

Linking a simple INFORUM model as a satellite to the BTM

The case of AEIOU

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Introduction - Aim of the paper

Short description on how the simple Austrian INFORUM model AEIOU was linked to the BTM as a satellite.

Satellite: Information on demand for Austrian exports and on Austrian import prices are derived from the BTM system, without considering any feedback from the Austrian economy to the BTM system.

Discussion of the advantages and limitations of a satellite approach.

Can model builders in other countries – and in small open countries in particular – benefit from the experience gained with the Austrian model?

AEIOU in its present stage

Typical INFORUM model in an infant stage of development.

Emphasis on a sound empirical foundation and a consistent accounting framework.

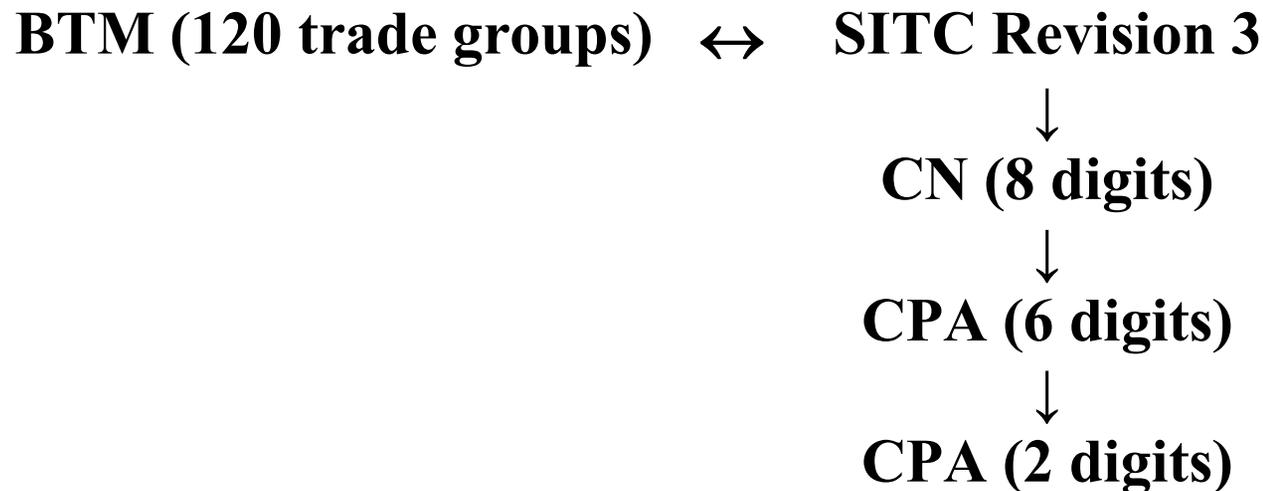
At the moment private consumption, capital formation, employment and imports are endogenized by means of econometrically estimated sets of equations.

Some progress made in the estimation of a simple accountant.

The lack of a price model and the absence of other relevant variables like investment by industries or capital stock by industries are the main reasons, why it was by far too early to consider full linking with the help of the BTM model.

Adapting the BTM Scenario

Establishing a Bridge between the BTM classification – European Standard Product Classification CPA



Adapting the BTM Scenario

Prices

In order to get import prices, the first step was to calculate real and nominal values for the 29 CPA groups we were interested in.

As the forecasts are expressed in constant US Dollars, nominal values had to be calculated at detailed level by multiplying each BTM commodity group by its price.

Import prices relative to domestic prices show up in the import share equations used in AEIOU.

Adapting the BTM Scenario

Prices - Example for the first AEIOU commodity group

$$\begin{aligned} f \text{ nomi1} = & b.\text{aum1} * b.\text{maup1} + b.\text{aum2} * b.\text{maup2} + \\ & + b.\text{aum3} * b.\text{maup3} + b.\text{aum4} * b.\text{maup4} \\ & + b.\text{aum5} * b.\text{maup5} + b.\text{aum6} * b.\text{maup6} \\ & + b.\text{aum7} * b.\text{maup7} + b.\text{aum8} * b.\text{maup8} \\ & + b.\text{aum10} * b.\text{maup10} \end{aligned}$$

$$\begin{aligned} f \text{ real1} = & b.\text{aum1} + b.\text{aum2} + b.\text{aum3} + b.\text{aum4} + b.\text{aum5} + b.\text{aum6} \\ & + b.\text{aum7} + b.\text{aum8} + b.\text{aum10} \end{aligned}$$

$$f \text{ price} = \text{nomi1} / \text{real1}$$

aum stands for Austrian Imports by commodity group

maup is import price index by commodity group

Linking AEIOU as a satellite to BTM - Necessary adaptations and indexing

Merchandise exports

Indexing

calculate the index base year 2004:

gdates 1980 2025

Merchandise exports:

vr 0 1 1.5 2.0 3.5 7

do {

ti Exports: Index 2004=1

f expind%1 = a.atx%1/a.atx%1{2004}

gr expind%1 }(1-29(28))

