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DISGUISED UNEMPLOYMENT AND UNDER-EMPLOYMENT IN AGRICULTURE

P.N. Rosenstein-Rodan

Center for International Studies
Massachusetts Institute of Technology
Cambridge, Massachusetts

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DISGUISED UNEMPLOYMENT AND UNDER-EMPLOYMENT IN AGRICULTURE I.

P.N. Rosenstein-Rodan

I. Discussions about over-population are an age-old topic in economic literature. They have been going on since the end of the sixteenth century (Botero) in various forms and terminologies; but it cannot be said that a generally acceptable concept of "optimum population" has resulted from it. The concept of "agrarian excess" or "surplus population," or of "disguised unemployment in agriculture"[1] has, in contrast, a precise meaning, and has only emerged in the late 1920's. Since the 1940's, it has been made one of the cornerstones of the theory of development of under-developed countries. While a wide literature on economic development has grown, based on the belief that most under-developed countries have considerable agrarian surplus population,[2] opposition has been voiced recently. J. Viner and G. Haberler denied the existence of the phenomenon; N.U. Sovani pointed out that there is hardly any truly removable surplus population in Indian agriculture, and T.K. Schultz has recently reversed his stand and stated broadly, "I know of no evidence for any poor country anywhere that would even suggest that a transfer of some small fraction, say 5 per cent, of the existing labour force out of agriculture, with other things equal, could be made without reducing its production."[3] As against these views, it is our firm belief that disguised unemployment

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[1] The three expressions will be used synonymously.

[2] The present writer, W.A. Lewis, H. Singer, R. Nurkse, A. Molinari, and many others.

[3] The Role of Government in Promoting Economic Growth in State of the Social Sciences (Chicago, 1956).

of more than 5 per cent exists in many--though not all--underdeveloped countries, and a proof of it will be given in the description and measure of disguised under-employment in southern Italy in the second part of the present memorandum. Southern Italy is probably only a representative case of many other underdeveloped countries. This is not the place, however, to discuss the whole development theory. The purpose of the present memorandum is not to investigate how much weight disguised unemployment in agriculture can bear as the foundation of the whole development theory, but a much narrower one of clarifying the definition and describing the method by which surplus population in agriculture can be measured or estimated. This is all the more necessary since the concept has been used in many different methodologically indefensible ways, ranging from its exact meaning, through a much less exact reference to the "relation between resources and population," right up to technocratic, unrealistic and impractical calculations of what employment in an optimum agriculture ought to be.

Two basic concepts of agrarian excess or surplus population, or of disguised unemployment in agriculture, have to be distinguished:

(a) The first is a static concept referring to that amount of population in agriculture that can be removed from it without any change in the method of cultivation, without leading to any reduction in output. The marginal productivity of labour, in other words, is zero. This is the basic concept, which has a clear and unequivocal meaning. We shall give a list of all the underlying assumptions and hope to provide thereby a brief methodological guide to the attempts at identifying and measuring it.

(b) The second and quite different concept is the dynamic one, which refers to that amount of population ("potential surplus") which can be removed from agriculture without its output falling, on the assumption of a change in the method of cultivation. The change in the method of cultivation may range from a slight reorganization in the method of work up to a thorough reorganization in fixed and variable capital, including a far-pushed mechanization. Obviously, according to the degree of change in the method of cultivation and to the length of time assumed to be necessary for it, there may be different degrees of dynamic concepts. It is convenient to distinguish at least two degrees of dynamic ("potential") surplus: (i) on the assumption of a small change of method of cultivation employing only rearrangement of work with but small additions of circulating capital, and (ii) the true dynamic surplus on the assumption of thorough change, including additional use of both fixed and variable capital. What matters, however, is that all these dynamic concepts are full of pitfalls and much less exact and certain in their meaning and result. They should not be confused under any circumstances with the unequivocal and basic concept of static disguised unemployment. Under very precise assumptions and in specific circumstances, a clear meaning can be given to the dynamic concept. The present memorandum, however, will be confined to the nature and measure of the static concept only.

