The Impact of Farm Income Support on Absolute Inequality

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Paul Allanson[1]

This paper focuses on the impact of agricultural support policies on the distribution of farming incomes, using measures to characterise and quantify the redistributive effects that are based on the change in the absolute Gini index. The provision of support to Scottish agriculture is found to have been at best ineffective as a means to reduce the average size of income disparities between farms. Agricultural policy is further shown to have been inefficient as a redistributive tool because of the adverse distributional effect of the re-ranking of farms induced by the provision of support.

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1 INTRODUCTION

The improvement of the income position of farm households is a prominent if poorly defined objective of agricultural policy in many countries. However the impact of farm support programmes on the distribution of income among individual farm households has received little explicit consideration in the agricultural economics literature. Ahearn et al. (1985) and Keeney (2000) amongst others have analysed the contribution of farm support programmes to the total inequality of agricultural incomes through the decomposition of the Gini coefficient by income components, but do not thereby provide a formal characterisation of the redistributive properties of farm support programmes *per se*. The conventional wisdom on the subject is summarised in OECD (2003) which argues that farm support measures do not change the income distribution in any significant way because farm support measures are still primarily based on production or production factors. Moreover the generic nature of many measures implies that the bulk of support goes to farm households who do not need it. OECD agricultural ministers (OECD 1998) have identified equity and targeting as operational criteria for policy evaluation.

In general terms, the redistributive effect of agricultural policy may be defined as the difference between the inequality of pre-support and post-support farm household incomes. However, the choice of inequality measure for this purpose is constrained by the incidence of negative farm incomes or losses, because many standard aggregative measure of inequality are either undefined for negative incomes (Amiel et al. 1996) or, if defined, do not give rise to well-behaved measures of redistribution if pre-support incomes are negative on average. Allanson (2004) seeks to overcome the latter problem by proposing a measure of redistributive effect that is defined as the difference between the absolute values of the (ordinary) Gini coefficients of pre-support and post-support income. This paper employs an alternative measure equal to the difference between the absolute Gini indices of pre-support and post-support incomes. This measure has the appealing property that a universal flat-rate payment scheme will be deemed distributionally neutral and, moreover, it may be decomposed to show how the distribution and scale of support determine the redistributive effect given the distribution of pre-support income.

The paper is organised as follows. The next section introduces the measures that are used to characterise and quantify the redistributive effects of agricultural policy. Section 3 sets up the empirical application by considering the data issues involved in the construction of the distributions of both pre-support and post-support Scottish farming incomes. Section 4 presents the empirical findings which relate to the effects of agricultural policy on both the inequality and stability of Scottish farming incomes over the period 1993/94 to 1999/00. The final section offers a summary and some brief concluding remarks in the light of the empirical findings.

2 MEASUREMENT OF REDISTRIBUTIVE EFFECTS

Following the approach taken by Musgrave and Thin (1948) the redistributive effect of agricultural policy may be defined as the difference between the inequality of pre-support and post-support farm household incomes. But the measurement of this effect poses a methodological problem because of the incidence of negative farm incomes or losses. Losses have often been treated as nuisance items in agricultural income distribution studies with one common practice being to set all negative incomes to zero even though this will obviously bias resultant measures of inequality (Schutz 1950). However, negative incomes can not credibly be ignored in the analysis of the redistributive impact of agricultural policy given that many farms would record losses were it not for the provision of support and pre-support farm incomes may also be negative on average.

Amiel et al. (1996) note many standard aggregative measure of inequality are simply undefined for negative incomes. But even those inequality measures that are defined for both positive and negative incomes may not give rise to well-behaved measures of redistribution if pre-support incomes are negative on average. In particular, relative inequality measures such as the (ordinary) Gini coefficient G, the relative mean deviation and the coefficient of variation, are not suitable for this purpose because the sign of this type of measure is determined by the sign of average income. Thus if average pre-support income is negative whereas average post-support income is positive then the resultant measure of redistribution will be negative irrespective of the effect of support on inequality (see Allanson 2004, for further discussion).