Linking AEIOU as a satellite to BTM - Necessary adaptations and indexing

Merchandise exports

Extending

fdates 2004 2015

vam C:\aeiou\model\hist b

dvam b

do {vf expg%1 = expind%1*expg%1{2004}}(1-29(28))

Linking AEIOU as a satellite to BTM - Necessary adaptations and indexing

Merchandise imports

Merchandise imports are estimated on the basis of import share equations.

The time series for the import prices $p_{im}(i)$ for the forecasting period were again derived from the BTM simulation.

Because import prices in the BTM are expressed in US Dollars whereas the import prices in the Austrian model are expressed in EURO, an adaptation for the exchange rate US Dollar / EURO became necessary.

After this adjustment, the series for import prices were indexed to 2004 = 1.

Is the assumption of a one-way dependency justified? The case of Austria

The omission of feedback effects can only be justified if a pronounced one-way dependency can be assumed, i.e. if Austrian exports are dependent on import demand of the countries in the BTM system, whereas the exports of no country in the BTM system are dependent on Austrian import demand in a significant way.

The same one-way dependency should be given with respect to prices.

Empirical evidence can be derived from the data in the BTM system to illustrate to which extent this set of assumptions is acceptable.

Is the assumption of a one-way dependency justified? The case of Austria

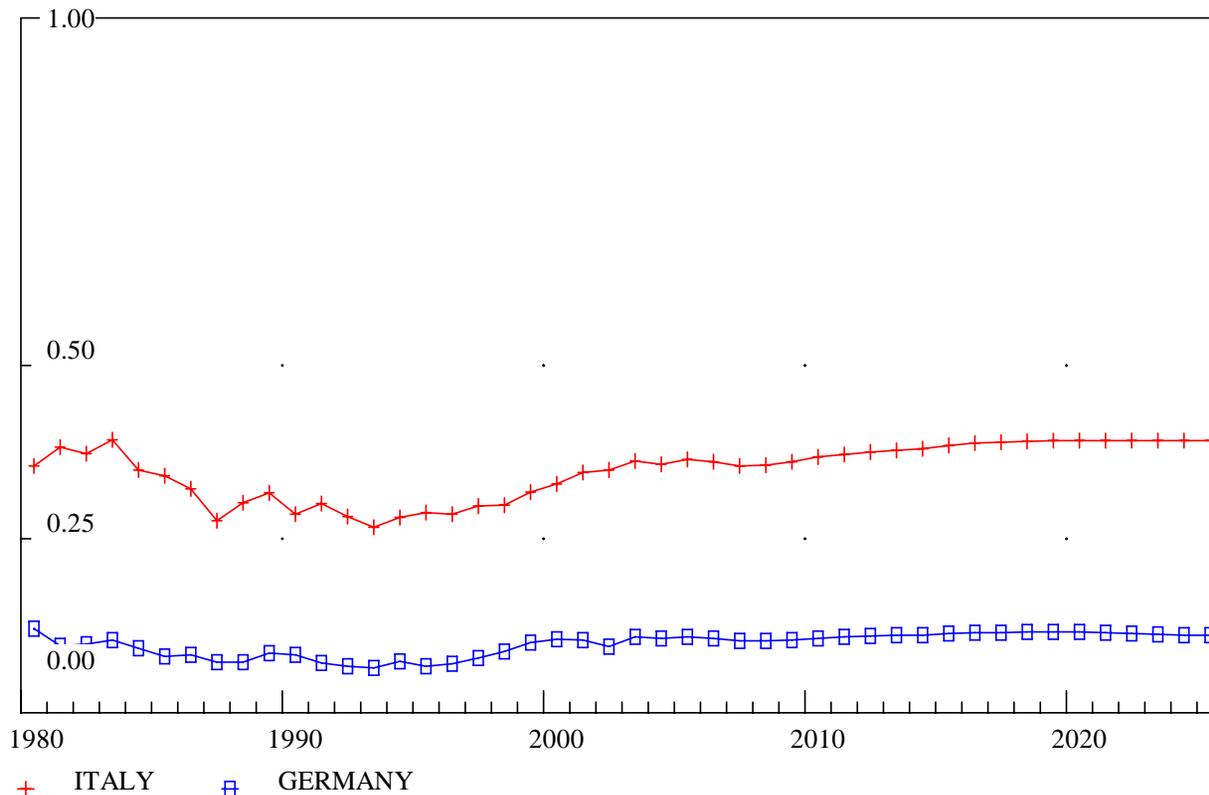
The only two importing countries where Austrian goods play a significant role are Germany and Italy.

