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Economic Analysis of the Effects of Rice Price Distortions in Pakistan: 1975–90

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INTRODUCTION

Price distortions induce inefficient utilisation of resources by giving incorrect signals to producers and consumers. Since distorted prices do not reflect the real value of resources, quantities of goods and services produced may not be consistent with their demand. The price Distortions may be caused by a number of different reasons. They may, for instance, be caused by monopolistic tendencies, preferential treatment of a particular sector of economy, establishment of diffusion of a particular product or an input, etc. In fact, price distortions occur sometimes from deliberate and sometime inadvertent Government policies of subsidies and price supports in pursuance of certain social or economic objectives.

Both producers and consumers maximise their economic welfare by allocating their resources in response to price signals from a fully competitive market. Since movements in commodity prices especially food prices affect producers and consumers in exactly the opposite way, fixation of their prices in developing countries represents a policy dilemma. While prices of all items used by consumers and producers are important, food prices carry a unique significance in low income countries where the marginal propensity to consume is very high. Since farm producers are also food consumers, the net impact of a food price change in their case will depend on the extent to which they have emerged from a subsistence economy. However, if inputs are subject to price fixation, the impact will be felt more readily and directly. In fact, where there is no Government intervention, prices equilibrate consumer demand with the productive capacities of producers. If prices are distorted by any agency, their allocative role is seriously diminished. Imperfections of both size and operation being prevailed ultimately induce mis-allocation of resources in the country. Resource use efficiencies increase, if government restricts its role to ensuring proper functioning of the market and lets the prices to be determined by the forces of demand and supply.

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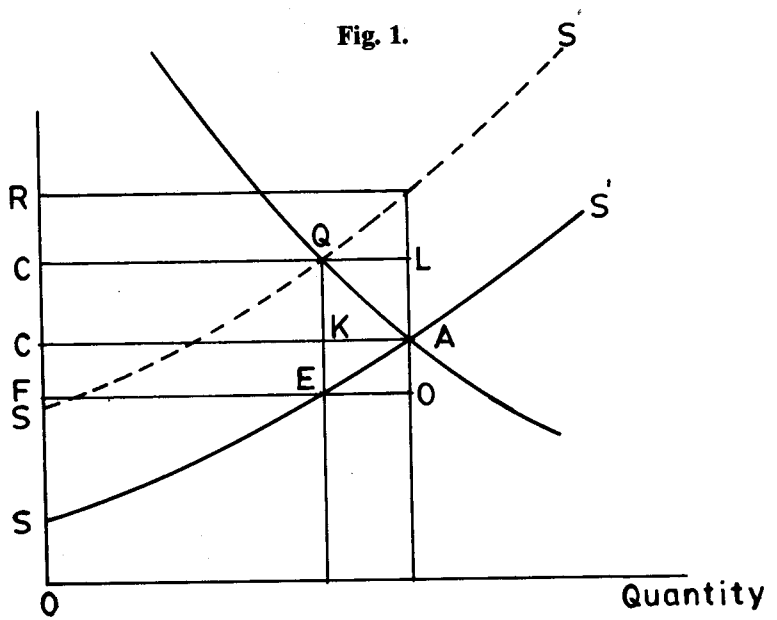
THEORETICAL FRAMEWORK

The Marshallian economic surplus framework based on partial equilibrium constitutes the theoretical basis for the analysis of the effect of price distortions in Pakistan. The effects are derived in both their real and pecuniary form by computing nominal protection coefficients (NPC) on the basis of domestic and border or international prices. The nominal protection coefficients thus derived determine the effects of distorted prices on the welfare of consumers and producers, resource use efficiency, growth, income distribution, stability and employment.

Setting aside the reasons, why the competitive equilibrium has been considered optimal; the concept of economic surplus, as has been considered by many, can lead us to be particularly useful for measuring the welfare effects of deviations from and optimum.

This application was extended by Marshall who used the diagrams to represent the leading features of the problem. If SS is the original supply curve, then the imposition of a per unit tax (Ea = AT = SS) will vertically shift this curve to SS'. The loss in Consumer Surplus is Ca AC; the loss to producers is GAFF and the tax revenue is Ca EF. Thus the net social loss is aAE. To see the effect of a per unit subsidy, the initial supply curve is SS'. With the payment of a subsidy of aE per unit of output, the supply curve becomes SS'. The cost to payers, RTAC, exceeds the sum of the gain to consumers CaAC, and the gain to producers, RTaC. Therefore the net loss is given by the area of TAa in the diagram 1.

Fig. 1.