One solution to this problem is to base the analysis on a measure of absolute inequality such as the absolute Gini index or one of the Kolm (1976a, 1976b) family of indices. Absolute inequality measures have the appealing property for the study of farm support programmes that they are invariant to equal absolute changes to all incomes. Thus a universal flat-rate payment scheme, which may be deemed to be distributionally neutral in the sense that all farms receive the same level of support regardless of pre-support incomes, will have no effect on absolute inequality. In contrast, relative inequality measures are scale invariant such that a policy which increases all incomes in the same proportion will be deemed to have no redistributive effect. But the presumed proportionality of benefits is precisely the basis of the widespread criticism of existing farm support programmes as poorly targeted and inequitable (see, inter alia, OECD 2003, Commission of the European Communities 1991a, European Commission 2002, Oxfam 2004). The absence of a change in relative inequality does not therefore provide a particularly appropriate benchmark of distributional neutrality for the analysis of the redistributive effects of agricultural policy.

Accordingly, let R be an index of the overall redistributive effect of farm income support defined as the difference between the absolute Gini indices of pre-support and post-support income, A_0 and A_1 respectively. The absolute Gini index A is equal to the average absolute difference between all distinct pairs of incomes in the population,[2] but may more usefully be defined as the product of the (ordinary) Gini coefficient and average income. In particular, the latter definition suggests a decomposition of R into 'vertical' and 'horizontal' components along the lines of Kakwani (1984):

$$(1) \qquad R = A_0 - A_1 = [\bar{y}_0 G_0 - \bar{y}_1 C_1] + \bar{y}_1 [C_1 - G_1] = V + H$$

where G_0 and G_1 are the (ordinary) Gini coefficients of pre-support and post-support income, $\bar{y}_0$ and $\bar{y}_1$ are the corresponding mean incomes, and C_1 is the concentration index obtained when post-support incomes are ranked by pre-support income.[1] The 'vertical' component $V = [\bar{y}_0 G_0 - \bar{y}_1 C_1] = - C_b \bar{b}$ provides a measure of the effects of differences in mean policy benefits between farms with different levels of pre-support income, which in turn depends on the distribution and scale of policy benefits where C_b is the concentration coefficient of benefits ranked by pre-support income[3] and $\bar{b}$ is the mean level of benefits. Let $D = - C_b$ be a disparity index that is positive (negative) if support is progressive (regressive) in absolute terms such that mean benefit levels are a decreasing (increasing) function of pre-support income, and that equals zero if the benefit schedule is uniform. For any given D, the gross redistributive effect of the policy will be proportional to the average level of benefits $\bar{b}$. However, the index of gross redistributive effect V overstates the redistributive impact of the provision of support because it includes the effects of changes in the ranking of farms between the pre-support and post-support income distributions that have no effect on overall inequality. The 'horizontal' component $H = \bar{y}_1 [C_1 - G_1]$ measures these re-ranking effects and is equal to the product of mean post-support income $\bar{y}_1$ and the re-ranking index $[C_1 - G_1]$ of Atkinson (1980) and Plotnick (1981). H is non-positive by definition, implying that any re-ranking that does occur has a negative impact on the overall redistributive effect of the programme.

The indices *R*, *V* and *H* may be given a normative interpretation with reference to the welfare measure $W = \bar{y}(1 - G) = \bar{y} - A$ of Sen (1973). Letting W_1 be welfare in the post-support income distribution and W_E be welfare under a hypothetical policy of uniform benefits equal in total value to the actual support programme, then

(2) $W_1 - W_E = R = V + H.$

Thus *R*, *V* and *H* can be interpreted as the monetary value of the redistributive effects of the policy expressed on an individual farm basis. In particular, *A* represents how much more or less would have to be given to each farmer under the distributionally neutral policy of uniform benefits to yield a welfare level equal to that under the actual support programme. Note that the (negative) re-ranking term *H* takes away from any welfare superiority of the actual benefit schedule over a distributionally neutral one.