II. There are two methods to measure disguised unemployment in agriculture. The first and the only satisfactory one is the direct method based on an empirical sample enquiry with questionnaires distinguishing different types of cultivation, different sizes and forms of property,

the composition of the labour force, and the "labour diagram" (number of labour-hours required and supplied). Such an enquiry--which will be described here in detail--gives a reliable estimate of the true (i.e. removable) disguised unemployment, as well as of the fractional (partial) and seasonal unemployment in agriculture.

The second indirect method may be used in three variants:

(a) The number of labour-hours required to produce a given output is subtracted from the number of labour-hours available from the active agrarian population. The difference represents the agrarian surplus population.

(b) The density of population deemed adequate for a given type of cultivation is subtracted from the actual density of population. The difference is the agrarian surplus population.

In order to keep account of different fertilities of the soil, conversion coefficients of arable-equivalents are used, for example: 1 hectare of garden = 3 hectares of cultivated area; 1 hectare of meadow = 0.4 hectares of cultivated area, etc. (J. Poniatowski, Population in Agriculture, League of Nations, 1939).

(c) The number of hectares required under a given type of cultivation to provide one person with a "standard income" is contrasted with the number of hectares and the agrarian population available. The difference represents people for whom there is no land available and who are therefore "surplus."

For income calculation "crop-units" are used by H.E. Moore, instead of arable-equivalents (area conversion coefficients) of J. Poniatowski.

The indirect method can, of course, attempt the measure of the

static--not only the dynamic--surplus population. The vital difference in assumptions is frequently blurred in literature. Even when it is rigidly observed, the results are highly imprecise, since the "amount of labour required" (a), or the "adequate density of population" (b), or the "adequate income or crop-unit" (c) cannot be exactly established. Its vagueness increases once it is applied not to small particular holdings but to larger areas. Even in the best cases no distinction can be made between those who could be removed from agriculture (true disguised unemployment), and those who represent fractional or seasonal unemployment (see III, viii).

When potential surplus population under dynamic assumptions is calculated ("if Asia were producing under American conditions of agricultural technology, how many people would suffice to produce her crop", . . . etc.[4]), the results are far too highly removed from reality and not relevant to any "operational" decisions on development programming or economic policy.

III. The direct method of measuring the static surplus is therefore the most reliable. All the assumptions made in such an enquiry will be now listed in detail:

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[4] H.E. Moore, Economic Demography of Eastern South-East Europe, Geneva, 1945. Another example: Italy's rural population in 1931 was 18 million. If Italy produced the average European output per head in agriculture, 27.1 per cent of the agricultural population would be removable surplus. If Italy's agricultural production were equal to France's output per head and per hectare (calculated in crop-units and arable area equivalents), 34.8 per cent would be surplus. If her agricultural production were equal to France's agricultural production per head (not taking account of arable area equivalents), 58.6 per cent would constitute agricultural surplus population.

(i) Only agricultural smallholdings of direct cultivators (peasant owners and tenants) are observed, the assumption being that where agricultural workers are employed, these workers would not be surplus. They may be, of course, partially under-employed in the same sense in which workers in industry, in handicrafts and in commerce do not efficiently use all of their working time.[5]

(ii) The agricultural area is divided in representative types of cultivation. For example, in Italy: (a) extensive monoculture; (b) intensive monoculture; (c) pluricultural cultivation, and (d) pluricultural cultivation with industrial crops. Each of these types of cultivation is grouped appropriately into holdings: (a) up to 2 hectares; (b) from 2 to 5 hectares; (c) from 5 to 10 hectares; (d) from 10 to 25 hectares, and (e) above 25 hectares.

(iii) Under the labour force in each of the holdings, one assumes the active population as being those from 14 to 65 years of age. Account is taken, however, of children under 14 and adults over 65 who work in agriculture. This is, of course, a very important phenomenon in peasant agriculture. If they did not work, the removable surplus of those between 14 and 65 would be less.

