negative sign, but it is significant only in the case of medium-sized firms, while overall inflation is only significant for large firms.

In columns 3 to 4 a measure of globalization, namely import penetration, is introduced as a further explanatory variable. Specification tests confirm for both groups of firms that the model is well specified.[22] For the group of medium-sized firms, overall inflation becomes significant, but import penetration – while it has the expected negative sign – is not significant. An interesting result, however, is that the effect of labor productivity – although still significant – is

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[18] *Relative producer prices, labor productivity, import penetration and mark-up ratio.*

[19] *All variables are transformed into logarithms.*

[20] *After correcting for outliers, there are only 14 sectors that concern large firms. This is due to the exclusion of sector 23, "Petroleum, petroleum products and related materials."*

[21] *Relative producer prices are measured as the difference between sectoral producer prices and overall producer prices.*

[22] *For the case of medium-sized firms, this model seems to be better specified than the first model; this is, however, not the case for the group of large firms.*

Table 3

Producer Prices, Productivity, Mark-ups and Openness

	Number of lags in years	Medium-sized firms (1)	Large firms (2)	Medium-sized firms (3)	Large firms (4)	Medium-sized firms (5)	Large firms (6)	Medium-sized firms (7)	Large firms (8)
Number of observations		168	147	168	147	168	147	168	147
F-test[1]		3.0	7.04	7.2	10.52	15.4	3.79	13.3	3.96
p-value		(0.06) *	(0.01) **	(0.00) **	(0.00) **	(0.00) **	(0.03) **	(0.00) **	(0.02) **
Estimated coefficients									
Changes in relative producer prices	1	−0.170 **	−0.188 **	−0.171 **	−0.145	−0.229	−0.181 **	−0.173 *	−0.146 *
Changes in labor productivity	1	−0.187 **	−0.105	−0.124 **	−0.107	−0.173 **	−0.112 *	−0.106 **	−0.056
Inflation in Austria	0	−0.635	−0.946 **	−0.693 **	−0.842 *	−0.072	−0.825	−0.740 **	−0.279
Changes in import penetration	1			−0.043	0.094			−0.007	0.082
Changes in mark-up ratio	1					0.299	0.052	0.037	0.196
Specification tests									
Sargan test of overidentifying restrictions[2]		4.51 (0.72)	3.35 (0.85)	3.53 (0.94)	7.79 (0.35)	3.81 (0.80)	2.96 (0.81)	2.63 (0.96)	5.33 (0.72)
Arellano-Bond test for AR(1) in first differences[3]		−1.87 (0.06)	−1.69 (0.09)	−1.97 (0.05)	−1.66 (0.10)	−1.92 (0.06)	−1.68 (0.09)	−1.88 (0.06)	−1.70 (0.09)
Arellano-Bond test for AR(2) in first differences[3]		−0.70 (0.48)	−0.81 (0.42)	−0.64 (0.52)	−0.59 (0.55)	−0.43 (0.67)	−0.84 (0.40)	−0.60 (0.55)	−0.98 (0.33)

Source: OeNB calculations.

Note: * significant at 90%; ** significant at 95%; p-values in parenthesis.

[1] Tests the overall significance of the regression. The null hypothesis is that all parameters are zero.

[2] Tests the validity of the overidentifying restrictions used in the GMM estimator. A failure to reject the null hypothesis indicates that there is no violation in the zero correlation assumption between additional instruments and the error term.

[3] The AR(1) and AR(2) tests refer to the test for the null of no first-order and second-order autocorrelation, respectively, in the first-differenced residuals, which is a necessary condition for the GMM estimator to be consistent and unbiased.

smaller in this specification, while the effect of overall inflation is slightly higher. For the case of large firms, we find that only overall inflation is significant, but its effect is again smaller than in the case when import penetration is not included. Moreover, in this model import penetration is not only not significant, but it has a counterintuitive positive effect on relative producer prices.

In the last four columns of the table we estimate a model in which the mark-up ratio is included, and we first exclude and then include import penetration. In all four cases, the effect of the mark-up on relative producer prices is not significant, although the effect is positive as expected.

The comparability of these results with other studies is limited by methodological differences.[23] Chen et al. (2004) e.g. find different effects of all variables on producer prices for selected EU countries:[24] The coefficients of openness on sectoral inflation measured by Chen et al. (2004) in their first estimates range from −0.010 to −0.068, depending on the additional variables included. By contrast, according to the above esti-

[23] In particular, differences exist in the model specification, number of lags, data used and instrumental variables used.