3 DATA

To assess the redistributive effects of the provision of agricultural support in Scotland over the period 1993/94 to 1999/00, the distribution of farms by both pre-support and post-support farming income is constructed for each year using individual farm record data extracted from the Scottish Farm Accounts Survey (FAS) and raising factors calculated from the June Agricultural Census returns on the distribution of agricultural holdings in Scotland by type of farming and size of business. The FAS is a representative survey of about 500 full-time commercial farms carried out each year on behalf of the Scottish Executive (SEERAD 2001). It provides a wide range of physical and financial data, including detailed information on crop areas, livestock numbers, quotas, production, sales, revenues, subsidies and costs, which allows for the identification of policy benefits. Given a population of around 17,500 full-time farms in Scotland, the sampling fraction for each farm size and type is approximately 3 per cent.[4]

Post-support income is measured by Family Farm Income (FFI), which represents the return to the farm's own capital and all unpaid labour (farmers and spouses, non-principal partners and directors and their spouses and family workers) based on the actual tenure and indebtedness of the farm business. FFI is thus a measure of farm business income with the distribution of FFI per holding providing 'an important guide to the existence and locations of holdings generating small amounts of income for their occupiers' (Hill 1991: 43). The analysis is conducted at the farm level rather than per unit of unpaid labour because of doubts concerning the relevance and reliability of data on family labour input in the UK context (see Hill 1991). The FAS does not provide sufficient information on either non-farm sources of farm household income or farm household composition to support a broader analysis of the distributional impact of farm income support on the overall welfare of the agricultural community.

Pre-support income is defined as FFI less that part of gross policy transfers that is estimated to accrue to farm occupiers as owners of factors of agricultural production. This approach recognises that farm occupiers may not be the ultimate beneficiaries of farm support programmes (Floyd 1965) and, in particular, allows for the effective incidence of support to vary depending on the way in which that support is provided (see OECD 2003: Part II). The analysis thereby serves to identify the contribution of support to the inequality of post-support farming incomes, but it does not allow for the impact of agricultural policy on the distribution of pre-support incomes. To do so would require a model of the impact on individual farm incomes of adjustments in both farm production choices and the state of agricultural input and output markets in response to agricultural policy changes. However it seems unlikely that the results of such an equilibrium displacement modelling exercise would be robust given the

magnitude of the changes that would be entailed by the complete abolition of support for agriculture (Gardner 1987).

Three types of policy instrument are identified in the analysis. First, with respect to market price support measures, estimates are taken from the OECD PSE database (OECD 2001) of the gap between the EU domestic market and border prices for the main agricultural commodities, measured at the farmgate level. These estimates are adjusted to reflect the difference between United Kingdom (UK) and EU average producer prices and then used to calculate the impact of market price support in terms of inflating both the value (net of direct payments, grants and other subsidies) of observed output quantities and the cost of purchased feed and seed inputs. Second, direct payments are explicitly identified in the FAS and cover payments under the various Common Agricultural Policy (CAP) commodity regimes, voluntary set-aside schemes and the UK Hill Livestock Compensatory Allowances scheme. But account is also taken of the implicit loss in revenues resulting from the obligatory set-aside requirements under the Arable Area Payments scheme (AAPS) in calculating the net value of these payments. Third, the value of other grants and subsidies includes all other payments to farmers except for those in respect of permanent improvements.

