AGRICULTURAL INCOME AND PRODUCTIVITY IN THE EUROPEAN UNION: CONVERGENCE OR DIVERGENCE AMONG MEMBERS ?

by

Fernando Brito Soares
Faculty of Economics, New University of Lisbon, Portugal and International Centre for Economic Research (ICER), Turin, Italy

and

Roberto Ronco
Faculty of Economics, University of Turin, Italy

Abstract

Sound increases in agricultural productivity and incomes have been from the very begining two of the main goals of the Common Agricultural Policy of the European Economic Community (now European Union - EU).
The paper tries to evaluate, through the estimation of convergence coefficients, if the increments achieved have widened or closed the gap between EU member states.
Results indicate that the richest countries either maintain their positive differences to the Union's average (Netherlands and Belgium) or even enlarge it (Denmark).
France shows a quick convergence pattern, while countries where Mediterranean production exceeds 30 % of Total Agricultural Output either keep their negative gap (Italy), or even enlarge it (Greece) or slowly converge to the average (Spain).
Portugal does converge but still has a long way to reach its European partners.
For the remaining countries no significant convergence coefficients were found.

December 2000

Acknowledgments:
The first author wants to acknowledge the financial support granted by the International Centre for Economic Research (ICER)

AGRICULTURAL INCOME AND PRODUCTIVITY IN THE EUROPEAN UNION: CONVERGENCE OR DIVERGENCE AMONG MEMBERS ?

1. Introduction

Agriculture and agricultural policies were, from the very beginning, one of the main concerns of the founding fathers of the European Economic Community (EEC). From 1956 to day the Community was enlarged several times, from 6 to 15 countries, and economic, monetary and political relationships between members were strongly strengthened leading to the European Union (EU) as we know it today.

Along this rather important and very often difficult path, the concern with agriculture and agricultural policies did not slow down. On the contrary, on many occasions the Common Agricultural Policy (CAP) has been a major obstacle to the development of the union and still remains the object of extended discussions and controversies.

Much has been said (and done) about CAP, its achievements, failures and future. Nevertheless, despite all past reforms, CAP continues to be the main user of the Union's financial resources and the centre of large disputes.

It is true that CAP has achieved many of the goals it was created for. Sound increases in agricultural productivity and income in member states is definitely among them [1]. But at what cost?

The continued policy of agricultural price supports for almost every production lead to higher income levels throughout European agriculture, hand to hand with the inevitable misallocation of resources. Consumer's losses are heavy and unfairly distributed, because variable levies were preferred to deficiency payments as the main tool for supporting domestic prices.

Apart its costs, income and productivity growth are, per se, positive achievements that must also be viewed under another perspective, namely if they are promoting convergence among countries or, on the contrary, the gap between higher and lower income and productivity states is widening.

The scope of this paper is then to evaluate the convergence (divergence) of both per capita agricultural income and labour productivity in EU members. For that purpose a simple model (Ben-David [1]) is used to compute convergence coefficients for the different EU member states.

2. Recent trends in income and productivity

Trend evaluation of economic variables in the agricultural sector is always impaired by the lack of consistent time series. If in addition one pretends to perform comparisons among different countries the task is even more difficult, because sufficiently long and compatible series are seldom available. In the case of the EU, Eurostat [5] provides series for Final Agricultural Output and Gross Agricultural Value Added (at market prices) both at current and 1990 prices and exchange rates for the 1973-1994 period, for 14 member states [2]. Unfortunately no other series are available at constant prices thus excluding the possibility of convergence analysis on, for instance, net income from agricultural activity (total or family).

To evaluate the recent trends in income and productivity, per capita Gross Agricultural Value Added and per capita Final Agricultural Output were taken as proxies, using total agricultural labour, measured in annual work units (Eurostat [6]) as the denominator.

Even a quick look at Tables 2.1 and 2.2 reveals that both Gross Value Added and Final Output tend to rise in time, over all countries.

This rising trend is also confirmed by Figures 2.1 and 2.2 where two other features can also be observed.

On the one hand the values show some ”seasonal” variability. This is not unusual because although being annual values they refer to agricultural production, which can register sizeable variations from year to year due, in particular, to variable weather conditions.

On the other hand a clear segmentation emerges from the figures. In both diagrams the fourteen member states under analysis can be grouped in four sets, each of them including countries showing similar performances.

Table 2.1 - Per Capita Gross Agricultural Value Added at 1990 prices
Gross Agricultural Value Added / Total AWU (in 1000 ECU), from 1973 to 1994

	Germany	France	Italy	Netherlands	Belgium	Luxembourg	U. Kingdom	Ireland	Denmark	Greece	Portugal	Spain	Sweden	Finland
1973	8.439	9.152	6.949	16.163	16.240	9.437	12.460	4.620	10.671	4.812		4.715		
1974	9.093	8.723	7.290	17.925	17.920	10.091	12.618	5.274	14.601	4.970		4.552		
1975	9.145	8.739	7.698	17.495	15.793	10.585	11.432	5.747	12.624	5.427		4.826		
1976	8.820	8.817	7.432	18.106	16.140	10.152	11.081	5.388	12.030	5.396		5.295		
1977	9.673	9.524	7.785	19.296	17.334	11.024	11.972	5.950	14.563	5.160		5.460		
1978	10.418	10.533	7.486	21.216	19.310	12.044	13.420	5.941	14.634	5.790		5.885		
1979	10.417	12.207	7.992	22.527	19.366	12.542	13.596	5.333	14.709	5.624		6.245	7.793	5.766
1980	10.995	12.055	9.365	22.517	20.448	12.852	15.085	5.813	16.839	6.436	1.232	7.313	9.647	6.889
1981	11.217	12.116	9.662	25.725	21.531	14.558	15.192	5.754	19.047	6.586	1.059	6.896	10.577	6.065
1982	13.644	14.815	10.063	27.728	23.037	17.388	16.404	6.747	21.958	6.791	1.261	7.562	13.018	6.969
1983	13.188	14.670	10.761	26.248	22.706	16.542	15.566	7.209	20.649	6.421	1.299	8.096	12.995	8.693
1984	14.370	15.666	10.263	29.798	24.481	17.979	18.822	8.289	25.888	6.662	1.438	9.028	14.308	8.935
1985	13.461	16.391	10.701	28.423	25.113	17.683	17.654	8.050	26.840	6.876	1.603	10.012	13.677	8.633
1986	15.162	16.967	11.017	30.680	26.831	18.554	17.593	7.771	28.959	7.158	1.654	9.164	14.064	9.061
1987	14.257	17.991	11.626	25.038	25.671	18.074	17.742	8.514	27.306	7.331	1.824	10.727	13.746	6.841
1988	15.674	18.056	11.650	27.596	28.136	18.585	17.848	8.791	31.926	7.714	1.545	11.754	13.688	8.409
1989	16.740	19.686	12.399	33.187	29.372	19.646	18.942	7.322	34.893	8.585	1.950	11.250	15.885	10.621
1990	17.345	21.105	12.162	36.568	28.931	19.870	20.226	9.483	36.252	7.700	2.430	12.492	19.378	12.405
1991	18.685	21.202	13.136	36.494	31.686	18.534	21.087	9.619	36.646	9.875	2.739	13.260	17.693	12.061
1992	20.798	24.618	14.205	37.236	36.281	22.821	22.564	10.501	35.227	9.591	2.889	13.532	16.535	10.590
1993	22.165	23.908	15.045	38.543	38.909	22.467	21.052	9.880	41.003	9.081	2.833	13.212	20.171	11.465
1994	22.627	24.819	15.694	41.223	37.068	23.004	21.664	9.394	41.546	9.803	3.133	12.089	20.211	12.180