Those who are engaged in work outside their holding--be it in an outside farm or in extra-agricultural activity--and derive 60 per cent or more of their income from it are excluded from "available labour," although they are "resident" in rural areas.

To calculate the labour-force, coefficients of labour efficiency of men, women, and children are used for each type of cultivation. In the Italian enquiry, coefficients of Serpieri (one child from

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5. It has been calculated, for example, by I. F. Mariani in 1951, that in Italian industry every worker has, on the average, been under-occupied for 4.48 per cent of his potential working capacity. This is not, however, a removable surplus population under the assumption of ceteris paribus.

14 - 18 years old equals 0.5; one woman equals 0.6; one man equals 1.), as well as a slight modification of those proposed by G. Orlando, have been used.

(iv) It is also assumed that one woman for a household up to five members is occupied in household activities and therefore not available for work in the field; where the family is of less than five, for instance, two or three, it is also supposed that one woman is fully occupied in household activities. The same is assumed for two women for families from 6 - 10 units, and for three women for families of above 10 units. This indivisibility reduces naturally the amount of removable surplus.

(v) It is assumed that those who are in surplus are involuntarily unemployed. Where, owing to custom, women will not be willing to accept work outside the home, they should not be counted as disguised unemployed. Thus, in Sicily, for instance, a much lower percentage of women would be willing to accept work outside their homes. These differences exist in many other countries. In the 1928 census of Greece, it will be seen, for example, that the percentage of women employed was very much smaller than that in Yugoslavia, etc.

(vi) Labour hours required for each type of cultivation over the whole year, month by month, are counted and compared with the labour hours available. This "labour diagram" (see Table 1 of the Appendix) gives the measure of seasonal under-employment.

Two kinds of seasonal under-employment have been distinguished: the first is the biological, or technical seasonal under-employment, since the growth of crops in a given type of cultivation requires

varying amounts of labour input over different months of the year which do not necessarily correspond to the supply of labour. This concept has been also called "seasonal under-employment of the productive cycle."[6] The second concept of seasonal under-employment, which we call "seasonal under-employment proper," takes account also of that amount of labour which is not available for climatic as well as institutional reasons. Thus, the number of holidays plus the number of days during which no labour in agriculture can be supplied owing to snow, tempests, monsoons, etc., reduce the number of labour days available during the year. An average of 270 working days has been assumed in the Italian enquiry.

(vii) Even when one knows what number of labour days is available and required, one cannot yet proceed with the calculation of the disguised unemployment and under-employment. The fact is that the number of labour hours available in different months is different during the year; it may be only eight hours or less in the winter, and twelve or thirteen hours in the summer months. Some amount of overtime hours is possible; however, it is <u>not</u> assumed to reduce the amount of disguised unemployment. The typical labour availability looks therefore as follows:

Month	Working Days	Working Hours per Day		Working Hours per Month		Equivalent in terms of Man-hours	
		Men and Children	Women	Men and Children	Women	Children	Women
November	23	8	8	184	184	92	110
December	18	8	8	144	144	72	86
January	18	8	8	144	144	72	87
February	18	9	9	162	162	81	97
March	20	10	10	200	200	100	120
April	20	11	10	220	200	110	132
May	27	12	10	324	270	162	194
June	26	13	10	338	260	169	203
July	27	12	10	324	270	162	195
August	27	11	10	297	270	148	178
September	23	10	10	230	230	115	138
October	23	9	9	205	205	103	123
Year	270			2.772	2.539	1.386	1.663

This is taken account of in the Italian enquiry, a detailed analysis of which will be given in the second part of this memorandum. It implied the simple though tedious recalculation of the number of labour units (men or women) who could be removed into employment outside agriculture, where the number of labour hours required is constant throughout the year.