But even in this case Austrian shares in their home market are very small, of course with some exemptions, CPA 02 “Products of forestry” and CPA 20 “Wood and Wood products”.

For some other products only Germany seems to be an important destination for Austrian goods: CPA 21 “Pulp, paper and paper products”, CPA 22 “Printed matter and recorded media”.

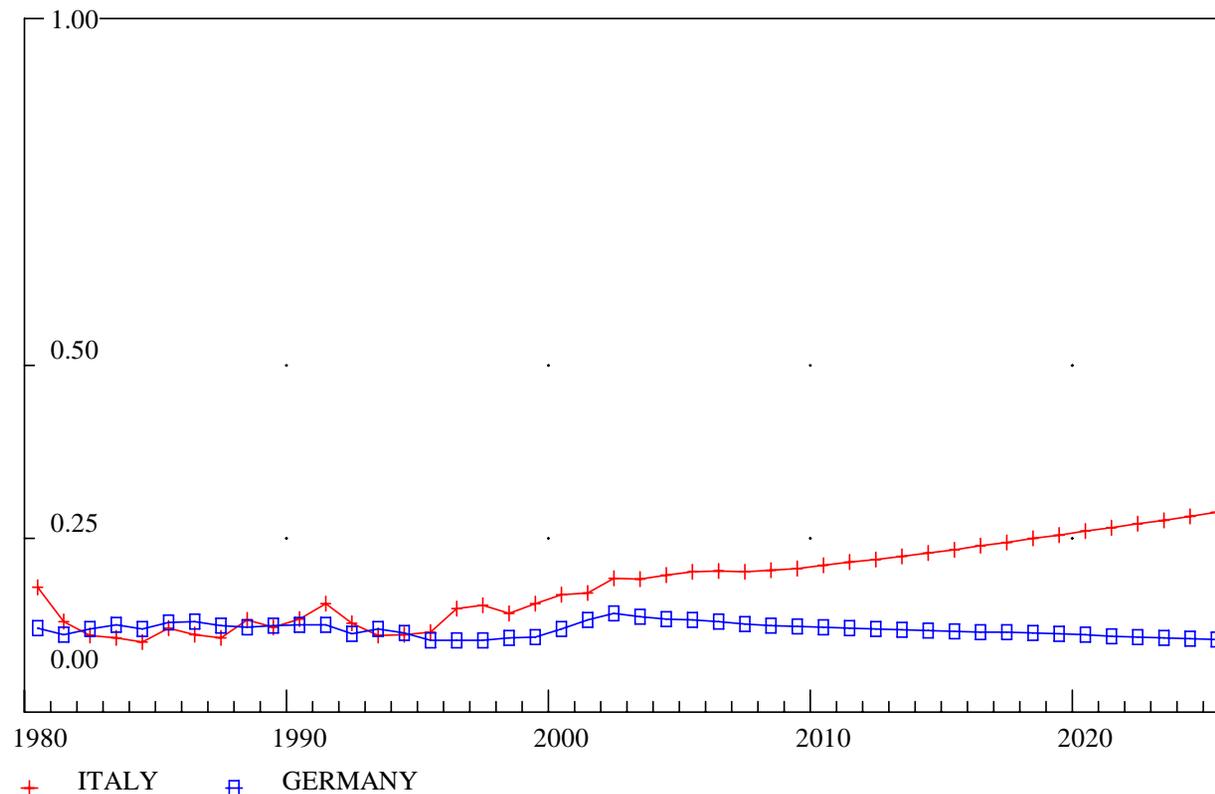
Is the assumption of a one-way dependency justified? The case of Austria

Figure 2 – The share of Austria on the Italian and German markets of Forestry products (CPA 02).



Is the assumption of a one-way dependency justified? The case of Austria

Figure 3 – The share of Austria on the Italian and German markets of Wood and Wood products (CPA 20).



Is the assumption of a one-way dependency justified? The case of Austria

From an Austrian perspective the shares of these commodity groups in total exports are quite low.

Another important aspect is that the production of forestry products and the production of wood and products of wood are primarily based on inputs produced in Austria, i.e. the total import content of these commodities is very low.

Any increase or decrease in exports of these commodities only will lead to a very small change in the import demand of Austria, which therefore can be neglected.