Source: Computed from

EUROSTAT, Economic Accounts for Agriculture and Forestry, EAAF 1989-94, Diskette version, Luxembourg, 1996

EUROSTAT, Agricultural Labour Input in the EU, 1973-1996, European Communities, Luxembourg, 1998

Table 2.2 Per Capita Final Agricultural Output at 1990 prices
Final Agricultural Output / Total AWU (in 1000 ECU), from 1973 to 1994

	Germany	France	Italy	Netherlands	Belgium	Luxembourg	U. Kingdom	Ireland	Denmark	Greece	Portugal	Spain	Sweden	Finland
1973	17.8833	16.5384	9.09446	33.0713811	34.7724	14.4714331	29.0758638	7.97188	23.8286	5.90475		6.7577		
1974	18.7052	16.6105	9.56613	35.5526975	37.0914	15.5166148	29.1397509	8.39539	27.8634	6.12936		6.8122		
1975	19.2186	16.5777	10.0269	35.5693838	35.8936	16.1948609	29.2445274	8.81328	27.0551	6.72455		7.32946		
1976	19.805	17.1524	9.91619	37.4160395	37.0759	16.6168519	28.9521863	8.85061	28.3437	6.77351		8.21789		
1977	21.6127	18.2071	10.5227	40.1754795	39.5682	17.228566	29.4211843	9.80962	31.9633	6.65632		8.76936		
1978	23.4222	19.8186	10.2732	43.8570604	42.5197	18.0623267	31.0187718	10.4062	34.2298	7.36048		9.52718		
1979	24.6555	22.0349	10.954	46.4766472	43.1656	18.6910103	31.780387	10.5051	36.5675	7.26098		10.4536	28.161	11.6638
1980	25.5941	22.2864	12.8073	48.190523	45.0605	19.3983587	33.2649045	10.4656	38.6959	8.18766	2.65283	12.141	30.3468	13.4522
1981	25.5921	22.5944	13.195	51.3351785	46.5665	21.5427209	33.2373396	10.8268	41.4784	8.43365	2.56681	12.4877	31.0589	12.5332
1982	28.5251	25.6505	13.8116	53.3737097	49.2123	24.4518193	35.841803	11.9946	46.1892	8.69518	2.78029	13.5912	34.6015	14.0991
1983	29.0474	25.8948	14.4889	54.8343939	48.8306	24.6876835	35.7006639	12.9469	45.7814	8.40472	2.78321	14.2326	34.6399	16.3235
1984	30.4091	27.4317	14.0909	56.7610053	51.4716	26.4540933	38.93591	14.0153	51.2428	8.63313	2.8951	15.69	36.7328	16.3405
1985	29.6091	28.5736	14.726	57.304564	53.52	26.7000274	37.8259503	13.8446	53.3675	8.88408	3.1086	16.8812	35.9847	16.382
1986	31.4209	29.8557	15.1655	60.9320148	56.9814	28.3948571	38.7273545	14.1927	55.8623	9.11647	3.21209	16.5398	37.994	17.2978
1987	31.5441	31.7358	16.0434	59.9413721	57.7505	28.8011791	39.4197168	14.9306	56.1225	9.50778	3.58508	18.3869	37.6581	15.6749
1988	33.169	32.5737	16.2873	62.0015586	61.8846	30.0260156	39.9427666	15.4	61.9885	9.91177	3.39264	19.744	39.6011	18.2044
1989	35.2908	35.1778	17.3108	64.1314105	65.2424	31.5240159	41.2599955	14.1928	65.6592	11.0064	4.12357	19.6553	42.3362	21.2102
1990	36.2576	37.442	17.0774	68.4088184	65.7808	32.6523833	42.5173346	16.3148	70.1036	10.3346	4.83671	21.4898	45.7908	22.7311
1991	38.4939	38.064	18.1295	68.1235917	71.6107	32.1190345	43.6969833	16.6206	70.9825	12.7213	5.27689	22.7299	41.905	21.6445
1992	40.918	42.1312	19.3818	68.740663	78.5085	37.3515091	45.2475484	17.7232	70.8175	12.4192	5.46736	23.3394	41.0502	20.0064
1993	41.604	42.0064	20.4876	70.1002546	81.7074	36.5192222	44.3400385	17.632	77.267	12.0478	5.64546	23.4079	45.9936	21.3984
1994	43.3423	43.8431	21.3498	72.953461	81.259	38.2671373	45.5326536	17.9787	79.0496	12.8951	5.99814	22.9162	47.985	22.1449

Source: Computed from

EUROSTAT, Economic Accounts for Agriculture and Forestry, EAAF 1989-94, Diskette version, Luxembourg, 1996