To evaluate a number of government domestic programmes for Agriculture, three alternative types of support programmes. First the government sets a support price above the equilibrium price and purchase and destroys all the excess; second, the government sets a support price in excess of the equilibrium, and the output is sold on the open market. Here the government makes up the differences between the support price and the market price by means of a per unit subsidy; third, the desired price is achieved by directly restricted output. These programmes are illustrated in Fig. 2 here SS' represents, the margined social cost of the resources used to produce the commodity, and DD' reflects the marginal value of the commodity to the community. It is also indicated that each programme is designed to achieve a price O. M. The net losses of the three programmes by the areas of ANJPC, JPE and NJI, respectively. It has also been pointed out that assuming a given support price the first type of programme will never involve a lower net social loss than the other programmes. For example for a given support price.

NLS (111) NSL (11)
as n

Where NSL (111) and NSL (11) are the net social losses associated with programmes of type (111) and type (11) respectively and a n and c are the absolute values of the price elasticities of demand and supply respectively.

Since there is a valid presumption that some how a country "gains" from trading with other countries. Therefore, the possibility of measuring this gain through an obvious approach is to treat it as an economic surplus. Economic Surplus which arises from the opportunity to exchange goods with other countries.

Marshall suggested a measure of a country's 'net benefit' from foreign trade, "the excess of the maximum number of representative unit that it would be prepared to give up for the commodity it imports over the amount it actually hands over at the equilibrium rate of interchange". Since the scope of our study leaves us with the 'partial welfare analysis'; therefore to define precisely alternative measures of a country's gain from trade a general equilibrium approach may be conceptually more useful. This concept is based on diagram represented in Fig. 3. Diagram shows that in the absence of trade, the price would be PA QA in country A and PB QB in country B. Equilibrium will be established when CE, country A's imports is equal to FG, country B's exports. The corresponding prices will be CH in country A and FK in country B. According to this concept both countries gain from the trade. In country A, the gain to consumers, MNCPA, exceeds the loss to procedure NBEPA. In country B the gain to producers of NGPBR exceeds the loss to consumers of

Fig. 2.

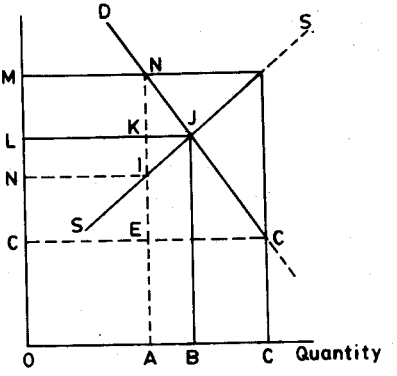
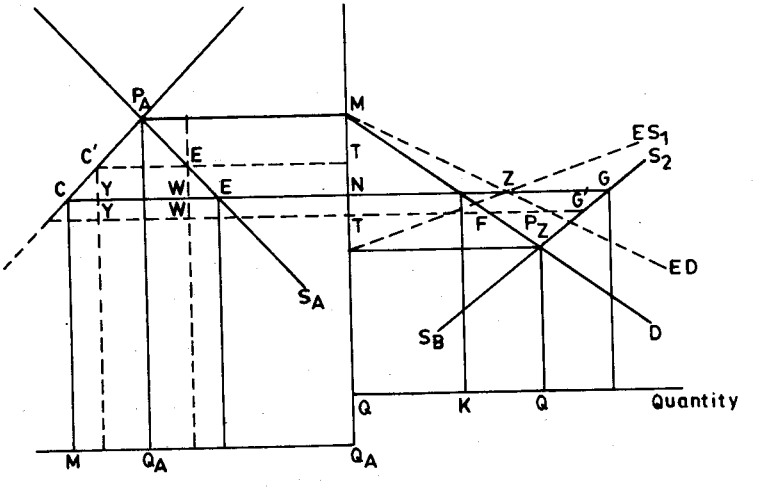


Fig. 3.



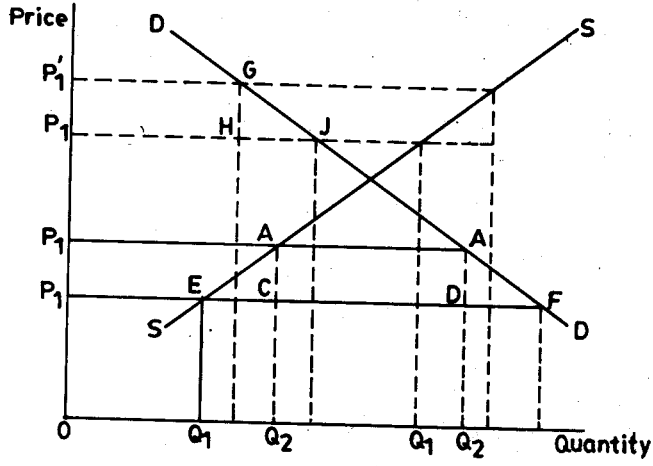
NFPBR. The net gain to country A is CPAEI; the net gain to country B is FGP. Therefore, the net social loss defined as the area between the excess demand and excess supply curves by EDA and ESB. This is maximised when volume of trade is NZ. This procedure, according to the concept of Economic Surplus is equivalent to maximise the net welfare gains to both the countries from trade:

