III Taller "La Modelización en el Sector Agropecuario"

Buenos Aires, 12 de noviembre de 2008

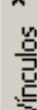# Modelización Sectorial para la Evaluación de Políticas Comerciales
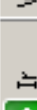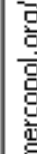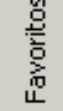
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INTA

OUTLINE

- Proyecto EUMercoPol
- Modelo CAPRI
- Modelización de Demanda
- Modelización de Oferta
- Escenarios
- Impactos Económicos

EUMercoPol - Microsoft Internet Explorer

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Dirección   http://www.eumercopol.org/   Ir

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Internet

Welcome to the EUMercoPol Project Web site

Analysis of the competitiveness of Mercosur's key agri-food sectors, comparison of policies and the ex-ante impacts of EU-Mercosur trade liberalisation.

European Commission
6th Framework Programme
Scientific Support to Policies
Specific Target Research Project

EUMERCOPOL

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What is CAPRI?

Common Agricultural Policy Regionalized Impact

- **EU-Agricultural sector model**
  - Coverage according to the European economic accounts of agriculture
  - EU is regionalised in 200 regions
  - Supply in each region represented through an aggregate programming model

- …in combination with **global trade model** for primary agricultural products
  - with bilateral trade flows (Armington approach)
  - with trade and domestic policy representation (detailed for EU, based on tariffs/TRQ's/PSE/CSE for other countries and country blocks)

Supply Model (EU)

- Objective function maximizes regional income

  Income = revenue from sales + premiums – purchases of input – nonlinear cost terms

- Constraints: arable/ grassland; set aside obligations; feeding requirements

- Policy coverage: premiums; set aside obligations; sales quotas

- Results: land allocation, production quantities, agricultural income, environmental indicators.

Interaction between supply and market module at EU-level

Markets
Multi-commodity spatial market model with 18 regional aggregates and all EU MS

Supply
200 Regional optimisation models

Perennial sub-module

Quantities

Prices

Iterations ⟶ Equilibrium
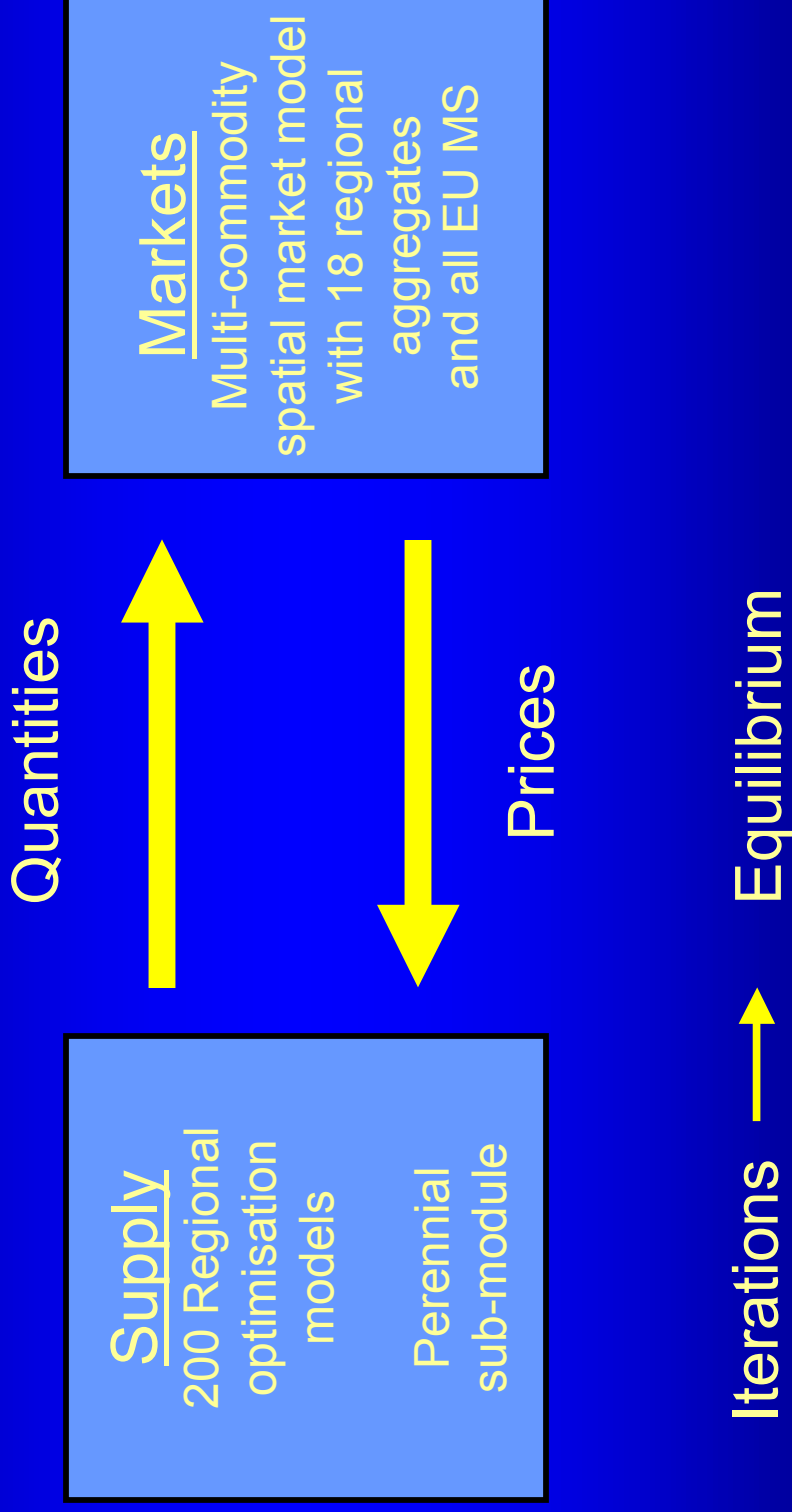
Overview on Market Model

- Multi-Commodity Model

  - More than one output market, but not general equilibrium, only agricultural commodities

  - Squared system of equations with unique solution: *no objective function*

  - Finds the set of prices/demand/supply where supply equals demand

Overview on Market Model

- Spatial system:
  - Bilateral trade flows (Armington approach)

- Synthetically parameterized behavioural functions based on microeconomic theory:
  - Supply
  - Feed demand   } normalised quadratic
  - Processing (milk and oilseeds)
  - Human consumption   generalised leontief

Functions and variables in market model

- Supply function

$$supply_{i,r} = as_{i,r} + \sum_j bs_{i,j,r} \frac{ppri_{j,r}}{p_{index.r}}$$

- Derived from normalised quadratic profit function
- as: constant term (adjusted in calibration)
- bs: slope term (adjusted in calibration)
- Supply determined by:
  - Own and cross prices
  - Price index