EUROSTAT, Agricultural Labour Input in the EU, 1973-1996, European Communities, Luxembourg, 1998

Fig. 2.1 - Per Capita Gross Agricultural Value Added at 1990 prices (1000 ECU)

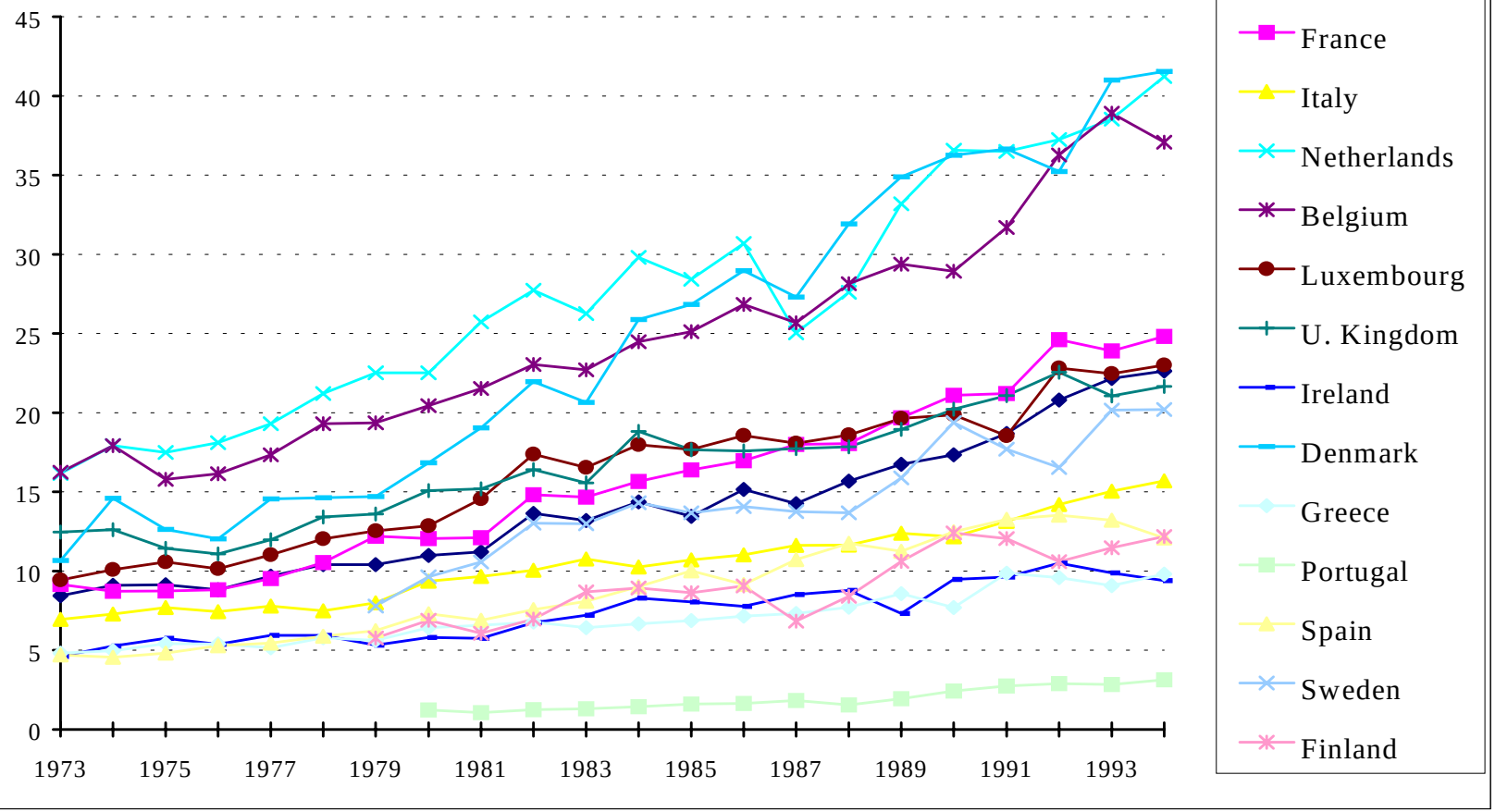
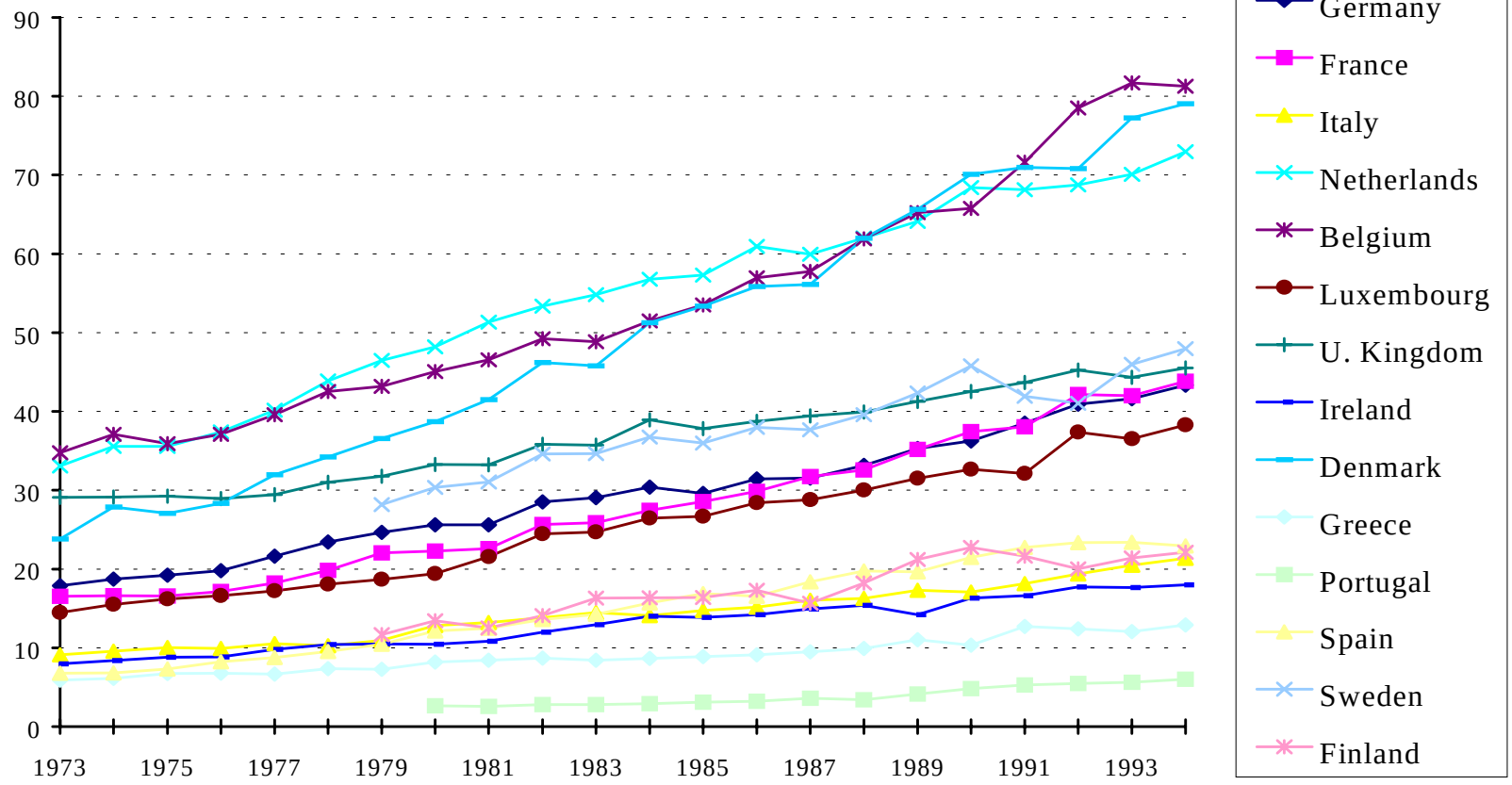