The net economic benefit to farmers of these transfers will depend on the extent to which the transfers result in increased returns to the farm-owned factors of production, including management, and hence in increased farming incomes. The effect on farming income of a unit increase in output revenues, whether due to market price support, output payments or a reduction in set-aside requirements, is estimated as the combined cost share of the farm-owned factors of production, while that of a unit increase in direct payments, grants or subsidies to individual inputs (i.e. land and livestock) is simply calculated as the farm-owned share of those inputs. Estimates of factor cost shares are obtained on the assumption that Scottish agriculture may be characterised by an aggregate Cobb-Douglas production technology exhibiting constant returns to scale. Allowing for fixed farm-specific and year-specific effects, the parameters of the Cobb-Douglas production function are estimated from an unbalanced panel of observations formed from the FAS samples for 1995/96 through 1999/00 (Roberts et al. 2002). This yields shares for total labour, land and buildings, livestock capital, and all other purchased inputs of 15.2%, 9.5%, 8.6%, and 41.4% respectively. With these attributable costs accounting for 74.8% of total revenue, the residual 25.2% is identified as the return to the farmer's (fixed) management input. Farm-owned shares of factors of production are derived for each farm in the FAS sample, with 78.7% of labour, 58.1% of land and buildings and 100% of livestock capital being supplied on average by farm occupiers in the full raised sample. Hence the average net benefit to farmers of an extra £1 of market price support or output-related payments; AAPS or other area-related payments; livestock headage payments, subsidies or grants; and purchased input subsidies would have been £0.513, £0.581, £1 and £0 respectively.

4 EMPIRICAL RESULTS

This section presents the empirical findings of the study, which relate to the effects of agricultural policy on both the inequality and stability of Scottish farming incomes over the period 1993/94 to 1999/00. Table 1 presents weighted summary statistics by year for Scottish agriculture. Average FFI per farm was positive throughout the period, but fell sharply in 1997/98 as a result of a marked decline in total output and had not recovered by 1999/00. In contrast, the total value of support was roughly constant in spite of the changing balance of support between direct payments and market price support during the phased introduction of the MacSharry reforms (Commission of the European Communities 1991b). Direct payments provided the main source of support throughout the period, with 1993/94 marking the start of

TABLE 1 Weighted Summary Statistics, 1993/94-1999/00.

	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
Total farm output	98434	107111	112834	112143	95713	95294	93851
Total farm input	80424	85703	89789	92163	90893	90445	89903
(Post-support) FFI (£/farm)	23856	27645	28903	26790	11504	11921	11656
% of farms with post-support FFI<0	*7%*	*9%*	*8%*	*7%*	*25%*	*26%*	*24%*
Total transfers (£/farm)	35348	37725	39757	38620	36983	40728	40132
Of which due to:- Market price support	*18312*	*18325*	*16025*	*10409*	*11633*	*13514*	*14216*
(Net) direct payments	*15306*	*17317*	*21618*	*26045*	*23931*	*25625*	*23699*
Other grants and subsidies	*1730*	*2082*	*2114*	*2167*	*1419*	*1589*	*2217*
Total net benefit to farmers (£/farm)	25876	27144	29117	29934	27476	30876	30119
Of which due to:- Market price support	*9855*	*9742*	*8504*	*5341*	*5923*	*7132*	*7637*
(Net) direct payments	*14436*	*15492*	*18787*	*22874*	*20446*	*22493*	*20724*
Other grants and subsidies	*1585*	*1910*	*1826*	*1718*	*1107*	*1252*	*1758*
As % of post-support FFI:	*108%*	*98%*	*101%*	*112%*	*239%*	*259%*	*258%*
Pre-support FFI (£/farm)	-2020	501	-214	-3144	-15972	-18955	-18464
% of farms with pre-support FFI<0	*57%*	*61%*	*63%*	*61%*	*86%*	*87%*	*87%*

Source: Author's calculations.

the introduction of the MacSharry reforms and 1995/96 their full implementation. Market price support was also significant with domestic producer prices for most commodities remaining well above corresponding world price levels in spite of the reduction in agricultural support prices between 1993/94 and 1995/96, though characteristically exhibiting greater variability than the other sources of support due to the effects of variation both in output levels and in domestic and world market conditions.

The total value of support exceeded FFI throughout the period, although farmers would not in practice have received the full benefit of these transfers due to leakages to other owners of factors of agricultural production. Allowing for these leakages, the total impact of agricultural support on average family farm income is estimated to have been between £25000 and £31000 per year rather than between £35000 and £41000. Average pre-support incomes are thus predicted to have been close to zero in the years up to 1996/97, but to have fallen sharply thereafter with losses of more than £15000 recorded in each of the three years 1997/98 through 1999/00. The chronic dependence of farming on state aid is highlighted by the finding that in no year would less than half of all farms have recorded pre-support losses, and nearly 90% would have done so in the latter years of the period.