[24] Belgium, Germany, Denmark, Spain, France, Italy, Netherlands and the United Kingdom.

mates, in Austria the coefficient of openness on relative producer prices is between –0.043 and 0.094, but is never significant. The coefficients of the mark-up ratio oscillate between 0.104 and 0.148 in the cross-country study, while for Austria they vary between 0.299 and 0.037 for medium sized firms and 0.052 and 0.196 for large firms, but are again never significant. Finally, the coefficients of productivity are much higher in Austria, coming to between –0.056 and –0.187.

The above results for Austria are also at odds with studies by the IMF at the European level (IMF, 2006). But they are in line with other studies on Austria (Badinger and Breuss, 2005), which find, for example, that following EU accession in 1995, there was no general reduction in mark-ups for most manufacturing goods. According to our estimates, increases in productivity dampen relative producer prices, while neither changes in the mark-up ratio nor the degree of openness have a significant effect on relative producer prices. This may reflect that changes in relative producer prices were mostly driven by technological progress rather than by enhanced competition from international low-cost producers.

5 Conclusions

Austria's integration in the world economy has made a quantum leap over the past decade. The growing theoretical and empirical literature suggests that globalization may have dampened inflation, particularly in high-income countries. This study investigated whether this is also the case for Austria, a high-cost, small open economy.

The paper first offered a broad overview of six channels through which one could expect globalization to dampen inflation: (1) direct effects on import prices, (2) indirect effects on producer prices through competition and the resulting higher productivity growth and lower mark-ups, (3) lower wage claims in the face of abundant global labor supply and changing labor market institutions, (4) lower financing costs and other "catalytic" effects from the global liberalization of capital movements, (5) better monetary, fiscal and structural policies and (6) changes to the global balance between the supply and demand of goods and services. The first two channels were investigated empirically for Austria.

First, the effects from the increasing share of imports from low-cost countries on manufacturing import prices were estimated. Overall import prices were slightly dampened by the rising – and meanwhile substantial – share of imports from the new EU Member States. By contrast, China and other emerging economies play a negligible role for Austrian import price developments.

Second, this paper studied the indirect effect of global competition on Austrian producer prices. A single-equation estimate found that globalization had a moderate effect on dampening relative producer prices at least for a sample of medium-sized and large manufacturing firms in Austria. These estimations show that gains in labor productivity seem to be the main drivers of dampening inflation in relative producer prices.

A rationale for the rather modest globalization effects on import and producer price inflation in Austria is that the country's foreign trade and FDI links are still (despite the surge of links with central and eastern European countries) dominated by

other high-income European countries. Furthermore, and maybe more importantly, Austrian social partners have pursued a policy of wage moderation for several years to maintain and bolster global competitiveness. Judging from the favorable evolution of the country's price competitiveness as well as from its export performance and trade and current account development particularly since the start of EMU, this policy has been a success. Given favorable cost and price developments in Austria, it should come as no surprise that imports from the rest of the world (including emerging economies) exert less of a price-dampening effect on Austrian import and producer prices than in some other high-income countries.

A note of caution on these findings seems warranted. The estimates in this paper do not capture to what extent "domestic" deregulation and liberalization were, in turn, motivated by globalization. In particular, Austria's accession to the EU in 1995 fostered liberalization and deregulation through EU law (e.g. network industries) and through market pressure (e.g. labor market). These effects are captured by productivity increases in the above estimates, while they ultimately go back to globalization. Furthermore, globalization is likely to have facilitated technological spillovers, thus boosting productivity growth also in Austria. Again, in the estimates undertaken in this study, this effect is captured under "productivity," while it was facilitated by globalization. Finally, the study was limited to the effects on the manufac-

turing sector, while services meanwhile account for more than three-quarters of Austria's output. Indeed, globalization has more recently substantially extended to the services sector, while gains in imports and exports of manufacturing goods in the last 15 years have been more modest. In that sense, the rather limited effects on Austrian inflation, as found in this study, may be a lower bound for overall true effects.