Fig. 2.2 - Per Capita Final Agricultural Output at 1990 prices (1000 ECU)



What we call Group 1 includes Netherlands, Belgium and Denmark, and has the highest values of both per capita Gross Value Added and Final Output.

At a lower level, for both economic variables, we find Group 2 including France, Germany, United Kingdom, Sweden and Luxembourg. Further down is Group 3 where Spain, Greece, Italy, Finland and Ireland are placed. At the bottom of the scale is Group 4 including only Portugal, which shows the lowest levels for both variables.

This behaviour is rather clear from 1982 onwards in what concerns the per capita Gross Value Added, whereas for per capita Final Output it becomes more apparent already after 1979.

If one relates these groups, and their relative position, to the crop and livestock production mixture, some interesting results may come out. For that purpose Table 2.3 was computed for 1994 [3], showing, for the fourteen member states, the shares of main products in total output.

First of all, Groups 1 and 2 (where income and productivity are higher) do not include any of the countries where "southern" production represents more than 30%, i.e. Italy, Greece and Spain. On the other hand in these two groups "northern" production always accounts for more than 30%.

Interestingly enough the share of "northern" production in Group 2 (always more than 45%) is higher than in Group 1 where cereals production tends to represent a smaller share. Moreover, these two groups show another important difference: fresh vegetables in Netherlands and Belgium and pork production in Denmark register a rather higher share when compared with those of Group 2 countries. This can be viewed as an additional explanation for the better performance of the first group in terms of income and productivity.

It could be argued that the Mediterranean countries in Group 3 (Spain, Greece and Italy) show even higher shares of fresh vegetables and, nevertheless, their income and productivity are lower. But one must not forget that these three countries do have smaller shares of "northern" products, for which the CAP is definitely more generous.

In what concerns Group 4 the inferior performances of Portugal are due not only to product-mix reasons (the shares are not that different from those of Mediterranean countries in Group 3) but also to the structural and technological backwardness of Portuguese agriculture.

Table 2.3 - Share of Main Agricultural Products in Total Output, 1994 (%)

	"Northern products"						"Southern products"				
	Cereals	Milk	Beef	Total	Pork	Lamb	Ol.Oil	F.Fruits	F.Veg.	Wine	Total
Group 1											
Netherlands	1	20.9	10.5	32.4	14.3	0.4	0	1.6	11.6	0	13.2
Belgium	3.2	13.8	19.7	36.7	18.8	0.2	0	4.3	13.7	0	18
Denmark	12	23.9	8.3	44.2	31.5	0.1	0	0.5	2	0	2.5
Group 2											
France	13.4	17.6	14.3	45.3	6.4	1.2	0	3.8	7.4	12.6	23.8
Germany	9.6	25.9	12.3	47.8	14.3	0.3	0	5.7	3.8	3.6	13.1
U. Kingdom	13.1	23.8	14.4	51.3	7.1	5.5	0	1.8	8.1	0	9.9
Sweden	13.7	32.6	12.6	58.9	13.5	0.2	0	1	3.5	0	4.5
Luxembourg	4.3	43.5	27.6	75.4	8.2	0	0	2.1	0.8	9.5	12.4
Group 3											
Spain	6.3	8.7	7.4	22.4	11.6	5.2	5.5	6.5	17.1	2.3	31.4
Greece	6.9	13.5	3.2	23.6	2.9	6.4	9.9	8.2	13.3	1.7	33.1
Italy	8.8	11.1	10	29.9	6.5	0.7	3.6	7.1	14.7	7.8	33.2
Finland	8.5	31	11.2	50.7	13.8	0.3	0	0.7	10.4	0	11.1
Ireland	3	33.8	37.5	74.3	5.9	4.9	0	0.3	3.2	0	3.5
Group 4											
Portugal	5.6	13.9	8.2	27.7	14.2	3.5	2.9	4.8	10.5	6.1	24.3

Source: Computed from

[4] Commission of the European Communities, *The Situation of Agriculture in the Community, Annual Report 1995*, Brussels, 1996

In short, it seems plausible to argue that the recent evolution of income and productivity in European agriculture shows a bias in favour of “northern” countries and this cannot be dissociated from the orientation of the Common Agricultural Policy.

3. Convergence analysis

Due to the variability of income and productivity pointed out in the previous section we decided to use moving averages of three years as our database. It is obvious that a larger number of years would be preferable but we had to cope with the shortness of the time

series and thus we could not afford loosing more than two observations in the statistical analysis.