Table 2 presents the main findings of the study. Absolute inequality in post-support farm incomes is shown to be substantial with the average income differential between farms comparable in size to average income levels in the latter years of the study period. In comparison, the distribution of pre-support income exhibited lower levels of absolute inequality prior to 1997/98, but similar levels thereafter. The provision of support thus increased the average size of income differentials prior to 1997/98, as indicated by the negative values of the index of net redistributive effect R, but thereafter had a broadly neutral effect on absolute inequality with the value of R approximately equal zero. In the first period, the negative redistributive impact of agricultural policy was such as to increase average income disparities by between 20 and 30 per cent.

The first point to note is that the disparity index D is consistently positive, implying that farmers with negative or low pre-support incomes received more than an equal share of total benefits (although their share of benefits was less than their share of overall losses). Hence the index of vertical redistribution V is also consistently positive, implying that agricultural policy would have made the distribution of farming income more equal in absolute terms had it not been for the adverse distributional effects of re-ranking as measured by the index H. The main change over the period is seen to be the increase in this gross positive redistributive effect due to both the increasing scale of average net benefits and the changing balance of support measures. In particular, the partial switch from price support measures to direct aid payments is likely to have had a beneficial impact given both the higher transfer efficiency and more progressive distribution of the latter. By the final years of the study period, the vertical redistribution effect of agricultural policy had risen to such an extent as to almost exactly offset the re-ranking effect.

The results presented in Table 2 are based on a ‘static’ analysis with the degree of inequality and redistribution observed in any particular year influenced not only by underlying long-run factors but also by random factors affecting the incomes of individual farms in that year. For example, in the extreme case, the long run income of all farms might be equal but, because in each year different farms have good or bad luck, observed farm income in each year may be very unequal. Conversely, the observed inequality may be entirely due to differences in permanent income between farms if transitory shocks are perfectly correlated across farms. Clearly, the two scenarios have very different implications for the design of agricultural policy with the first calling for short-term assistance to deal with transitory problems of low or negative incomes on individual farms and the second requiring action to deal with the structural problems that trap some farms in low or negative incomes.

We consider here the impact of agricultural support policy on the stability of farm incomes by exploiting the longitudinal information on individual farms in the FAS panel. To measure the stability of income and support levels, we calculate a stability index in the spirit of Shorrocks (1978), which may be defined for any income or support variable X over a

TABLE 2 The Redistributive Effects of Agricultural Support Policy, 1993/94-1999/00

		1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
Absolute Gini index for post-support FFI	A_1	12089	16791	16015	14473	11397	11931	10950
Absolute Gini index for pre-support FFI	A_0	9274	14069	12581	11953	11361	13646	11165
Index of redistributive effect	R	−2815	−2721	−3434	−2520	−36	1715	215
Index of vertical redistribution	V	1991	1370	1624	2961	5002	6888	5824
Of which due to: Market price support		*-1713*	*-1521*	*-1450*	*-712*	*-68*	*404*	*347*
(Net) direct payments		*3499*	*3242*	*3539*	*3927*	*4859*	*6264*	*5286*
Other grants and subsidies		*205*	*-351*	*-465*	*-254*	*211*	*220*	*191*
Index of re-ranking	H	−4806	−4091	−5058	−5482	−5038	−5173	−5609
Disparity of net benefits: Total support	D	0.077	0.050	0.056	0.099	0.182	0.223	0.193
Market price support		*−0.174*	*−0.156*	*−0.171*	*−0.133*	*−0.011*	*0.057*	*0.045*
(Net) direct payments		*0.242*	*0.209*	*0.188*	*0.172*	*0.238*	*0.278*	*0.255*
Other grants and subsidies		*0.130*	*−0.184*	*−0.255*	*−0.148*	*0.191*	*0.176*	*0.109*
Average net benefits: Total support	$\bar{b}$	25876	27144	29117	29934	27476	30876	30119
Of which due to: Market price support		*9855*	*9742*	*8504*	*5341*	*5923*	*7132*	*7637*
(Net) direct payments		*14436*	*15492*	*18787*	*22874*	*20446*	*22493*	*20724*
Other grants and subsidies		*1585*	*1910*	*1826*	*1718*	*1107*	*1252*	*1758*
Average post-support FFI	$\bar{y}_1$	23856	27645	28903	26790	11504	11921	11656
Atkinson-Plotnick re-ranking index	C_1-G_1	−0.201	−0.148	−0.175	−0.205	−0.438	−0.434	−0.481