Functions and variables in market model

- Processing demand oilseeds

$$proc_{i,r} = ac_{i,r} + \sum_j bc_{i,j,r} \frac{procMarg_{j,r}}{p_{index.r}}$$

  – Derived from normalised quadratic profit function
  – *ac*: constant term
  – *bc*: slope term
  – *procMarg*: processing margin
  – Supply determined by:
    • Processing margin
    • Price index

Product and regional coverage in the Market Model

- Product coverage:
  - 46 primary and processed products
    - cereals, oilseeds, vegetables, permanent crops, pulses, potatoes, meat, dairy products, oils, oilcakes, eggs

- Regional coverage:
  - 18 trade blocks
    - EU10, EU15, Norway, Bulgaria and Rumania, Rest of Europe, USA, Canada, Mexico, **"*Mercosur+*"**, Rest of South America, India, China, Japan, Australia and New Zealand, Mediterranean Countries, LDC, ACP (non LDC), Rest of the World

Policy coverage in market model

- Policy coverage (what is technically implemented!)
  - Tariffs
    - ad valorem and specific
  - Tariff rate quotas
  - Export subsidies
  - Intervention purchases (EU)
  - PSEs/CSEs: policy induced price wedges for trade blocks other than EU

Policy coverage in market model

- Implemented bilateral agreements
  - EU - CEE
  - USA - CAN
  - EU - LDC
  - Cotonou Agreement: EU - ACP
    - Implemented as tariff reductions for beef and with respect to sugar import quotas

Two-Stage Armington in CAPRI

Demand (Arm1) =
Human consumption
+ Feed Use + Processing

Imports (Arm2)

Domestic Sales (DSales)

$$\text{Arm}_{i,r} = sp1_{i,r} \left[dp_{i,r,rw} \text{Imports}_{i,r}^{-\rho} + dp_{i,r,r} \text{DSales}_{i,r}^{-\rho} \right]^{-1/\rho}$$

Flows(R,R$_n$,XX)

...

Flows(R,R$_1$,XX)

$$\text{Imports}_{i,r} = sp2_{i,r} \left[\sum_{r1} dp_{i,r,r1} \text{Flows}_{i,r,r1}^{-\rho} \right]^{-1/\rho}$$

Main results

- Changes of prices, production, consumption at various levels, market balances

- Impact on Bilateral trade flows

- Welfare effects
  - agricultural income, consumer surplus, EU-budget

- EU: Acreages, herd sizes, yields, output and input use, agricultural income indicators per activity and region

- EU: Environmental indicators at regional level

Processing

- Processing from primary to secondary products is modelled explicitly for:
  - <u>Oilseeds</u>
  - <u>Milk</u>
- For other products, final demand includes the processed raw quantities (e.g. the consumption of cereals includes the processing to Pasta or beer)

MERCOSUR AMPLIADO

MATRIX OF HUMAN DEMAND ELASTICITIES

	SUG	WHT	MAIZE	RICE	SOYB	BEEF	CHICK	Dairy products	APPLE	INCOME
SUG	X									X
WHT		X	X	X	X	X	X			X
MAIZE			X	X	X	X	X			X
RICE				X	X	X	X			X
SOYB					X	X	X	X		X
BEEF							X	X		X
CHICK								X		X
Dairy products								X		
APPLE									X	X

MERCOSUR AMPLIADO

MATRIX OF SUPPLY ELASTICITIES

	SUG	WHT	MAIZE	RICE	SOYB	BEEF	CHICK	MILK	APPLE
SUG	X								
WHT		X	X	BR	X	X		X	
MAIZE			X		X	X	X	X	
RICE				X	BR	UY		BR	
SOYB					X	X	X	X	
BEEF						X		X	
CHICK							X		
MILK								X	
APPLES									X

ECONOMETRIC ESTIMATION OF FOOD DEMAND ELASTICITIES FROM HOUSEHOLD SURVEYS IN ARGENTINA, PARAGUAY AND BOLIVIA

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Objetivos del trabajo

- Presentar los resultados sobre Elasticidades precio e ingreso obtenidas con el sistema de demanda LINQUAD (un sistema de demanda incompleto que es lineal en ingreso y lineal y cuadrático en precios)

- Efectuar algunos comentarios teóricos y metodológicos.

Organización del trabajo

- **En la primera parte se repasan:**
  - Aspectos teóricos
  - Las exigencias impuestas por la teoría microeconómica
  - Las propiedades y limitaciones del sistema analizado (LINQUAD).

- **En la segunda se presentan:**
  - Los datos utilizados y la metodología aplicada
  - Los resultados
  - Algunos comentarios acerca de las estimaciones

Estimación de funciones de demanda

- A partir de maximizar una función de utilidad sujeto a la restricción presupuestaria

- A partir de una función de costos o mínimo gasto – aplicando la teoría de la dualidad-

- ¿Un sistema de demandas?
  - ¿Completo o incompleto?
  - Separabilidad de la función de utilidad (demandas condicionales)

El sistema LINQUAD

- Las demandas cumplen todas las propiedades a excepción de la de "aditividad". Esta condición establece que el gasto total en los bienes de interés debe ser menor al ingreso, pero las demandas de cada uno de los bienes de no interés no podrán ser distinguidas (Agnew, 1998). Lafrance y Hanemann (1989) *"cuasi-integrabilidad"*.

El sistema LINQUAD

- El vínculo teórico entre los sistemas completos e incompletos de demanda es alcanzado mediante la creación de una mercancía compuesta que comprende todos los bienes de no interés

$$s = q'z = y - p'(x^M(p,q,y)) \qquad (1)$$

El sistema LINQUAD

- Agnew (1998) Ecuaciones de demanda consistentes con el concepto de cuasi-integrabilidad, lineales con respecto al ingreso deflactado y lineales y cuadráticas respecto a los precios deflactados, a partir de la función de cuasi-gasto:

$$\varepsilon\left[p,q,\theta(q,u)\right]=\sum_{k=1}^{K}\alpha(q)_k\,p_k+\frac{1}{2}\sum_{j=1}^{K}\sum_{k=1}^{K}\beta_{jk}p_jp_k+\theta(q,u)e^{\gamma_p} \qquad (2)$$

- Se obtienen las K ecuaciones de demanda Marshallianas para el modelo LINQUAD original:

$$q_i=\alpha(q)_i+\sum_{k=1}^{K}\beta_{ik}p_k+\gamma\left[y-\sum_{k=1}^{K}\alpha(q)_k\,p_k-\frac{1}{2}\sum_{j=1}^{K}\sum_{k=1}^{K}\beta_{jk}p_jp_k\right] \qquad (3)$$

Metodología

- Ajuste de los precios por "efectos calidad" (Cox y Wohlgenant, 1986)

  – Los precios ajustados reflejan la variación no explicada. Las variables incluidas para explicar las diferencias en calidad de los precios implícitos fueron: el tamaño del hogar, la región geográfica, el nivel de educación del jefe del hogar, el quintil de ingresos al que pertenece el hogar, el sexo del jefe del hogar y la proporción del gasto en alimentos de cada hogar realizado en hipermercado.