The model used is a very simple one (Ben-David [1]) and can be briefly described by the following equation:

$$Y_{i,t+1} - Y^*_{t+1} = \phi [Y_{i,t} - Y^*_t] \quad (1)$$

where

$Y_{i,t}$ = log of country i per capita agricultural gross value added (labour productivity) in year t

Y^*_t = unweighted average of the log of the reference group members per capita agricultural value added (labour productivity) in year t

Letting $Z_{i,t} = Y_{i,t} - Y^*_t$ equation (1) can be rewritten as

$$\Delta Z_{i,t+1} = -kZ_{i,t} \quad (2)$$

where $\Delta Z_{i,t+1} = Z_{i,t+1} - Z_{i,t}$ and k is the convergence coefficient, which equals $1 - \phi$.

The sign of k coefficient indicates either convergence ($k > 0$) or divergence ($k < 0$) and the larger its value the faster the convergence (divergence).

In fact if we take for instance a country with a per capita Gross Value Added below the average of the reference group (the values $Z_{i,t}$ being negative), for convergence to take place the gap has to get smaller over time, i.e. $Z_{i,t}$ must increase (decrease in absolute value) thus implying $\Delta Z_{i,t+1} > 0$ and $k > 0$. By similar reasoning one gets the sign of k when there is divergence and/or the values of $Z_{i,t}$ positive.

Since there have been several enlargements of the Community during the period 1973-1994 it seemed appropriate to extend the analysis to different reference group scenarios from EEC-6 to EEC-15 [4].

In the following sections we will develop the analysis for the two economic variables that were taken as proxies for Agricultural Income and Productivity: per capita Gross Value Added and Final Output.

3.1. Gross Value Added

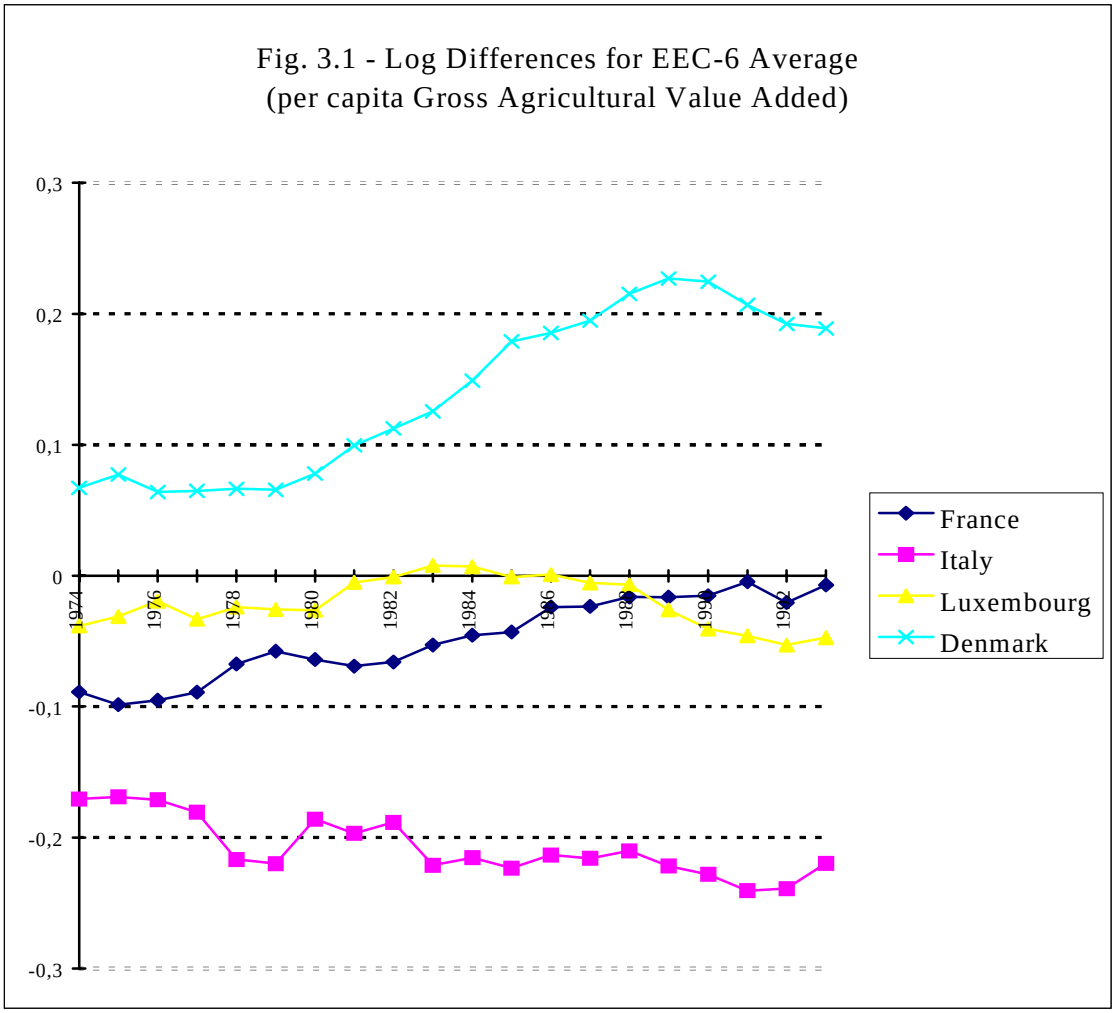
Before estimating equation (2) we can get a first approach to the convergence analysis by having a look at the log differences.

For that matter we plotted $Z_{i,t}$ for the fourteen countries to get an idea about the presence or absence of convergence (divergence) [5].

Figure 3.1 represents a small sample of the results obtained when the reference group is EEC-6. Four different patterns are immediately detected.

Both France and Denmark show a growing tendency in the log differences to the

Fig. 3.1 - Log Differences for EEC-6 Average
(per capita Gross Agricultural Value Added)



Community average, but while for France that suggests convergence for Denmark it means divergence insofar as the differences have positive signs.

Italy displays a pattern of relative stability (although a sligthly decreasing tendency may be on sigth) indicating that, very likely, no convergence or divergence can be find.