Source: Author's calculations.

measurement period of *T* years as the ratio of the *T*-year Absolute Gini index of *X,* calculated using each farm's average value of *X* over the *T*-year period, to the average of the *T* annual values of the Absolute Gini index of *X*. The index will equal zero when income or support levels are exactly equalised over the measurement period in which case the *T*-year Absolute Gini index is equal to zero, and will equal unity when all absolute income or support differentials between individual farms remain constant through time in which case the Absolute Gini index for each year and for the measurement period as a whole will be the same. Hence if inequality is largely a short-run phenomenon due to transitory shocks then the index will take a value close to zero whereas if inequality largely arises from long-term differences between farms then the index will take a value close to unity.[5]

The stability analysis is restricted to a balanced panel of 336 farms for which FAS data are available for all seven of the years 1993/94 to 1999/00.[6] Table 3 reports the values of the stability index and constituent annual average and *T*-year absolute Gini indices for the various measures of income and support employed in the study over progressively longer measurement periods commencing in 1993/94. The stability indices are seen to all equal unity when *T=1*, since the *one*-year absolute Gini index is simply the absolute Gini for 1993/94. In all other cases, *T*-year inequality is less than the average level of annual inequality, due to the process of averaging over time, and the values of the indices are less than unity. Figure 1 plots the values of the stability indices against *T* to more clearly illustrate the nature of the relationship between them for the different measures of income and support.

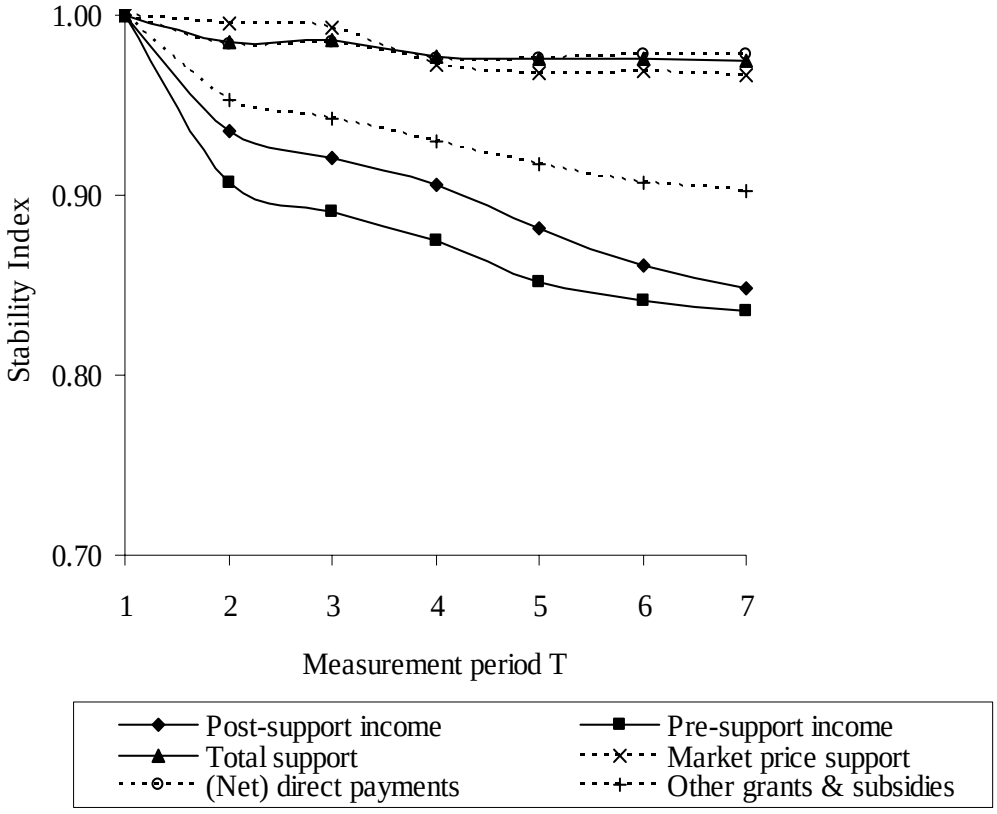
TABLE 3 Stability of Income and Support Levels, 1993/94-1999/00