Is the assumption of a one-way dependency justified? The case of Austria

Table 2 **The most important commodity groups of Austrian exports 2001**

CPA	Share in total Austrian exports in %
29 Machinery and equipment n..c.	13,76
34 Motor vehicles, trailers and semi-trailers	13,40
24 Chemicals, chemical products	8,78
27 Basic metals	7,38
32 Radio, TV and communication equipment	6,70

Is the assumption of a one-way dependency justified? The case of Austria

The most important commodity groups of Austrian exports – machinery and vehicles – only play a little role seen from the perspective of the importing countries represented in the BTM system.

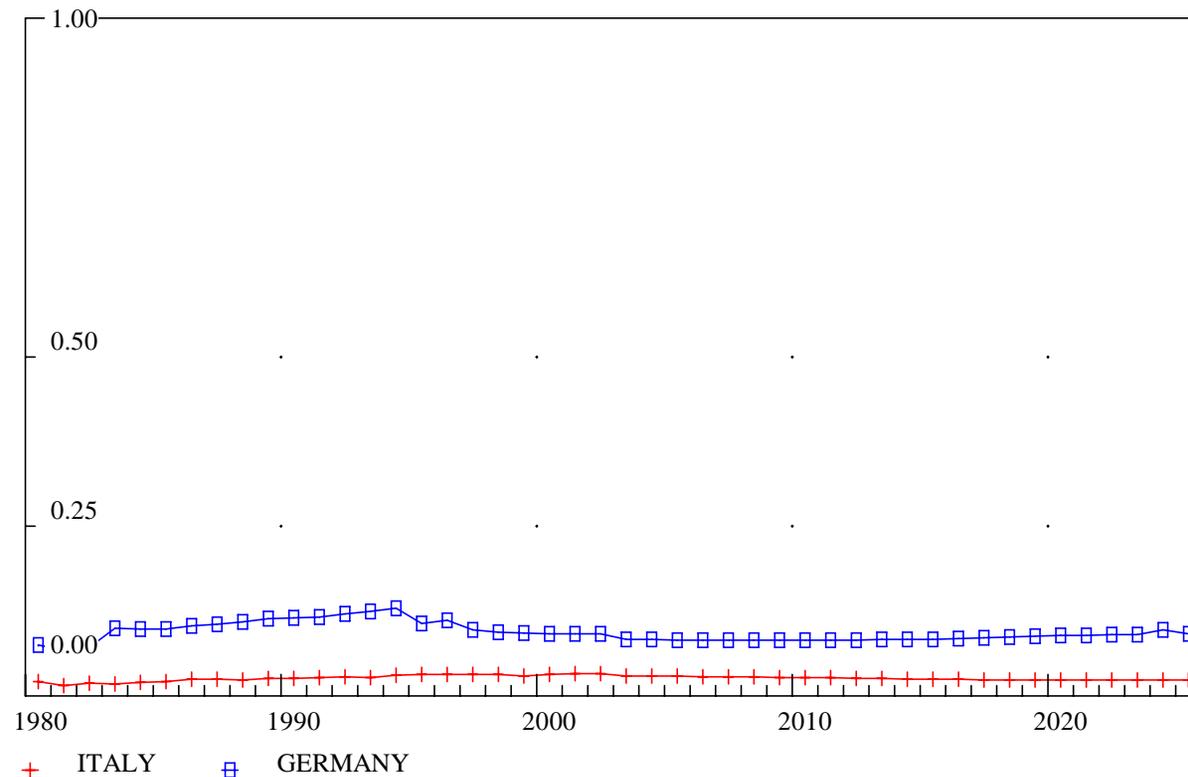
The production of these commodities in Austria relies on imported inputs considerably. Any change in the export performance of these commodities will thus – in reality – lead to a change in the Austrian import demand from countries represented in the BTM system.

The Austrian share in import demand of vehicles of the countries in the BTM system is quite low.

Some serious effects can result from the omission of feedback effects in the case of machinery.

Is the assumption of a one-way dependency justified? The case of Austria

Figure 4 – The share of Austria on the Italian and German markets of Machinery and Equipment (CPA 29).



Is the assumption of a one-way dependency justified?

The case of other small countries

The satellite approach can fruitfully be adopted for other small countries, like Estonia, Latvia, Poland as well as other new European Union member States, which are able to influence the global trade even less than Austria.

The following tables provide some empirical evidence taken from the bilateral trade database for the European Union.