As to Luxembourg two tendencies can be identified: a growing one from 1974 to 1983 and a decreasing one from 1984 to 1993. This suggests a convergence movement in the first period and a divergence one in the second, given the fact that log differences are almost always negative.

The inspection of the patterns shown in the diagrams is also helpful in the choice of time periods to carry the estimation of convergence coefficients. A sustained pattern of increasing, decreasing or stable values for the full range of observations will encourage the estimation of only one equation. On the contrary, more or less conspicuous inflection points in the diagram suggest that separate equations should be estimated for the observations between those points.

With these criteria in mind we estimated equation (2) for the fourteen member states. The results obtained when EEC-6 was taken as the reference group is reported in Table 3.1. [6] We will limit our analysis to this set of results insofar as those referring to the other scenarios [7] point towards very similar behaviour both for country and time period. In the table k values and the associated t statistics denounce quite a variety of performances.

Countries with the highest values of per capita Gross Agricultural Value Added (Group 1 in Table 2.3) either show a stable pattern or are enlarging their positive deviation from the community average.

For the Netherlands k coefficients are not statistically different from zero, the same applying to Belgium in the period 1975-1993. For the latter a statistically significant convergence coefficient in 1975-1983 is contrasted by a barely significant divergence one in 1984-1993. In both cases stability is achieved at above the average levels.

As for Denmark, the highly significant negative k during 1979-1989 is not neutralised by the stability and divergence trends respectively in the first and last years of the period in analysis. The important thing to retain is that for Denmark divergence does not mean a negative movement because, as mentioned above, with positive $Z_{i,t}$ values it leads to larger and larger positive deviations from Community average.

Table 3.1 - Gross Agricultural Value Added Convergence (Divergence) to EEC-6

	Period	*k*	N [a]	*t* - statistic		Half-life [b]	Double life [c]	$Z_{i,t}$ [d]
				value	signif. level (%)			
Germany	1975-1993	0.0147	19	0.34		46		*n*
	1975-1981	-0.0303	7	0.95			24	*n*
	1982-1993	0.0410	12	0.62		16		*n*
France	1975-1993	0.0756	19	2.04	5	8		*n*
Italy	1975-1993	-0.0088	19	0.49			80	*n*
	1975-1981	-0.0141	7	0.34			50	*n*
	1982-1993	-0.0065	12	0.36			107	*n*
Netherlands	1975-1993	0.0043	19	0.28		159		*p*
	1975-1984	-0.0057	10	0.75			123	*p*
	1985-1993	0.0175	9	0.52		39		*p*
Belgium	1975-1993	0.0049	19	0.44		141		*p*
	1975-1983	0.0297	9	2.32	2.5	23		*p*
	1984-1993	-0.0222	10	1.54	10		32	*p*
Luxembourg	1975-1993	0.0405	19	0.47		16		*n* , *p*
	1975-1983	0.2076	9	1.62	10	2		*n* , *p*
	1984-1992	-0.2115	9	1.72	10		4	*p* , *n*
United Kingdom	1975-1993	0.0382	19	0.32		17		*p* , *n*
	1975-1982	0.3396	8	2.11	5	1		*p*
	1984-1993	-0.2275	10	1.69	10		4	*n*
Ireland	1975-1993	-0.0109	19	0.83			64	*n*
	1975-1980	-0.0452	6	1.77	10		16	*n*
	1981-1993	0.0011	13	0.07		656		*n*
Denmark	1975-1993	-0.0320	19	1.50	10		22	*p*
	1979-1989	-0.0974	11	4.76	0.5		8	*p*
Greece	1975-1993	-0.0128	19	1.46	10		55	*n*
	1975-1985	-0.0237	11	2.41	1		30	*n*
Portugal	1982-1993	0.0153	12	2.56	2.5	45		*n*
Spain	1975-1993	0.0191	19	1.39	10	35		*n*
	1975-1981	0.0261	7	1.74	10	26		*n*
	1982-1993	0.0313	10	1.62	10	21		*n*
Sweden	1981-1993	0.0530	13	1.21		12		*n*
Finland	1981-1993	0.0045	13	0.15		154		*n*

[a] N is the number of observations

[b] Half-life is the number of years needed for a 50% reduction in the gap

[c] Double-life is the number of years needed for doubling the gap

[d] *n* stands for negative and *p* for positive

In fact if the 1979-1989 pattern were to prevail the gap would be doubled in just 8 years. In countries belonging to what we called Group 2 we detect a stability behaviour for Germany, Sweden and Luxembourg, whereas France is definitely catching up from a below the average situation.

The United Kingdom is the only member state in this group to show positive $Z_{i,t}$ values (although for the limited period of 1975-1982) and has a rather curious performance. When the gap is positive we find $k>0$ and when it is negative then $k<0$, even if barely significant. This means that in the United Kingdom per capita Gross Agricultural Value Added performance shows a decisive opposite tendency in relation to his community partners. If the first period behaviour prevailed it would take only 1 year to be half way to the average, and 4 years would suffice for doubling the negative gap, if the second period performance was to last.

In Group 3, Italy, Finland and Ireland, although below the average, are able to keep their gaps insofar as the k coefficients are not significantly different from zero.

Spain presents a very tenuous tendency for converging. The positive k values are barely significantly different from zero and it would take two or three decades for halving the negative gaps.

Greece is definitely the most worrying case. For the entire period it barely diverges, while the performance in 1975-1985 would lead to doubling the negative gap in only 1 year.