(viii) The labour diagram thus constructed (see the diagrams A and B in the Appendix) shows the total amount of "disguised under-employment." This is not yet, however, equal to the true removable surplus population. People who are under-employed, over one part of their working time only, could not be removed without output falling. Only entire labour units, men or women, whose removal would not lower agricultural output, can be considered true agricultural surplus or disguised unemployment. In the terminology of the Italian enquiry, a distinction is made accordingly between: (a) removable disguised under-employment (equal to our concept of disguised unemployment, or surplus or excess population); (b) the disguised fractional unemployment too (or under-employment), which are those labour hours not used throughout the whole year that do not add up to an entire labour unit. Those in fractional disguised unemployment cannot be removed outside agriculture, although they could be provided with more part-time work in handicrafts, community development, etc., (c) seasonal under-employment due to climatic factors.

The distinction between removable and irremovable surplus[7] is an important instance of the difference between the aggregative macro-economic procedure characteristic of indirect methods, and the disaggregative micro-economic procedure used in the direct method. While the distinction between

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[6] See C. Gini, Patologia Economica, Torino, 1952.

[7] This distinction has been stressed by A. Molinari: "Occupazione e sviluppo demografico nei passi sottosviluppati," Roma, 1955, pp. 14,15, and G. Dell'Angelo in the present enquiry, who demonstrated how fractional disguised unemployment can be measured.

removable and irremovable surplus may give different results in different countries, its importance can be seen in the Italian enquiry where the true removable surplus is only about one-half of the total disguised unemployed labour force. Even when account is taken of this distinction, however, it appears that more than 10 per cent of the active labour force in southern Italian agriculture is surplus on an additional assumption to be mentioned under (ix).

(ix) If one adheres rigidly to assumptions of ceteris paribus under which nothing whatsoever can be changed in the method of cultivation, even a mere one-week or a one-month peak load of work can substantially lower the amount of disguised unemployment. It is convenient and reasonable, however, to loosen slightly this assumption of no change, provided that the extent and the nature of the minimum change deemed compatible with static assumptions is precisely described. This is only the same method that is applied in the theory of supply where a minimum amount of imperfect competition is always assumed.[8] It has been accordingly assumed in the Italian enquiry that where some additional labour would have to be engaged for a peak load of up to two months (50 working days) during the year, in over-populated areas this would constitute a tolerable minimum of change which is deemed still compatible with the static assumption of ceteris paribus. In other words, all those who are employed during the year for less than 51 days are assumed to be removable. In the Appendix, diagram A shows the removable and irremovable surplus under the rigid assumptions of no change whatsoever. Diagram B introduces the assumption of the minimum change compatible with the static presupposition whereby peak loads up to two months can be substituted by hired labour, while those who only work for fifty days a year or less are considered to be truly in disguised

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[8] See J. R. Hicks, Value and Capital.

unemployment. Diagram B shows, therefore, the "conventional" unemployment and under-employment.

On the basis of the labour diagram (Tables 1 and 2) of one random peasant holding, the three types of under-occupation [(a) removable = true disguised unemployment, (b) irremovable fractional unemployment, and (c) seasonal under-employment)] can be calculated for this peasant holding.

This procedure has been applied in two sample enquiries covering 100 farm holdings each in Italy, and the results of these two enquiries conducted by Dr. G. Dell'Angelo and Prof. G. Orlando in collaboration between the Center for International Studies of M.I.T. and the SVIMEZ in Rome will become available towards the end of 1956 and will be communicated as the second part of this memorandum. This will include, apart from the results of these two investigations, also a bibliography of the literature on disguised unemployment.

IV. Although the purpose of the present memorandum is only to describe the method used for the measurement of disguised unemployment, a few words may be added on an additional enquiry directly connected with the present one, and provided in Chapter III of Prof. G. Orlando's report (see Part II of this memorandum), which may help to estimate the difference between the money- and the opportunity cost of the removable surplus if it were to be employed outside agriculture. When a worker in disguised unemployment, whose share in the income of his family gives him an income of around 100 dollars per annum, is removed from agriculture and provided with work outside it, the family members remaining on the farm have at their disposal an additional income of $100. The wages of the disguised unemployed provided with work amount to about $400 a year. If the whole of the $100 additional income accruing to the family members remaining on the farm were