  – Si gasto = 0, p aj = intercepto; si gasto > 0, p aj = intercepto + residuo

- Corrección del sesgo por variables censuradas en dos etapas.

  – Estimación de la probabilidad de consumo de cada hogar en cada grupo de alimentos (Modelo Probit)

  – Procedimiento de Shonkwiller y Yen (1999). Multiplica las variables explicativas por la función de distribución normal acumulada y se agrega como una nueva variable explicativa la densidad probabilística de la distribución normal.

Modelo Estimado

- Primera Etapa: En el modelo Probit $X_i\beta$ se definió

$$X_i\beta = \beta_0 + \beta_1 Dalto_i + \beta_2 Dbajo_i + \beta_3 Sexo_i + \beta_4 Dr1_i + \beta_5 Dr3_i + \beta_6 Dr4_i + \beta_7 Dr5_i +$$
$$+ \beta_8 Dr6_i + \beta_9 I + \beta_{10} Edad + \beta_{11} May65 + \beta_{12} Men14 + \beta_{13} Tamhog + \beta_{14} I^2 +$$
$$+ \beta_{15} I * Tamhog$$

- Segunda Etapa: La ecuación del LINQUAD modificada:

$$e_i = \Phi(Z_{it}, \nu_i) p_i \left\{ \alpha_i + \sum_{k=1}^{K} \beta_{ik} P_k + \gamma \left[I - \sum_{k=1}^{K} \alpha_k P_k - \frac{1}{2} \sum_{j=1}^{K} \sum_{k=1}^{K} \beta_{Jk} P_J P_k \right] \right\} + \delta_i \phi(Z_{it}, \nu_i) + \xi_{it}$$

- Todos los precios son precios deflactados. El deflactor es el índice de precios correspondiente a los capítulos de gasto que no son alimento del período analizado, ponderado de acuerdo a la participación de cada capítulo en el gasto total de cada hogar.

Datos

- Argentina: Encuesta Nacional de Gastos de Hogares 1996-1997

- 27260 hogares

- Los consumos fueron calculados en términos de cantidades homogéneas: kg del producto básico

Productos

- Dairy Products: Cheese, yoghurt, butter.
- Milk: Fluid milk and powder milk
- Beef A: High and medium quality beef.
- Beef B: Low quality beef
- Sweets: Candies, marmalades, chocolate.
- Chicken: Chicken
- Wheat: Wheat flour, pasta, pizza, bread, cookies.
- Rice: Rice
- Sugar: Sugar
- Apple: Apples
- Oil: Vegetal oil.

Paraguay

- Encuesta Integrada de Hogares 2000-2001
- Dirección General de Estadística, Encuestas y Censos (DGEEC)
- Hogares rurales y urbanos
- 2682 hogares

Productos

- Maize: corn, corn flour.
- Milk: Fluid milk and powder milk, cheese, yoghurt, butter.
- Beef A: High quality beef.
- Beef B: Medium quality beef
- Beef C: Low quality beef.
- Chicken: Chicken
- Wheat: Wheat flour, pasta, pizza, bread, cookies.
- Rice: Rice
- Sugar: Sugar and brown sugar
- Apple: Apples
- Oil: Vegetal oil.

Bolivia

- Encuesta Contínua de Hogares de Bolivia 2003-2004

- Instituto Nacional de Estadística (INE)

- Hogares rurales y urbanos

- 9770 hogares en total

- 2983 utilizados en la estimación

Productos

- Maize: corn, corn flour, corn flakes.
- Milk: fluid milk, powder milk, milk cream, cheese, yoghurt, butter.
- Beef A: high quality beef.
- Beef B: medium quality beef
- Beef C: low quality beef.
- Chicken: chicken
- Wheat: wheat flour, pasta, pizza, bread, cookies.
- Rice: rice
- Sugar: sugar
- Apple: Apples
- Oil: Vegetal oil (sunflower, almond, soybean, olive).

Estimación

- Primer etapa: para cada producto se estimaron regresiones tipo probit para determinar la probabilidad de compra

- Segunda etapa: estimación de los sistemas de demanda utilizando el método "Iterative Seemingly Unrelated Regression" controlando por censura y precios ajustados (en el caso de Argentina)

- Cálculo de las elasticidades a partir de los parámetros estimados

ARGENTINA

ARGENTINA: PRICE AND INCOME DEMAND ELASTICITIES ESTIMATED AT THE MEAN VALUES OF PRICES, QUANTITIES AND EXPENDITURE (STANDARD ERRORS COMPUTED BY THE DELTA METHOD)