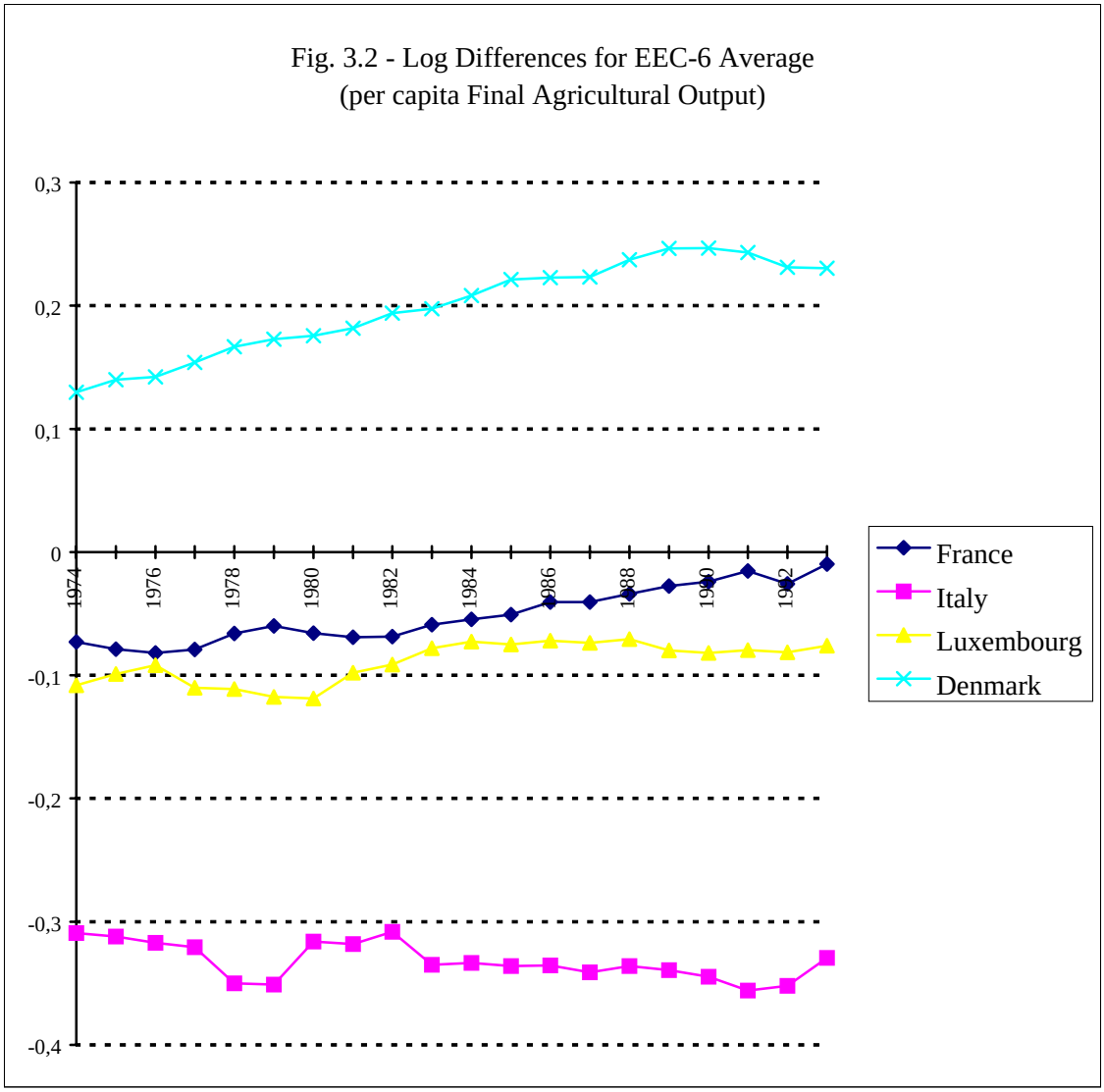
Finally let us have a look at Portugal, the only country in Group 4.

Contrary to Greece, the actor with the lowest per capita Gross Agricultural Value Added in the entire community, is not getting away from the main stream. It is catching up although it would take 45 years to be half way through its journey.

3.2. Final output

As it was done for Gross Value Added, we plotted $Z_{i,t}$ values for Final Output to get the first idea about convergence (divergence). Figure 3.2 shows the diagrams for the same four [5] countries and it suggests almost the same behaviour previously detected for

Fig. 3.2 - Log Differences for EEC-6 Average
(per capita Final Agricultural Output)



those countries: stability for Italy during the entire period (with a barely significant tendency for divergence if we take only the1983-1991 period); convergence for France; and divergence for Denmark. In the case of Luxembourg, the slight tendency for divergence in per capita Gross Value Added during1984-1992 is now contrasted by a similarly weak tendency for convergence for 1982-1993.

As it was the case for per capita Gross Value Added, countries in Group 1 also show positive deviations from EEC-6 average in terms of per capita Final Output ($Z_{i,t} > 0$). The Netherlands and Belgium confirm their tendency for stability during the entire period, but show opposite tendencies if sub-periods are considered. The Netherlands starts by diverging (1975-1979) and then converges (1980-1993), while Belgium first converges (1975-1984) and then diverges (1985-1993).

Table 3.2 - Final Agricultural Ouput Convergence / Divergence to EEC-6

	Period	*k*	N [a]	*t* - statistic		Half-life [b]	Double life [c]	$Z_{i,t}$ [d]
				value	signif. level (%)			
Germany	1975-1993	0.1551	19	0.89		4		*n*
	1975-1979	0.2274	5	1.44		2		*n*
	1980-1988	-0.0371	9	0.19			20	*n*
France	1975-1993	0.0510	19	1.78	5	13		*n*
Italy	1975-1993	-0.0022	19	0.22			320	*n*
	1983-1991	-0.0152	9	1.61	10		46	*n*
	1982-1993	-0.0021	12	0.20			331	*n*
Netherlands	1975-1993	0.0090	19	1.19		76		*p*
	1975-1979	-0.0218	5	3.54	1		33	*p*
	1980-1993	0.0206	14	2.52	2.5	33		*p*
Belgium	1975-1993	0.0002	19	0.04		2811		*p*
	1975-1984	0.0183	10	3.38	0.5	37		*p*
	1985-1993	-0.0215	9	3.86	0.5		33	*p*
Luxembourg	1975-1993	0.0230	19	1.09		29		*n*
	1977-1980	-0.0566	4	1.38			13	*n*
	1982-1993	0.0278	12	1.36	10	24		*n*
United Kingdom	1975-1993	0.0826	19	4.46	0.5	8		*p*
Ireland	1975-1993	-0.0034	19	0.45			204	*n*
	1975-1981	-0.0114	7	1.05			62	*n*
	1985-1993	-0.0105	9	1.03			67	*n*
Denmark	1975-1993	-0.0229	19	2.70	0.5		31	*p*
Greece	1975-1993	-0.0055	19	1.11			127	*n*
	1976-1985	-0.0148	10	2.94	1		48	*n*
	1986-1991	0.0130	6	1.86	10	53		*n*
Portugal	1982-1993	0.0114	12	2.39	2.5	60		*n*
Spain	1975-1993	0.0324	19	3.99	0.5	21		*n*
Sweden	1981-1993	0.0833	13	1.33		7		*p*
	1983-1992	0.1088	10	1.54	10	6		*p*
Finland	1981-1993	-0.0010	13	0.04			663	*n*

[a] N is the number of observations

[b] Half-life is the number of years needed for a 50% reduction in the convergence gap

[c] Double-life is the number of years needed for doubling the divergence gap

[d] *n* stands for negative and *p* for positive

Denmark keeps its divergence movement, which would lead to doubling its gap from European average in 31 years.