saved, it could be said that only $300 of additional resources are required to provide for wages of the additional employed "surplus" men. The difference between the money cost and the opportunity cost of wages would thus be 25 per cent. The remaining family members are poor and hungry, however, and will not save the whole of the additional income accruing to them; they will expand their consumption and save only a part of the additional product. A household budget analysis on a sample of the poorest 15 per cent of southern Italian peasants (in Calabria) shows that they will save between 15 and 18 per cent of their additional disposable income. Other sample enquiries observing the household budgets of newly employed workers removed from agriculture into towns in southern Italy, show that they will save from their wages from 20 to 28 per cent per annum. This unusually high rate of saving may not endure in the long run, since one part of it goes during the first years of their employment--and these were the only years covered in the sample enquiry--for repayment of debt. In the longer run, moreover, the newly employed workers will probably acquire the system of tastes of their new milieu and class. If it were assumed that in the long run they will save from 10 to 15 per cent, the total amount of savings, both in the farm, which has been relieved from one surplus family member, and by the man himself in town, will amount to $15 - $18 saved in the farm, plus $40 - $60 by the newly employed worker himself. The total amount of savings will thus be $55 - $78, i.e., roughly speaking, 14 - 19.5 per cent of the annual wage of the newly employed man. The difference between the money cost and the opportunity cost of wages would thus amount to between 14 and say 20 per cent; this may be less than has been thought by some enthusiasts, but it is nonetheless a very considerable amount. Where the removal of the surplus worker requires hiring of an outside worker for a

peak-load of say one month (25 working days). The wages paid for this temporary employment ($1.30 per day = $32.50) have to be deducted from the $100 accruing to the family. The additional income of the family will then only amount to $67.50, and their savings will be about $5.00 less. The difference between the money cost and the opportunity cost of wages would then amount roughly to 12.5% - 18 per cent, instead of 14 - 20 per cent.

V. Some general impressions may be added finally about the probable amounts of disguised unemployment in various countries. Where the number of types of cultivation is rather limited, for instance cereal production in extensive monoculture on farm holdings in Poland, Roumania, and Yugoslavia during the inter-war period, the amount of disguised unemployment was presumably very great, and the estimates made then of its being 20 - 25 per cent of active population in agriculture seem reasonable. An empirical confirmation of it is provided by the fact that agricultural output in German-occupied Poland during the second World War did not fall when about 20 per cent of agricultural population was removed and from it into the army abroad, prisoners of war and forced labour. Where there is a greater variety of types of cultivation, including mixed farming and especially some industrial plants for tobacco, tomatoes, etc., and some wine-growing and olive trees, the removable surplus is very much less, being in southern Italy, for instance, probably around only 10 - 12 per cent of active population in agriculture. Where there are two or even three crops a year, most of the active population in agriculture is employed for more than fifty days a year. The amount of removable surplus population may therefore be negligible. This may be even the case in the most densely populated areas, as, for instance, in Java (Indonesia) where there are two or three

crops a year and where, moreover, in each district during one crop season the people of each district help each other. Although no detailed measurements have been made, it was my impression that the agricultural surplus population in Java would be very small. The converse may also hold true, so that even in not densely populated areas (for example, South America as distinguished from Central America and Iraq and Syria) there may be nonetheless some, although hardly considerable, disguised unemployment in agriculture.

APPENDIX

FARMHOLDING No. 35

Province: Cosenza

Type of land: hillside

Area: ha 3.85.87

Type of cultivation: pluri-cultural

Type of enterprise: private farm holding

Location of farm house: on the holding

Composition of the farm family:

- units by working age:

Men	1 = man-unit	1.0
Women	2 = " "	1.2
Children	1 = " "	0.5
	Total	2.7

- units not of working age:

Adults over 65: 0; of whom Men: 0, Women: 0,
Children under 14: 1.

Units outside farm family hired for peak work: 0.