**Appendix 1:
Data and Calculation Method Used in Section 3**

The data used were taken from Eurostat's COMEXT database. We extracted import values and volumes for all available trading partners and for the years 1995 to 2005. The trading partners were grouped in the following way:
— high-cost countries: Australia, Canada, Switzerland, Liechtenstein, Norway, New Zealand, U.S.A., EU Member States,
— low-cost countries: new EU Member States, China, rest of the world.

For the product categorization we used the SITC classification at the two-digit level. Before processing the data further, we replaced missing values and outliers by interpolated values.

Table A1 shows the change in import share for the group of low-cost countries.

The percentage change in the euro area import unit value can be decomposed by equation A1 setting the high-cost countries as a reference.

Table A1

Country Shares in Austrian Manufacturing Imports by Sector

%

		Low-cost countries			China			New Member States		
		1995	2005	Change	1995	2005	Change	1995	2005	Change
51	Organic chemicals	15.0	17.5	2.5	1.0	3.3	2.2	8.1	7.1	−0.9
52	Inorganic chemicals	21.9	26.2	4.4	6.6	3.5	−3.1	8.4	14.1	5.8
53	Dyeing, tanning and colouring materials	1.7	2.5	0.8	0.1	0.3	0.3	0.9	1.7	0.8
54	Medical and pharmaceutical products	1.4	1.7	0.4	0.2	0.1	0.0	0.8	1.0	0.2
55	Essential oils and perfume materials	3.2	7.2	4.0	0.1	0.1	0.0	2.2	3.9	1.8
56	Fertilizers manufactured (other than those of group 272)	52.2	52.9	0.6	0.2	0.1	−0.1	46.5	29.3	−17.2
57	Plastics in primary forms	7.6	7.4	−0.2	0.0	0.0	0.0	5.9	5.9	0.0
58	Plastics in non-primary forms	3.0	8.0	5.0	0.0	0.4	0.3	2.4	4.8	2.4
59	Chemical materials and products not elsewhere classified	2.7	4.4	1.8	0.4	0.4	0.0	1.6	3.0	1.4
61	Leather, leather manufactures not elsewhere classified and dressed furskins	15.6	18.2	2.6	0.7	1.5	0.9	2.9	4.9	2.1
62	Rubber manufactures not elsewhere classified	10.0	15.4	5.4	0.1	0.3	0.2	8.1	8.1	−0.1
63	Cork and wood manufactures (excluding furniture)	20.4	26.7	6.3	0.3	1.1	0.7	16.5	18.5	2.0
64	Paper, paperboard and articles of paper, pulp of paper or of paperboard	4.5	9.6	5.0	0.2	0.3	0.1	4.0	8.2	4.2
65	Textile yarn fabrics made-up articles not elsewhere classified and related products	12.2	20.7	8.5	0.8	1.8	1.0	5.4	6.6	1.2
66	Non-metallic mineral manufactures not elsewhere classified	13.2	18.5	5.3	0.7	2.4	1.7	8.9	10.4	1.5
67	Iron and steel	12.1	14.9	2.7	0.1	0.1	−0.1	10.2	8.9	−1.3
68	Non-ferrous metals	17.0	21.4	4.4	0.3	0.2	−0.1	8.0	13.4	5.4
69	Manufactures of metals not elsewhere classified	11.6	20.2	8.6	0.8	2.5	1.6	7.9	12.3	4.4
71	Power generating machinery and equipment	4.2	12.5	8.3	0.5	0.7	0.2	2.5	8.2	5.7
72	Machinery specialized for particular industries	6.4	14.7	8.2	0.0	0.6	0.6	5.4	10.9	5.5
73	Metal working machinery	9.9	14.8	5.0	0.4	1.0	0.6	7.9	9.7	1.8
74	General industrial machinery, equipment not elsewhere classified and machine parts not elsewhere classified	4.5	11.7	7.2	0.3	1.2	0.9	3.3	8.0	4.7
75	Office machines and automatic data-processing machines	9.0	26.6	17.6	0.9	4.8	3.9	0.9	16.8	15.9
76	Telecommunications, sound recording, reproduction apparatus and equipment	13.7	32.8	19.2	2.2	7.3	5.1	6.7	6.9	0.2
77	Electronic machinery appliances, appliances not elsewhere classified and electrical parts thereof	10.9	30.3	19.4	0.9	2.9	2.0	5.5	13.2	7.7
78	Road vehicles (including air-cushion vehicles)	3.3	12.0	8.7	0.0	0.2	0.2	1.9	7.1	5.2
79	Other transport equipment	6.3	45.7	39.4	0.1	11.7	11.6	4.8	7.7	2.9
81	Prefabricated buildings	16.6	25.1	8.5	1.9	9.5	7.5	12.7	12.9	0.2
82	Furniture and parts thereof	11.5	28.0	16.5	0.4	1.7	1.3	8.0	13.7	5.6
83	Travel goods, handbags and similar containers	32.1	31.5	−0.6	21.3	15.0	−6.3	2.9	3.0	0.1
84	Articles of apparel and clothing accessories	23.0	30.5	7.5	4.6	4.7	0.1	6.4	6.0	−0.4
85	Footwear	22.7	37.0	14.3	2.9	6.2	3.3	8.5	9.2	0.8
87	Professional scientific, controlling instruments and apparatus not elsewhere classified	3.2	6.9	3.8	0.4	0.9	0.5	1.5	3.1	1.6
88	Photographic apparatus, equipment and supplies and optical goods	8.1	12.9	4.8	1.9	4.7	2.8	1.6	3.4	1.8
89	Miscellaneous manufactured articles not elsewhere classified	8.5	17.6	9.1	2.4	3.7	1.3	3.5	8.7	5.2