	DAIRY PRODUCTS	MILK	BEEF_A	BEEF_B	SWEETS	CHICKEN	WHEAT	RICE	SUGAR	APPLE	OIL	INCOME
DAIRY PRODUCTS E1_	-0.7667 0.0113 -67.70	0.0062 0.0078 0.80	0.0976 0.0129 7.56	0.0515 0.0112 4.61	-0.0067 0.0035 -1.63	0.0418 0.0110 3.78	0.0979 0.0083 11.84	0.0234 0.0044 5.31	0.0190 0.0052 3.61	-0.0103 0.0058 -1.79	0.0369 0.0062 5.94	0.2910 0.0051 57.18
MILK E2_	0.0135 0.0106 1.27	-0.4841 0.0403 -12.02	0.1443 0.0204 7.09	0.0050 0.0165 0.30	-0.0038 0.0042 -0.90	0.0481 0.0025 19.53	0.0318 0.0117 2.72	-0.0010 0.0092 -0.11	-0.0280 0.0112 -2.49	0.0276 0.0111 2.49	-0.0156 0.0098 -1.60	0.1325 0.0051 25.88
BEEF_A E3_	0.0977 0.0115 8.49	0.0950 0.0133 7.16	-0.1744 0.0476 -3.67	0.0233 0.0174 1.34	-0.0067 0.0050 -1.32	0.0027 0.0157 0.17	0.0180 0.0122 1.47	0.0163 0.0086 1.90	-0.0039 0.0102 -0.38	0.0042 0.0094 0.45	-0.0073 0.0104 -0.70	0.2049 0.0066 31.23
BEEF_B E4_	0.0506 0.0088 5.72	0.0034 0.0096 0.35	0.0196 0.0154 1.27	-0.2474 0.0364 -6.80	0.0020 0.0148 0.13	0.0190 0.0137 1.39	-0.0500 0.0105 -4.78	-0.0315 0.0056 -5.65	-0.0305 0.0064 -4.77	0.0164 0.0064 2.55	-0.0119 0.0073 -1.62	0.2159 0.0061 35.13
SWEETS E5_	-0.0045 0.0023 -1.96	-0.0027 0.0020 -1.36	-0.0076 0.0036 -2.07	-0.0013 0.0036 -0.37	-1.0107 0.0159 -63.51	0.0002 0.0031 0.07	-0.0007 0.0023 -0.32	-0.0004 0.0014 -0.30	-0.0032 0.0014 -2.24	-0.0016 0.0012 -1.27	-0.0006 0.0019 -0.29	0.0527 0.0016 32.36
CHICKEN E6_	0.0473 0.0115 4.11	0.0361 0.0117 3.08	0.0001 0.0183 0.01	0.0223 0.0180 1.24	0.0020 0.0050 0.40	-0.5893 0.0520 -11.33	0.0055 0.0117 0.47	0.0017 0.0079 0.22	-0.0115 0.0091 -1.26	0.0040 0.0072 0.55	0.0235 0.0093 2.53	0.1468 0.0063 23.38
WHEAT E7_	0.0676 0.0051 13.36	0.0151 0.0052 2.88	0.0129 0.0084 1.54	-0.0373 0.0081 -4.60	0.0019 0.0022 0.89	0.0053 0.0069 0.76	-0.2373 0.0198 -11.97	0.0183 0.0034 5.34	-0.0052 0.0038 -1.34	0.0099 0.0033 3.04	-0.0103 0.0042 -2.44	0.1305 0.0034 38.15
RICE E8_	0.0934 0.0170 5.50	-0.0031 0.0259 -0.12	0.0683 0.0369 1.85	-0.1545 0.0271 -5.71	-0.0012 0.0081 -0.14	0.0065 0.0292 0.22	0.1126 0.0215 5.24	-0.2413 0.0816 -2.96	-0.0543 0.0278 -1.96	0.0617 0.0241 2.56	0.0202 0.0203 1.00	0.1064 0.0093 11.40
SUGAR E9_	0.0923 0.0222 4.16	-0.0846 0.0347 -2.43	-0.0157 0.0483 -0.33	-0.1589 0.0343 -4.64	-0.0167 0.0092 -1.80	-0.0431 0.0371 -1.16	-0.0337 0.0265 -1.27	-0.0590 0.0305 -1.93	0.0883 0.1016 0.87	-0.0018 0.0356 -0.05	-0.0811 0.0269 -3.02	0.1668 0.0124 13.40
APPLE E10_	-0.0341 0.0190 -1.79	0.0647 0.0268 2.41	0.0092 0.0348 0.26	0.0618 0.0269 2.30	-0.0075 0.0064 -1.17	0.0106 0.0228 0.47	0.0468 0.0176 2.66	0.0525 0.0207 2.54	-0.0030 0.0278 -0.11	-0.1016 0.0797 -1.27	0.0472 0.0166 2.85	0.1557 0.0078 19.86
OIL E11_	0.0940 0.0153 6.15	-0.0291 0.0176 -1.65	-0.0244 0.0288 -0.85	-0.0410 0.0229 -1.79	-0.0006 0.0073 -0.08	0.0549 0.0219 2.51	-0.0460 0.0170 -2.70	0.0128 0.0130 0.99	-0.0484 0.0157 -3.09	0.0357 0.0124 2.89	-0.4521 0.0649 -6.97	0.1625 0.0070 23.22

PARAGUAY

PARAGUAY: PRICE AND INCOME DEMAND ELASTICITIES ESTIMATED AT THE MEAN VALUES OF PRICES, QUANTITIES AND EXPENDITURE (STANDARD ERRORS COMPUTED BY THE DELTA METHOD)

	MAIZE	DAIRY PRODUCTS	BEEF_A	BEEF_B	BEEF_C	CHICKEN	WHEAT	RICE	SUGAR	APPLE	OIL	INCOME
MAIZE	-0.9826	-0.2292	-0.2342	-0.2975	0.0132	0.1440	-0.0215	-0.0302	0.0930	-0.0086	-0.0694	0.1063
E1_	0.0670	0.0608	0.1594	0.1157	0.0055	0.0880	0.0433	0.0287	0.0306	0.0437	0.0206	0.0248
	-14.66	-3.77	-1.47	-2.57	2.39	1.64	-0.50	-1.05	3.04	-0.20	-3.37	4.29
DAIRY PRODUCTS	-0.0668	-0.3153	-0.0389	-0.0974	-0.0007	-0.1207	0.0133	-0.0341	-0.0003	0.0369	-0.0235	0.2048
E2_	0.0179	0.0878	0.0468	0.0313	0.0024	0.0215	0.0133	0.0076	0.0078	0.0113	0.0062	0.0097
	-3.74	-3.59	-0.83	-3.12	-0.31	-5.60	1.00	-4.47	-0.04	3.26	-3.77	21.20
BEEF_A	-0.2161	-0.1171	5.1471	-0.6337	0.0321	0.1811	0.2617	0.0964	0.0533	-0.1941	-0.1767	0.1571
E3_	0.1480	0.1475	0.9225	0.3260	0.0232	0.2255	0.0660	0.1018	0.1159	0.1494	0.0470	0.0205
	-1.46	-0.79	5.58	-1.94	1.38	0.80	3.97	0.95	0.46	-1.30	-3.76	7.65
BEEF_B	-0.1086	-0.1205	-0.2534	-0.3308	-0.0046	-0.0709	0.0071	0.0067	-0.0340	0.0125	0.0108	0.2455
E4_	0.0427	0.0391	0.1294	0.3107	0.0555	0.0659	0.0232	0.0240	0.0262	0.0361	0.0170	0.0130
	-2.55	-3.08	-1.96	-1.06	-0.08	-1.08	0.31	0.28	-1.30	0.35	0.64	18.95
BEEF_C	0.0070	0.0093	0.0163	0.0046	0.1044	0.0020	0.0082	0.0011	0.0003	0.0077	0.0001	0.0292
E5_	0.0022	0.0032	0.0101	0.0031	0.2371	0.0014	0.0039	0.0005	0.0005	0.0016	0.0005	0.0160
	3.14	2.93	1.60	1.48	0.44	1.44	2.13	2.51	0.71	4.89	0.21	1.82
CHICKEN	0.0913	-0.2491	0.1224	-0.1144	-0.0002	0.7995	-0.1277	0.0090	0.0282	0.0577	0.0639	0.1061
E6_	0.0549	0.0539	0.1516	0.1117	0.0021	0.4182	0.0341	0.0284	0.0301	0.0456	0.0184	0.0204
	1.66	-4.62	0.81	-1.02	-0.07	1.91	-3.74	0.32	0.94	1.27	3.47	5.21
WHEAT	-0.0094	0.0298	0.1473	0.0144	0.0012	-0.1102	0.2764	-0.0189	-0.0207	0.0426	-0.0204	0.2776
E7_	0.0227	0.0238	0.0374	0.0331	0.0051	0.0286	0.1452	0.0077	0.0084	0.0104	0.0061	0.0167
	-0.41	1.25	3.93	0.44	0.22	-3.85	1.90	-2.46	-2.47	4.11	-3.33	16.66
RICE	-0.0564	-0.2137	0.1998	0.0419	0.0037	0.0285	-0.0641	-0.0820	-0.1570	0.0267	0.0273	0.0669
E8_	0.0549	0.0496	0.2097	0.1246	0.0021	0.0869	0.0280	0.5517	0.0559	0.0776	0.0213	0.0174
	-1.03	-4.31	0.95	0.34	1.76	0.33	-2.29	-0.15	-2.81	0.34	1.28	3.83
SUGAR	0.1518	0.0093	0.0948	-0.1383	0.0011	0.0749	-0.0556	-0.1320	-0.2084	-0.1310	0.0796	0.0378
E9_	0.0493	0.0430	0.2012	0.1146	0.0017	0.0777	0.0257	0.0471	0.4789	0.0882	0.0202	0.0167
	3.08	0.22	0.47	-1.21	0.61	0.96	-2.17	-2.80	-0.44	-1.49	3.95	2.26
APPLE	-0.0170	0.2672	-0.4416	0.0735	0.0336	0.1930	0.1702	0.0286	-0.1731	-0.1940	-0.0860	0.1804
E10_	0.0921	0.0809	0.3394	0.2062	0.0082	0.1540	0.0415	0.0856	0.1154	0.9810	0.0376	0.0212
	-0.18	3.30	-1.30	0.36	4.10	1.25	4.10	0.33	-1.50	-0.20	-2.29	8.51
OIL	-0.1026	-0.1119	-0.2833	0.0512	-0.0001	0.1545	-0.0528	0.0216	0.0739	-0.0602	-0.1524	0.0372
E11_	0.0308	0.0317	0.0759	0.0690	0.0020	0.0440	0.0176	0.0167	0.0187	0.0267	0.5212	0.0116
	-3.34	-3.52	-3.73	0.74	-0.07	3.51	-2.99	1.29	3.95	-2.25	-0.29	3.22