Breakdown of units for the calculation of under-employment and surplus population:

Family Unit

Composition	Working Age		Not of working age		Units outside farm family
	Agriculture	Household	Active	Inactive	
Men	1	--	--	--	--
Women	1	1	--	--	--
Children	1	--	--	1	--

TABLE 1

MAN-POWER BUDGET OF THE FARM

Months	Man-power requirements of the farm		Man-power utilized by man-hours			
			Family units			Units outside farm family
			Working age		Not of working age	
	No. of man-hours	%	Agricultural	Household		
November	229	10.0	200	29	--	--
December	188	8.2	154	34	--	--
January	84	3.7	60	24	--	--
February	55	2.4	50	5	--	--
March	230	10.0	167	63	--	--
April	111	4.8	79	32	--	--
May	108	4.7	102	6	--	--
June	351	15.2	294	57	--	--
July	325	14.2	267	58	--	--
August	278	12.1	212	66	--	--
September	114	5.0	90	24	--	--
October	222	9.7	157	65	--	--
Year	2,295	100.0	1,832	463	--	--

TABLE 2

APPRAISAL OF UNDER EMPLOYMENT OF FARM FAMILY WORKING UNITS

Months	Under-employed units											
	Men			Women			Children			TOTAL		
	No.	Under-employed man-hours	Degree of under-employment	No.	Under-employed man-hours	Degree of under-employment	No.	Under-employed man-hours	Degree of under-employment	No.	Under employed man-hours	Degree of under-employment
November	1	64	35	1	62	56	1	60	65	2.1	186	47
December	1	48	33	1	48	56	1	52	72	2.1	148	49
January	1	120	83	1	63	72	1	60	83	2.1	243	80
February	1	130	80	1	87	90	1	73	90	2.1	290	85
March	1	137	69	1	66	55	1	50	50	2.1	253	60
April	1	175	80	1	116	88	1	92	84	2.1	383	83
May	1	244	75	1	182	94	1	152	94	2.1	578	85
June	1	158	47	1	131	65	1	127	75	2.1	416	59
July	1	144	44	1	138	71	1	132	81	2.1	414	61
August	1	231	78	1	92	52	1	88	59	2.1	411	66
September	1	210	91	1	78	57	1	105	91	2.1	393	81
October	1	169	82	1	47	38	1	58	56	2.1	274	64
Year	1	1,830	66	1	1,110	67	1	1,049	76	2.1	3,989	69

TABLE 3

DISGUISED AND SEASONAL UNDER-EMPLOYMENT

Available man-hours: 5,821 Under-employed man-hours: 3,989

Degree of monthly and annual under-employment

N	D	J	F	M	A	M	J	J	A	S	O	Annual
48.19	49.01	80.20	85.29	60.24	82.90	85.00	58.59	60.79	65.97	81.37	63.57	68.53

Appraisal of disguised and seasonal under-employment (man-hours)

Disg. under-empl. = 5,821 x 0.4819 = 2,805
Seas. under-empl. = 5,821 (0.6853 - 0.4819) = 1,184

Conventional appraisal of disguised and seasonal under-employment (man-hours)

Disg. under-empl. = (5,821 x 0.5859) - [386(0.5859 - 0.4819) + 302(0.5859 - 0.4901)] = 3,341