Is the assumption of a one-way dependency justified? The case of Estonia

Table 3 – Estonian 5 most important export articles (by CPA, in % on total merchandise exports)

32	Radio, TV and communication equipment	26,0
20	Wood and products of wood	10,5
15	Food products and beverages	8,1
17	Textiles	6,9
18	Wearing apparel; furs	6,9
Total		58,4

Table 4 - Estonian market shares for its most important export articles in the BTM European countries (%). CPA 32 – Radio- TV and Telecommunication Equipment

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
at	0,001	0,000	0,000	0,001	0,003	0,000	0,001	0,016	0,041	0,005	0,003
be	0,000	0,000	0,000	0,012	0,000	0,000	0,005	0,002	0,029	0,007	0,018
de	0,001	0,010	0,017	0,009	0,085	0,213	0,040	0,150	0,222	0,199	0,105
dk	0,028	0,045	0,035	0,027	0,033	0,050	0,051	0,052	0,021	0,041	0,042
es	0,000	0,000	0,000	0,000	0,041	0,029	0,002	0,000	0,006	0,003	0,008
fr	0,000	0,000	0,004	0,002	0,000	0,004	0,005	0,003	0,039	0,002	0,000
gb	0,000	0,000	0,001	0,004	0,003	0,008	0,028	0,006	0,018	0,023	0,006
it	0,000	0,000	0,000	0,002	0,000	0,007	0,000	0,000	0,017	0,005	0,001

Is the assumption of a one-way dependency justified? The case of Poland

Table 5 – The 5 most important export articles in Poland, in 2000 (by CPA; % on total exports of merchandises)

34	Motor vehicles, trailers and semi-trailers	11,9
27	Basic metals	8,4
15	Food products and beverages	7,1
36	Furniture; other manufactured goods n.e.c.	7,0
17	Textiles	6,5
	Total	40,9

Table 6 - Polish market shares for its most important export articles in the BTM European countries (%). CPA 02 – Forestry

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
at	2,42	2,59	2,00	1,80	1,54	1,95	1,87	3,51	4,75	4,16	2,90
be	1,60	1,07	1,10	1,09	0,97	1,02	1,11	1,43	1,94	1,92	2,01
de	6,77	5,70	5,96	6,10	6,05	5,63	5,56	5,82	7,26	5,84	4,38
dk	3,06	1,85	1,73	2,02	2,08	1,75	2,12	2,40	3,13	3,25	3,76
es	0,33	0,45	0,59	0,47	0,81	1,19	1,04	1,54	1,61	1,32	1,60
fr	0,29	0,41	0,32	0,40	0,61	0,91	0,92	0,89	0,78	0,88	0,93
gb	0,45	0,10	0,26	0,17	0,17	0,19	0,16	0,21	0,35	0,43	0,50
it	0,80	1,13	1,12	1,20	1,23	1,22	0,98	0,91	1,01	0,83	0,95

Conclusions:

Can the satellite approach be justified?

From the perspective of the BTM system

The omission of feedback effects from countries of the size and the export structure of Austria seem to be quite acceptable.

The distortions of BTM results will be very small in size and limited to few commodity groups.

Conclusions:

Can the satellite approach be justified?

From the perspective of the national model

Justified if the model is used for a “standard forecasting exercise”. In such a situation the BTM results provide a perfect background scenario.

Limitations may occur in the case of policy simulations on the national level.

A whole range of very useful scenarios can be calculated without the necessity to run the entire system. The analysis of a shift in public expenditure from general government to health related public expenditures in Austria is a good example for such an exercise.

Conclusions:

Can the satellite approach be justified?

From the perspective of the national model

On the other hand, a policy simulation assuming effects on the prices of domestic production and thus changes in the competitive position of the various tradable commodities in the domestic and international markets cannot be carried out without considerable loss of consistency.

In such a simulation important feedback effects are ignored. Analyses of this type require a fully integrated system.

The evaluation of the EU enlargement effects on Italy with a stand-alone model and with the full system has clearly shown the shortcomings of a satellite approach for this kind of policy simulations.

Conclusions

Generally speaking the satellite approach is only acceptable if a clear asymmetry in the degree of dependency is given, if the country under consideration is heavily dependent on demand and prices from the rest of the world (as represented by the BTM) whereas the rest of the world is not dependent on the demand and the prices of the country under consideration.

This asymmetry or one-way-dependency has to exist on the level of all industries/commodity groups distinguished.

Conclusions

In any case the satellite status of a model always will not be more than a second best solution.

It can be suggested if feedback effects can be ignored like in the case of Austria and if the state of development of the model does not allow a full integration, i.e. if the price side of the model is missing and if the model does not produce investment and capital stock by industries.

Linking a model as a satellite thus seems to be a recommendable general strategy for models for small countries in an early stage of development.

Thank you for your attention