BOLIVIA

TABLE III   BOLIVIA: PRICE AND INCOME DEMAND ELASTICITIES ESTIMATED AT THE MEAN VALUES OF PRICES, QUANTITIES AND EXPENDITURE (STANDARD ERRORS COMPUTED BY THE DELTA METHOD)

	MAIZE	DAIRY PRODUCTS	BEEF_A	BEEF_B	BEEF_C	CHICKEN	WHEAT	RICE	SUGAR	APPLE	OIL	INCOME
MAIZE	-4.4831	0.0605	2.1921	0.1181	0.4016	-0.5007	0.3958	0.7154	0.1622	1.4207	-0.2785	-0.0002
E_1_	0.2677	0.0972	0.3839	0.2569	0.2142	0.3253	0.0813	0.1356	0.0890	0.1523	0.1290	0.0449
	-16.74	0.62	5.71	0.46	1.88	-1.54	4.87	5.28	1.82	9.33	-2.16	0.00
DAIRY PRODUCTS	0.0617	-0.1926	-0.2276	0.0224	0.0236	-0.0124	-0.0386	-0.1000	-0.0741	0.0006	-0.0675	0.1521
E_2_	0.1049	0.3687	0.1077	0.0641	0.0815	0.0629	0.0359	0.0616	0.0337	0.0320	0.0563	0.0157
	0.59	-0.52	-2.11	0.35	0.29	-0.20	-1.08	-1.62	-2.20	0.02	-1.20	9.69
BEEF_A	1.6343	-0.1661	1.3776	0.0418	-0.6787	0.4444	0.2766	-0.4370	-0.2070	0.4016	-0.5114	0.2360
E_3_	0.2875	0.0746	1.2260	0.2472	0.2906	0.3806	0.1077	0.2335	0.1491	0.1363	0.2381	0.0283
	5.69	-2.23	1.12	0.17	-2.34	1.17	2.57	-1.87	-1.39	2.95	-2.15	8.33
BEEF_B	0.1798	0.0276	0.0884	-6.3461	-0.2105	0.6159	0.9503	0.5096	0.4831	-0.2891	-0.4672	0.1447
E_4_	0.3991	0.0922	0.5130	2.0507	1.3585	0.6467	0.1473	0.4161	0.3539	0.4689	0.5152	0.0451
	0.45	0.30	0.17	-3.09	-0.15	0.95	6.45	1.22	1.36	-0.62	-0.91	3.21
BEEF_C	0.2579	0.0149	-0.5773	-0.0848	-3.3557	-0.7393	-0.3579	-1.0716	-0.1714	0.0043	-0.5199	0.1368
E_5_	0.1393	0.0491	0.2526	0.1907	0.9221	0.2806	0.0743	0.1497	0.0942	0.1231	0.1460	0.0237
	1.85	0.30	-2.29	-0.44	-3.64	-2.64	-4.82	-7.16	-1.82	0.03	-3.56	5.76
CHICKEN	-0.3362	-0.0098	0.4002	0.2650	-0.7608	-3.4796	-0.0772	-0.6483	-0.2980	0.1492	-0.4502	0.1196
E_6_	0.2165	0.0703	0.3383	0.2772	0.2872	0.8884	0.1102	0.2253	0.1435	0.1708	0.2282	0.0272
	-1.55	-0.14	1.18	0.96	-2.65	-3.92	-0.70	-2.88	-2.08	0.87	-1.97	4.39
WHEAT	0.2458	-0.0196	0.2449	0.3870	-0.3412	-0.0670	-0.5850	0.1254	0.1096	0.0984	-0.0231	0.0873
E_7_	0.0509	0.0208	0.0902	0.0594	0.0714	0.1037	0.2777	0.0507	0.0300	0.0348	0.0471	0.0099
	4.83	-0.94	2.72	6.52	-4.78	-0.65	-2.11	2.47	3.65	2.83	-0.49	8.77
RICE	1.0827	-0.1387	-0.8760	0.5001	-2.4958	-1.4729	0.3025	-10.5365	-2.1507	-0.4190	-1.2413	0.0745
E_8_	0.2057	0.0865	0.4731	0.4062	0.3490	0.5131	0.1229	1.1850	0.2241	0.2760	0.3324	0.0453
	5.26	-1.60	-1.85	1.23	-7.15	-2.87	2.46	-8.89	-9.60	-1.52	-3.73	1.64
SUGAR	0.4353	-0.1806	-0.7376	0.8340	-0.7006	-1.1958	0.4728	-3.7972	-1.6386	-0.0559	-1.8081	-0.0415
E_9_	0.2382	0.0837	0.5336	0.6103	0.3878	0.5772	0.1286	0.3958	1.5368	0.3967	0.5317	0.0486
	1.83	-2.16	-1.38	1.37	-1.81	-2.07	3.68	-9.59	-1.07	-0.14	-3.40	-0.85
APPLE	6.2516	0.0105	2.3878	-0.8124	0.0407	0.9993	0.6971	-1.2143	-0.0935	-19.2506	-2.2631	0.0808
E_{10}_	0.6704	0.1300	0.8015	1.3293	0.8332	1.1300	0.2448	0.8013	0.6522	3.5757	0.9736	0.0493
	9.33	0.08	2.98	-0.61	0.05	0.88	2.85	-1.52	-0.14	-5.38	-2.32	1.64
OIL	-0.4639	-0.1028	-1.1480	-0.5044	-1.3345	-1.1322	-0.0569	-1.3695	-1.1299	-0.8593	-15.2128	-0.0944
E_{11}_	0.2160	0.0874	0.5326	0.5555	0.3758	0.5740	0.1259	0.3671	0.3324	0.3703	1.6607	0.0520
	-2.15	-1.18	-2.16	-0.91	-3.55	-1.97	-0.45	-3.73	-3.40	-2.32	-9.22	-1.82