Measurement period	93/94	93/94 to 94/95	93/94 to 95/96	93/94 to 96/97	93/94 to 97/98	93/94 to 98/99	93/94 to 99/00
T	1	2	3	4	5	6	7
			Average annual absolute Gini index				
Post-support income	11678	12422	13408	13395	12908	12677	12252
Pre-support income	8057	9242	10107	10382	10356	10809	10733
Total support	9319	9533	9862	10124	10080	10161	10164
Market price support	5794	5802	5690	5483	5279	5129	4995
(Net) direct payments	6420	6469	6906	7414	7484	7728	7793
Other grants & subs.	911	967	972	989	933	907	920
			T-year absolute Gini index				
Post-support income	11678	11627	12344	12130	11377	10912	10389
Pre-support income	8057	8382	9007	9086	8815	9098	8974
Total support	9319	9395	9721	9892	9839	9913	9902
Market price support	5794	5774	5650	5334	5111	4968	4830
(Net) direct payments	6420	6367	6803	7235	7302	7561	7619
Other grants & subs.	911	922	916	920	856	823	831
			Stability Index				
Post-support income	1.00	0.94	0.92	0.91	0.88	0.86	0.85
Pre-support income	1.00	0.91	0.89	0.88	0.85	0.84	0.84
Total support	1.00	0.99	0.99	0.98	0.98	0.98	0.97
Market price support	1.00	1.00	0.99	0.97	0.97	0.97	0.97
(Net) direct payments	1.00	0.98	0.99	0.98	0.98	0.98	0.98
Other grants & subs.	1.00	0.95	0.94	0.93	0.92	0.91	0.90

Source: Author's calculations.

We note first that the stability index for total support does not drop below 0.97 indicating that the inequality of benefits observed in any one year almost entirely reflects permanent differences in eligibility between farms. The stability of (net) direct payments might have been expected given that eligibility for many direct payments is based on quasi-fixed factors of production and restricted by historical production levels and/or possession of relevant quotas. More surprising is that the distribution of market price support appears no less stable over time given that the benefits of market intervention to individual farms will have been subject to commodity-specific fluctuations in both output levels and world market conditions. Only the distribution of other grants and subsidy appears to have been subject to any significant degree of variability, perhaps due to shifting patterns of participation in a changing miscellany of voluntary schemes.

FIGURE 1 Stability of income and support measures.



The results further suggest that the provision of support stabilises farm incomes to some extent given that the stability index for post-support income lies consistently above that for pre-support incomes. In particular, the initial decline in the stability index for post-support income is more gradual than that for pre-support income, implying that the support system has some capacity to buffer farm incomes from transitory shocks to pre-support incomes. Nevertheless, the subsequent convergence of the two stability indices as the measurement period increases suggests that the support system does little to remedy the underlying, structural determinants of inequality. Levels of long-run or structural inequality would appear to be about 85% of annual inequality, with Table 3 implying a long-run value for the average pre-support income differential between farms of roughly £9000.