In Group 2 countries we find now positive $Z_{i,t}$ values for both the United Kingdom and Sweden during the entire period. This change is certainly due to the fact that these two countries register the highest values of intermediate consumption among EU members. In that same period these values ranged from 52% to 58% of Final Output in the United Kingdom, and from 58% to 69% in Sweden. Both countries reveal convergence tendencies, although they are barely significant for Sweden.

On the contrary $Z_{i,t}$ values for Luxembourg are now all negative what is not surprising because intermediate consumption in this country is among the lowest (34% to 39% of Final Output). The k value is marginally significantly different from zero only in the period of 1982-1993 and thus it can be said that Luxembourg reveals a stability pattern in what concerns the evolution of per capita Final Agricultural Output.

France and Germany keep their behaviour, e.g. quick convergence from behind for France and stability in its position below the average for Germany.

In Group 3 only Spain shows a significant tendency for convergence, although it would take 21 years for halving its deviation from the average. Italy, Ireland and Finland can be said to maintain their negative gap, even if for the first a marginally significant k coefficient points towards divergence.

As it happened with Gross Value Added, Greece exhibits a divergence pattern (particularly significant in 1976-1985) which takes it further and further away from its partners.

Portugal confirms its convergence movement but in a slower pace (it would take 60 years to cut in half the negative gap.

4. Concluding remarks

The results obtained, although not very surprising, allow for a few interesting conclusions.

Countries with the highest levels of both per capita Gross Value Added and Final Output (Group 1), either keep their positive gap from the average or even enlarge it, as it is the case for Denmark.

Three of the member states ranking second in the two economic indicators (Germany, Luxembourg and Sweden), also keep their distances (negative or positive) from the average values, while France shows a clear and rapid convergence pattern for both variables and the United Kingdom registers a converging movement only for Final Output.

From the three countries where Mediterranean production exceeds 30% of Total Agricultural Output (all of them in Group 3) only Spain is catching up with his European partners. Italy maintains it's below the average situation and Greece tends to enlarge its negative gap.

On their part Ireland and Finland never present any significantly sound convergence coefficient for both indicators.

At the bottom of the list, Portugal is definitely catching up but still has a long way to go in reaching the European average.

If the Common Agricultural Policy was influential in the performance of these 14 countries (and it definitely was at least for the oldest Union members), then one is lead to the conclusion that Mediterranean production has not been favoured by such policies. In addition we are also tempted to conclude that the production of cereals, milk, beef and pork has benefited from those policies although the results for Ireland and Finland seem to contradict it (or be the exception that confirms the rule). In any case this type of causation conclusions can not be drawn from the work we performed, but rather from a more in depth production mixture analysis. This remains to be done.

Footnotes

[1] In a recent study promoted by the European Commission (see Buckwell [2]) it is shown that per capita agricultural income was close to the non-agricultural one for Belgium, Germany and Greece; for Spain, Italy and Sweden it was slightly below; in France, Ireland and Finland it was about 25% higher; in Denmark, Luxembourg and Netherlands it exceeded that of the non-agricultural sectors of the economy by more than 50% (150% in the case of Netherlands); and only in Portugal it was largely behind.

[2] Data is not available for Austria. For Portugal, Sweden and Finland the series are not complete.

[3] The choice of the year is not a problem since the product-mix does not change drastically in the short/medium run. If there has been some move it pointed towards the enlargement of "northern" production in "southern" countries (see Cesaretti [3]).

[4] In our case it would be more correct to say EEC-14 since data is not available for Austria.

[5] The entire set of diagrams can be obtained upon request, from the authors, as Annex to this Working Paper.

[6] For computation of half-life and double life figures see Ben-David [1].

[7] Changing the reference group causes only a scale effect on $Y^*_{i,t}$. In our case the values of $Y^*_{i,t}$ decrease when we move from 6 to 14 member states and consequently $Z_{i,t}$ increases in absolute value. If this increase does not change the sign of $Z_{i,t}$, the sign of *k*, and thus the pattern shown by a given country, does not change either. In the case $Z_{i,t}$ changes from negative to positive, *k* will also change sign but that will not alter the positive or negative movement of the country: getting closer to the average, coming from below, and then getting away from it; or getting closer to the average, coming from above, and then diverging from it.

Results for the other reference groups can also be obtained upon request, from the authors, as Annex to this Working Paper.

References

[1] BEN-DAVID, D. (1993), "Equalising exchange, Trade liberalisation and income convergence", *Quarterly Journal of Economics*, 106, 407-443

[2] BUCKWELL, Alan et al. (1997), "Towards a Common Agricultural and Rural Policy for Europe – Report of an Expert Group", Commission of the European Communities, Directorate General VI /A1

[3] CESARETTI, Gian Paolo (1985), "Agriculture under CAP: The Italian Experience in *Prospective evolution of EEC Common Agricultural Policy: its relevance for Mediterranean members*, F. B. Soares (ed.), Lisboa, Instituto Gulbenkian de Ciencia, Centro de Estudos de Economia Agraria, pp. 33-57

[4] Commission of the European Communities, *The Situation of Agriculture in the Community, Annual Report 1995*, Brussels, 1996

[5] EUROSTAT, Economic Accounts for Agriculture and Forestry, EAAF 1989-94, Diskette version, Luxembourg, 1996

[6] EUROSTAT, Agricultural Labour Input in the EU, 1973-1996, European Communities, Luxembourg, 1998