Table IX. Average Income and Expenditure Shares in the sample

Food Product	Income Share			Expenditure Share		
	Argentina	Paraguay	Bolivia	Argentina	Paraguay	Bolivia
Maize	-	0.78%	0.06%	-	0.80%	0.09%
Dairy Products	1.44%	0	0	1.81%	-	-
Milk	1.28%	4.08%	0.73%	1.60%	4.22%	1.14%
Beef A	2.31%	0.18%	0.62%	2.89%	0.19%	0.96%
Beef B	2.66%	2.75%	0.24%	3.33%	2.85%	0.37%
Beef C	-	2.36%	1.79%	-	2.44%	2.79%
Sweets	0.51%	-	-	0.64%	-	-
Chicken	1.33%	1.82%	0.77%	1.67%	1.88%	1.19%
Wheat	4.13%	4.35%	3.23%	5.17%	4.50%	5.02%
Rice	0.27%	0.64%	0.37%	0.34%	0.67%	0.58%
Sugar	0.28%	0.82%	0.23%	0.34%	0.84%	0.58%
Apple	0.38%	0.31%	0.06%	0.47%	0.33%	0.09%
Oil	0.48%	0.80%	0.27%	0.60%	0.83%	0.43%
Total	15.07%	18.11%	8.31%	18.86%	18.75%	13.15%

Comentarios Finales

- Los resultados presentados son una aproximación al análisis de consumo de alimentos en el Cono Sur.

- Sería interesante en futuras investigaciones generar estimaciones utilizando otras definiciones de productos y calidades.

- Finalmente, la especificación del modelo podría incluir otros productos y calidades además de controlar por diferencias socio demográficas en la muestra.

SUPPLY ELASTICITIES FOR SELECTED COMMODITIES IN MERCOSUR AND BOLIVIA

Víctor Brescia

Daniel Lema

Methodology

- *Partial Adjustment, Cointegration and Error Correction Models and the Dynamic Panel Data* approaches were used.

- Depending on the data availability and the ability to represent the technological and economic scenarios.

ARGENTINA

- Commodity: WHEAT
- Series lenght:1961/62 – 2004/05
- Data file: SERIES_ARGENTINA_FAO
- Procedure: VAR + ECM
- Commodity: **MAIZE**
- Series lenght:
- Data file: SERIES_ARGENTINA_FAO
- Procedure: VAR + ECM
- Commodity: **SOYBEANS**
- Series lenght:
- Data file: SERIES_ARGENTINA_FAO
- Procedure: NERLOVE / Partial Adjustment
- Commodity: POULTRY
- Series lenght:
- Data file: SAGPYA-CEPA
- Procedure: Supply-Demand Simultaneous Equations (3SLS)

URUGUAY

- Commodity: **WHEAT**
- Series lenght: 1975 – 2005
- Data file: SERIES_URUGUAY_FAO
- Procedure: NERLOVE / Partial Adjustment
- Commodity: **SOYBEANS**
- Series lenght: 1975 – 2005
- Data file: SERIES_URUGUAY_FAO
- Procedure: VAR + ECM

BRASIL

- Commodity: **WHEAT**
- Series lenght: Febr. 1990 – Jan. 2006
- Data file: SERIES_BRASIL_FAO
- Procedure: Panel data (Arellano-Bond). Five states: Mato Grosso do Sul, Paraná, R.G. do Sul, Santa Catarina and Tocantis.

- Commodity: **MAIZE**
- Series lenght:
- Data file: SERIES_BRASIL_FAO
- Procedure: Panel data/ Fixed-effects

BOLIVIA

- Commodity: **MAIZE**
- Series lenght: 1961-2004
- Data file: SERIES_BOLIVIA_FAO
- Procedure: NERLOVE / Partial Adjustment
- Commodity: **SOYBEANS**
- Series lenght: 1961-2004
- Data file: SERIES_BOLIVIA_FAO
- Procedure: NERLOVE / Partial Adjustment

PARAGUAY

- Commodity: **MAIZE**
- Series lenght: 1961-2004
- Data file: SERIES_PARAGUAY_FAO
- Procedure: NERLOVE / Partial Adjustment
- Commodity: **SOYBEANS**
- Series lenght: 1961-2004
- Data file: SERIES_PARAGUAY_FAO
- Procedure: NERLOVE / Partial Adjustment

ARGENTINA: SUPPLY ELASTICITIES

	SUG	WHT	MAIZE	RICE	SOYB	BEEF	CHICK	MILK	APPLES
WHT		0.429			-0.260	-0.365			
MAIZE			1.305						
SOYB			-0.526		0.582				

POULTRY

SUPPLY ELASTICITY	0.23
PRICE FLEXIBILITY	0.90
DEMAND ELASTICITY	1.11

BOLIVIA: SUPPLY ELASTICITIES

	SUG	WHT	MAIZE	RICE	SOYB	BEEF	CHICK	MILK	APPLES
MAIZE		-0.450	0.620						
SOYB		-2.640			6.820				

BRAZIL: SUPPLY ELASTICITIES

	SUG	WHT	MAIZE	RICE	SOYB	BEEF	CHICK	MILK	APPLES
WHT		0.860			-0.900				
MAIZE			0.280		-0.450				

PARAGUAY: SUPPLY ELASTICITIES

	SUG	WHT	MAIZE	RICE	SOYB	BEEF	CHICK	MILK	APPLES
MAIZE		-0.890	1.270						
SOYB		-2.870			2.160				

URUGUAY: SUPPLY ELASTICITIES

	SUG	WHT	MAIZE	RICE	SOYB	BEEF	CHICK	MILK	APPLES
WHT		1.240							
SOYB				-3.78	1.580				

ESCENARIOS

REFERENCE SCENARIO AND BASELINE

- In the reference scenario the CAP reform of 2003 is implemented as it would be in 2013.