5 CONCLUSIONS

The principal focus of the paper is the measurement of the redistributive effects of agricultural policy. One possible criticism of such an exercise is that the distribution of agricultural policy transfers reflects goals other than income support, such as those to do with the environment, sustainability and rural development. However measures specifically targeted to these other objectives still only account for a relatively small share of total support, whereas the direct payments that were first introduced by the MacSharry reforms of the CAP and now account for the bulk of support, had the stated objective of compensating farmers for the adverse income effects of cuts in support prices. The European Commission has for many years expressed concerns about the inequitable distribution of income support (Commission of the European Communities 1991a, European Commission 1997, 2002) and in the recent Mid Term Review of Agenda 2000 made various proposals to improve the targeting of direct payments (European Commission 2002, 2003).

The redistributive effect of agricultural policy is measured as the difference between the absolute Gini indices of pre-support and post-support incomes. This is a measure of the change in absolute inequality, which provides a benchmark of distributional neutrality more in accord with both public and official perceptions of fairness in the distribution of agricultural support than one based on the concept of relative inequality. The measure has a natural interpretation as the change in the average disparity of incomes between farms due to the provision of support. Moreover it may be decomposed into a vertical redistribution effect and a horizontal re-ranking component, and thus serves not only to quantify but also to characterise the redistributive effect of agricultural policy.

The measure is used to explore the effects of agricultural policy on the distribution of Scottish farm incomes over the period 1993/94 to 1999/00. It is found that the provision of support increased the average size of farm income differentials prior to 1997/98, but thereafter had a broadly neutral effect on absolute inequality. Nevertheless, the vertical stance of agricultural policy is shown to have consistently been progressive in absolute terms with the average level of benefit decreasing with the level of pre-support incomes. And it is only because of the adverse distributional effects of the re-ranking of farms that the provision of income support did not in fact reduce absolute inequality. Finally, the provision of support appears to have buffered farm incomes from the effects of transitory shocks to some extent, but does not seem to have remedied the underlying structural factors that are the major cause of the inequality observed in any particular year.

In sum, the operation of agricultural policy in Scotland was at best ineffective as a redistributive tool. This comes as little surprise in the light of the existing literature on the subject. But what is found in this study adds to such conventional wisdom the observation that agricultural policy was also inefficient as a redistributive tool because of the negative effect of the re-ranking induced by the provision of support. One likely cause of this horizontal inequity is the organisation of the CAP on a commodity basis, with the level of support varying across commodities. However this may not be the main factor given that results from a disaggregated analysis by farm type (not reported) show that the re-ranking index H for the agricultural sector as a whole is not consistently higher than the comparable indices for individual farm types. Allanson (2005) provides further evidence in support of this conclusion.

NOTES

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2. $A = \left\{ \frac{1}{2n(n-1)} \sum_{i=1}^{n} \sum_{j=1}^{n} | y_i - y_j | \right\}$ where y_i is the income of individual i (i=1,…n).

3. C_1 is defined in relation to the concentration curve obtained by plotting the cumulative proportion of post-support income against the cumulative proportion of the population ranked by pre-support income in the same way that G is defined in relation to the ordinary Lorenz curve (see Lambert, 2001). Note that $C_1 = G_1$ if the ranking of farms by pre-support and post-support incomes is identical.

4. The sampling frame excludes very small farms (less than 8 Economic Size Units (ESU)), very large specialist livestock units (greater than 200 ESU), and certain minor farm types.

5. Following Shorrocks (1978), it is easy to show that:

$$A_T = \overline{X}_T G_T \leq \frac{1}{T} \sum_{t=1}^{T} \overline{X}_t G_t = \frac{1}{T} \sum_{t=1}^{T} A_t ,$$

where A_T , G_T and $\overline{X}_T$ are the T-year Absolute Gini index, Gini coefficient and mean value of X respectively, and A_t , G_t and $\overline{X}_t$ are the corresponding annual values in year t. Hence the stability index must lie in the closed unit interval.

6. There are 345 farms with data for all seven years. Of these farms, nine are dropped to ensure that the there is no representation of large LFA cattle farms large cereals farms, and medium lowland mixed cattle & sheep farms in any year (note that farms may change both their size and type over time).

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