Source: Eurostat (Comext), OeNB.

Equation A1

$$\frac{\Delta p_{t}}{p_{t-n}} = \sum_{j}\left[\frac{p_{j,t}-p_{HC,t}}{p_{t-n}}\Delta\alpha_{j,t}\right] + \sum_{j}\alpha_{j,t-n}\left[\frac{\Delta p_{j,t}}{p_{j,t-n}}\frac{p_{j,t-n}}{p_{t-n}}-\frac{\Delta p_{HC,t}}{p_{HC,t-n}}\frac{p_{HC,t-n}}{p_{t-n}}\right] + \frac{\Delta p_{HC,t}}{p_{HC,t-n}}\frac{p_{HC,t-n}}{p_{t-n}}$$

j = {China, new Member States, rest of low-cost countries}

The first term is the share effect. A rising share of a low-cost country will have a negative effect on overall import price inflation.

The second term is the price effect. If the change in the price level of a (low-cost) country is smaller than the change of the price level in the reference group (high-cost countries), the price effect for this (low-cost) country will be negative.

The third term represents the residual effects due to price changes in the high-cost countries.

A detailed description of the method can be found in Kamin et al. (2004).

Appendix 2:
Data and Estimation Method Used in Section 4

Data:
Producer prices: Source MultiREG (WIFO, Joanneum Research).
Labor productivity: value-added at constant prices divided by total employment. This is an index with reference year 1995.
Source: STAN, OECD.
Import penetration: is the share of imports in total domestic demand; total domestic demand is production plus imports less exports.
Source: STAN, OECD.
Mark-up ratio: total costs divided by turnover. Source: BACH.
Inflation: HICP.
Source: Statistics Austria.

Bulkiness: Ratio of quantity to value of imports to Austria from the rest of the world; Source: STAN, OECD.
Size: total employment.
Source: BACH.

Estimation Method:
The model was estimated using STATA Version 8. We estimate our model in a panel data framework using the methodology of Arellano and Bond (1991).[25] All variables are in natural logarithms. The model is estimated in first differences to remove industry specific fixed effects. We use generalized method of moments (GMM) methods due to the possibility that openness is endogenous[26] and due to the presence of a lagged dependent variable, which is unavoidable given the high autocorrelation of producer prices. Endogenous variables in levels lagged two or more periods will then be valid instruments, provided there is no autocorrelation in the time-varying component of the error term. This can be checked by performing tests for serial correlation in the first-differenced residuals. Additionally, we used bulkiness and size as instrument variables. The validity of the instruments can be tested by means of the Sargan test of overidentifying restrictions. The lag length in the GMM instruments is chosen to avoid overfitting, which would remove the effect of instrumental variables estimation.

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[25] *The estimation was performed using Roodman's (2005) "xtabond2" procedure in STATA, which implements the Windmeijer (2005) finite-sample correction to the two-step covariance matrix. This makes two-step estimation a viable alternative to one-step as it is robust even in such a small sample.*

[26] *Refer to Chen et al. (2004) for an extensive discussion of endogeneity problems and instrumentation.*

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