- It includes the currently most plausible implementation of decoupling and payment scheme options (single farm payments, regional uniform payments or hybrid forms) for the different EU Member States

- And EU preferential trade preferences with e.g. Mercosur countries, Chile, the least developed countries (EBA initiative: duty and quota free access) as well as African, Caribbean and Pacific countries under the Cotonou agreements.

- It comprises specific and ad-valorem tariffs as currently applied by the different WTO members.

Bilateral Partial Liberalisation

- ## Scenario 1: EU proposal

- The EU proposal for a bilateral liberalisation between the EU and the Mercosur countries differentiates between three different groups of products.

- Each group undertakes different grades of liberalisation. Products not mentioned in these groups remain as before.

Table 8 : Product classification according to the EU proposal

	Measure	Products
Group I	Full liberalisation within ten years	Eggs
		Barley
Group II	50 % reduction in import tariffs over ten years	Olive oil
		Broken rice
Group III	Additional TRQs. tariff 50 % of WTO bound in-quota tariff	Maize
		Wheat
		Rice
		Cheese
		Butter
		SMIP & WMIP
		Beef
		Poultry
		Pork meat

Source: USDA, 2005

Scenario 2: Mercosur proposal

- The Mercosur countries have proposed a non-paper to the EU which contains the main trade liberalisation issues the Mercosur countries have against the EU25.

- The TRQs of the EU bilateral to the Mercosur countries is to be increased for the following products and height.

- All quotas are duty free. The additional quota is distributed among the Mercosur countries as done in the EU proposal to ensure comparability among the partial liberalisation scenarios.

- Also, out quota tariffs are the same as before. Mercosur proposal includes by far higher quota extensions than the European proposal

Table 10: Distribution of the additional TRQ quantities among the Mercosur countries

Mercosur proposal	MAIZ	BEEF	PORK	SGMT	POUM	RICE	WHEA
ARG	2915.73	56.39		2.27	5.02		991.45
BRA	478.37	160.56	20.00		244.98		4.96
URU	2.31	65.29		17.73		90.04	3.59
PAR	103.59	17.76					
Total	3500.00	300.00	20.00	20.00	250.00	90.04	1000.00

Source: Own calculations

All other agricultural products, not mentioned above, should be liberalised with duty free unlimited TRQs. For processed agricultural products. Mercosur proposed full reciprocal liberalisation.

Scenario 3: Bilateral Partial EU Liberalisation + G-20 WTO-Proposal

- The assumptions of the partial EU liberalisation are combined with the WTO Proposal, also called the G-20 Proposal.

- The G-20 Proposal contains the following assumptions: Products are differentiated in sensitive and non sensitive products depending on their origin (Developed or Developing Country).

- For this scenario it is essential to define sensitive products even though in the present situation no product group is yet defined as a sensitive product.

- The bound tariffs (ad valorem and specific tariffs) will be cut.

- A cut of at least 54% on average will be undertaken for the developed countries and 36% on average for the developing countries.

Table 11: List of possible sensitive products

Developed Countries	Developing Countries
Beef	Beef
Cheese	Sugar
Tomatoes	Rice
Wheat and Meslin	Wine
Sugar	Skimmed Milk Powder
Pork	
Rice	

Source: Laborde et al. (2006)

Scenario 4: Bilateral Full Liberalisation

- The difference of the full liberalisation in contrast to the bilateral partial liberalisation relates to the product coverage and the extent of adjustment of trade barriers.

WELFARE RESULTS

Table 1: Absolute changes of Welfare measures across scenarios (Mn €)

|		Scenario 1	Scenario 2	Scenario 3	Scenario 4
European Union 25	Money Metric	534.0	3138.0	20494.0	10095.0
	Agricultural Profit	-530.7	-2724.3	-12617.4	-8664.8
	Total Welfare	-360.0	-1619.0	6515.0	-4282.0
Venezuela	Money Metric	-0.3	-12.9	-27.2	-23.6
	Agricultural Profit	-0.4	3.8	25.0	7.2
	Total Welfare	-0.3	-5.5	0.8	-9.4
Brazil	Money Metric	-128.0	-1152.0	-512.0	-2752.0
	Agricultural Profit	342.0	3507.4	1377.9	7618.0
	Total Welfare	128.0	2048.0	512.0	3584.0
Paraguay	Money Metric	-4.0	-33.0	-16.0	-56.0
	Agricultural Profit	6.1	43.4	25.5	79.8
	Total Welfare	0.0	1.0	3.0	4.0
Argentina	Money Metric	-32.0	-304.0	-112.0	-736.0
	Agricultural Profit	69.8	603.7	209.1	1225.0
	Total Welfare	16.0	160.0	-48.0	48.0
Uruguay	Money Metric	-6.0	-58.0	-16.0	-76.0
	Agricultural Profit	9.8	92.2	29.4	139.2
	Total Welfare	3.0	32.0	10.0	59.0

Source: CAPRI Modelling System

Table 2: Relative difference (%) of imported quantities of the EU25 and their value

|		Scenario 1	Scenario 2	Scenario 3	Scenario 4
Venezuela	Imported quantities	0.0	-5.7	50.8	-5.8
	Import value	*0.0*	*-3.1*	*-17.3*	*-3.2*
Brazil	Imported quantities	0.6	8.1	1.4	3.8
	Import value	*2.2*	*12.6*	*0.9*	*25.6*
Paraguay	Imported quantities	8.1	71.8	10.0	49.2
	Import value	*16.7*	*96.4*	*9.2*	*50.8*
Argentina	Imported quantities	2.2	20.2	2.2	36.1
	Import value	*2.3*	*20.0*	*0.5*	*47.1*
Uruguay	Imported quantities	9.5	39.7	12.5	242.3
	Import value	*14.1*	*73.1*	*0.3*	*62.9*