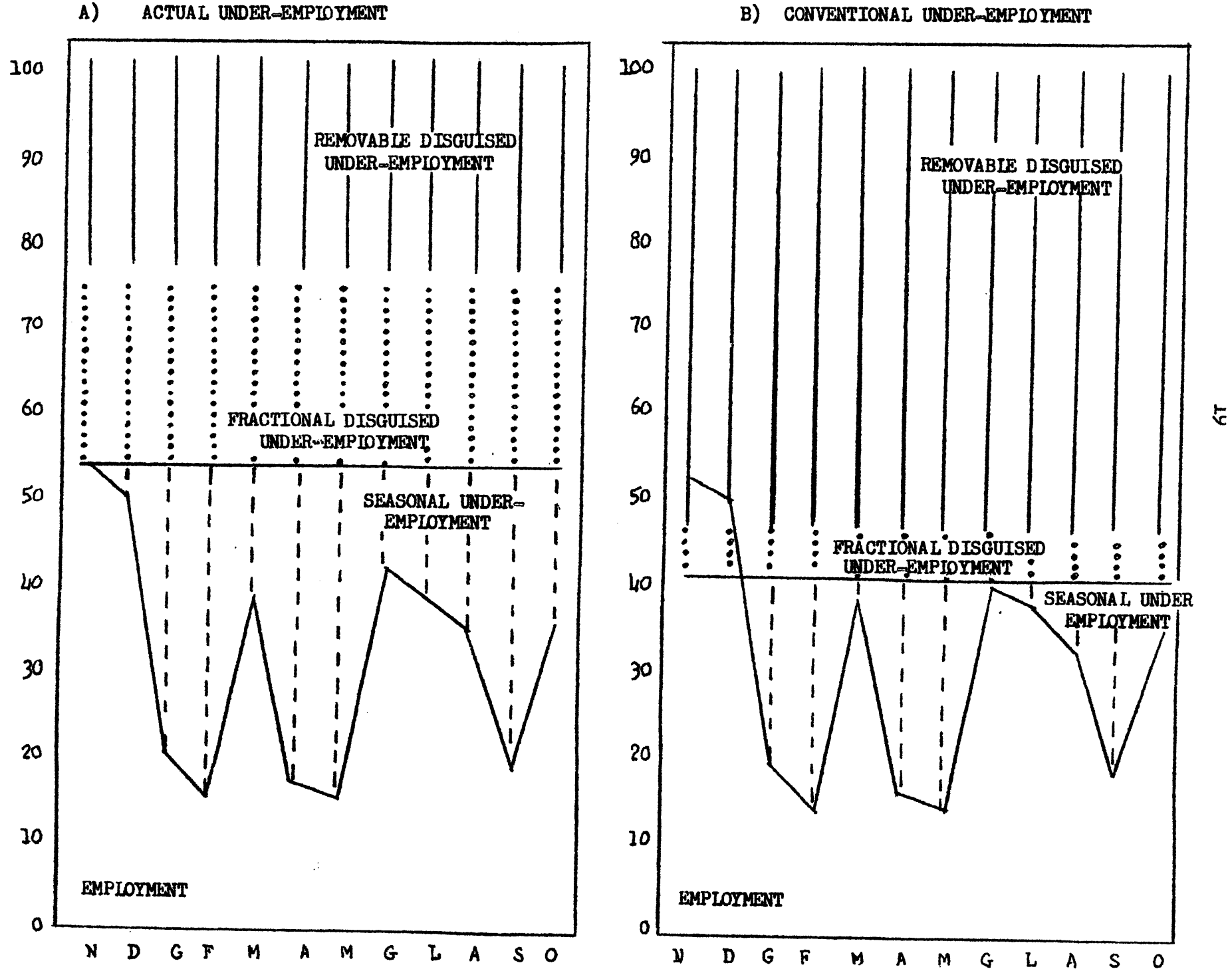
Seas. under-empl. = 5,821 [(0.6853 + 0.0119)] - 0.5859 = 648

Appraisal of under-employment (man-hours)

1.	Disguised under-employment:		3,341	83.76
	(a) removable (units in excess) $1_d + 1_r$	3,049	76.44	
	(b) not removable (fractional)	292	7.32	
2.	Seasonal under-employment		648	16.24
	Total under-employment		3,989	100.00

Degree of under-employment

Disguised		57.40
removable	52.38	
not removable	5.02	
Seasonal		11.13
Total		68.53


A) ACTUAL UNDER-EMPLOYMENT
B) CONVENTIONAL UNDER-EMPLOYMENT
100
90
80
70
60
50
40
30
20
10
0
REMOVABLE DISGUISED UNDER-EMPLOYMENT
FRACTIONAL DISGUISED UNDER-EMPLOYMENT
SEASONAL UNDER-EMPLOYMENT
EMPLOYMENT
N D G F M A M G L A S O