Source: CAPRI Modelling System

MERCOSUR: Exportaciones a la UE
Incremento 2002-2013
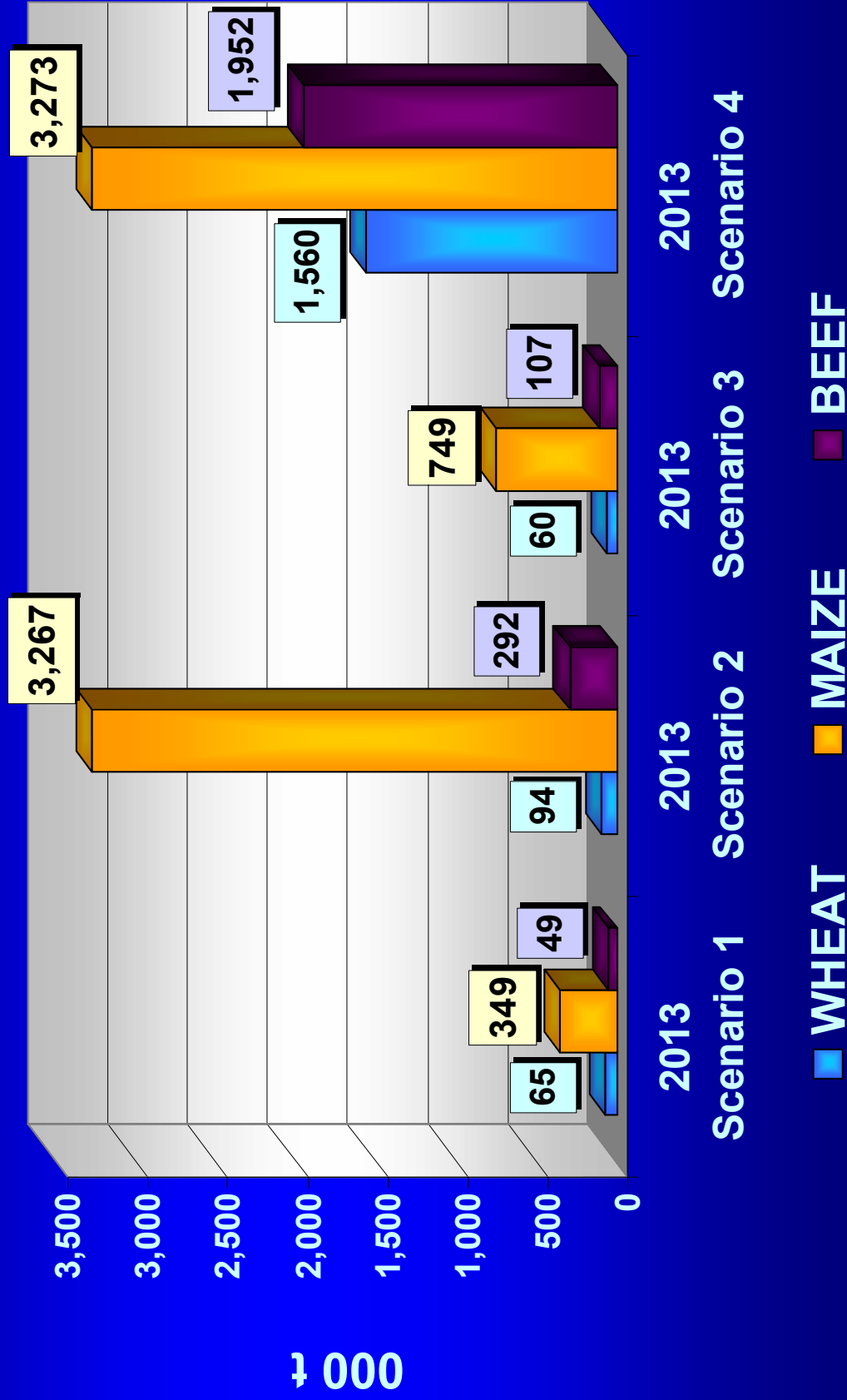
MERCOSUR: Socio-economic impacts of trade liberalization with EU
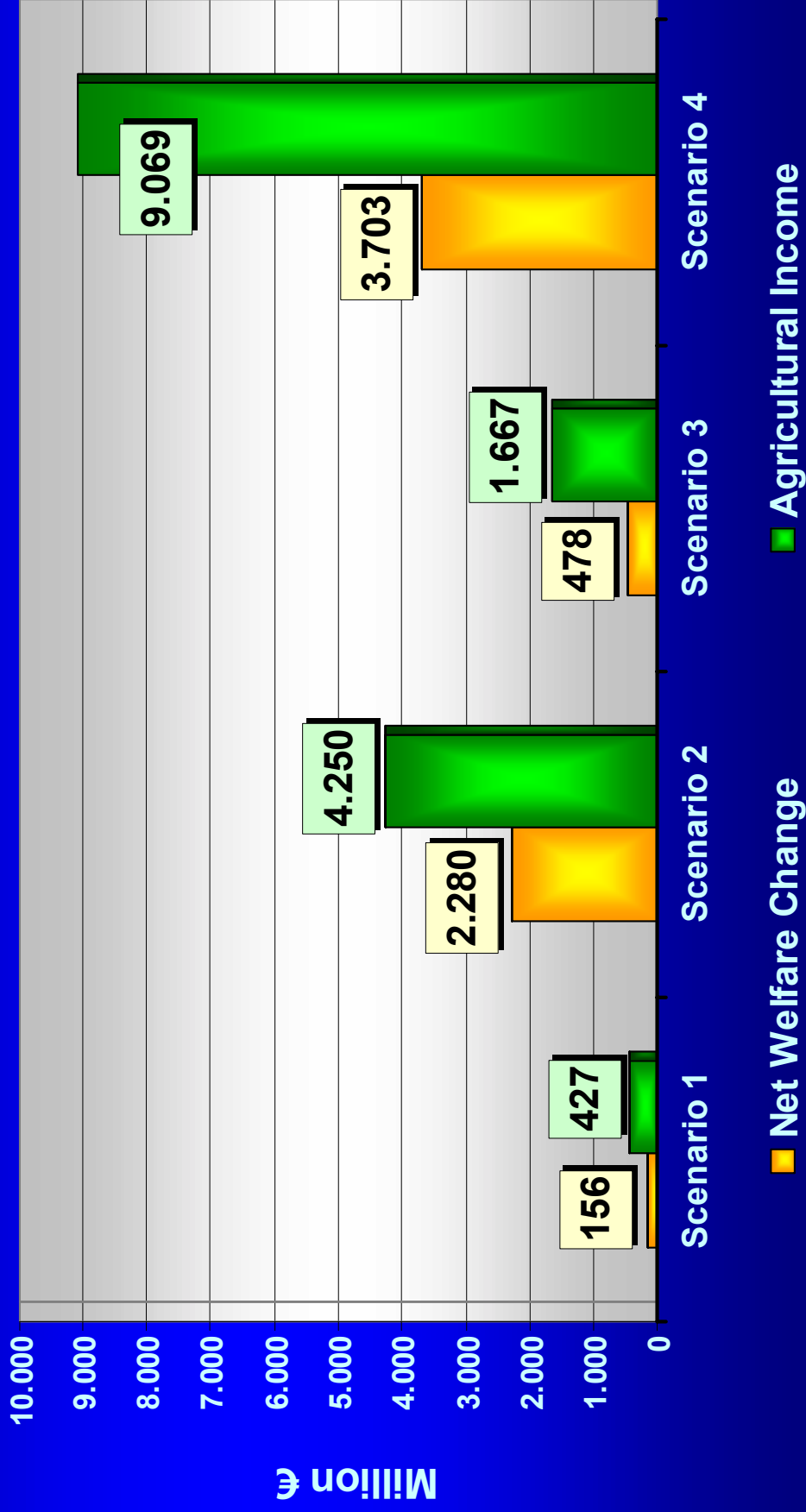
LINKS

- Proyecto EUMercoPOL
- http://www.eumercopol.org/

- Instituto de Economía y Sociología – INTA
- www.inta.gov.ar/ies