MZA = EPAC and NZR = FGPB

In this case, if country A imposed a prohibitive tariff on the import of the commodity, both countries would be worse off then under free trade. Therefore, if country A imposes a per unit tariff of TT' on the import of the Commodity, the new equilibrium will be where A's imports, C'E, equals B's exports, F'G. For country A the loss to consumers is given by TC' CN, the gain to producers by TE' EN and the gain in government revenge by E'C'V'W. The net gain to country A is thus VWW'V' (CC'V + EE'W). The net loss to country B is given by FF'G'G'. Therefore, the two countries taken together loss, since FF'G'G' must exceed VWV'V'.

On the other hand at the free trade price Pf, the country imports Q1 Q4 of the commodity. If a tariff of PF Pt is imposed, imports will only be Q2 Q3. The loss to consumers is given by the area of Pt BFPf. The gain to producers by the area of Pt AEPf. The gain in government revenue by ABDG. Thus the net welfare loss from the tariff is given by AEC + BDF. In the literature area AEC is referred to as the "Production Cost". It is so because it represent the loss imposed by the distortion of Production, which is from the optimal pattern, correspond to the international price ratio. Area BDF is referred to as the consumption cost, because it represents the loss resulting from the consumption distortion, again from optimal pattern, correspond to international price ratio (Fig. 4). Here if we suppose that Pf' is the world price and the payment of a per unit export subsidy is there. Therefore, PF' Pt' will result as a net welfare loss of HGJ + KLM.

Fig. 4.



So far we have discussed the theoretical foundations of the concept of Net Social Loss in Production, Consumption, etc., with international trade and in a closed economy. The framework discussed framed the basis for empirical, to estimate the price distortion effects with regard to RICE; (Basmati and IRRI separately).

METHODOLOGY AND ECONOMIC ANALYSIS

The causes of price distortions evaluated are input subsidies, output controlled prices, concessional credit disbursement, tariffs, import and export taxes, overvalued exchange rates, etc. More specifically, the subsidies associated with inputs like fertilizer, irrigation water, pesticides, credit, etc., will be considered. The effects of support and procurement price programmes are examined with reference to Rice. The data for the period from 1975 to 1990 is used for the analysis. Since Nominal Protection coefficients provide a measure of the disparity between domestic prices and international prices, the derivation of the nominal protection coefficients therefore are proceed as:

$$NPC = \frac{1 + P - rP}{rP_w} = \frac{pd}{rP_w}$$

Where

P – domestic
P – world price (Border price)
r – equilibrium exchange rate.

The basic structure of the analytical model comprises of the following components (1).

1. Net Social Loss in Production

$$NSL_p = \frac{1}{2}(Q_w - Q)(P_w - P_p)$$

$$= \frac{1}{2} t_P^2 \, n_s \, v$$

Where

Q_w = Production at World prices.
P_w = World Prices

Q_p = Reduction at domestic prices.

t_P^2 = Proportion of tariff in domestic price at the producer level.

P_p = Production prices.

n_s = Elasticity of domestic supply/T.B.C.

V = Value of production at prices faced by producers.

2. Net Social Loss in consumption.

$$NSL_c = \frac{1}{2}(C_w - C_p)(C_p - W_p)$$

$$= \frac{1}{2} t_C^2 \, n_d \, W$$

Where:

C_w = Consumption at World Prices.

C_p = Consumption at domestic prices.

t_c = Proportionate of tariff in domestic prices at the consumer level.

W = Value of consumption at P_c.

P_c = Consumer Prices.

n_d = Elasticity of domestic demand.

3. Welfare Gain of Producers.

4. Welfare Gain of Consumers.

Change in Foreign Earnings.

$$dF = -Pw \; (Qw - Q + C - Cw)$$

Change in Government Revenue.

$$dG = (NSLp + NSLc) - Gp - Gc$$
$$-(1) \quad -(2) \quad -(3) \quad -(4)$$

The analysis are argumented by working out effective protection rates for Rice. The following procedure is used in determining the effective rates of protection.

$$ERP = \frac{VAD}{VAW} = \frac{VAW}{VAW}$$

Where:

VAD = Value-added at domestic prices.
VAW = Value-added at world prices.

The value added at world prices (VAW) has also been used to measure domestic resource costs incurred as a result of policies distorting agricultural prices. Domestic resource costs is being estimated with reference to the following equation:

$$DRC = \frac{DR}{VAW}$$

Where:

DR = Value of domestic resources employed in particular activity.
VAW = Value added at world prices.

RESULTS

Our results, with given supply elasticities, indicate that due to government intervention distortions in procedure prices impose significant cost on the economy separately in terms of foregone output. As a result the levels of production are significantly low than what it is reversed with respect to consumption. This situation is, however, at the expense of this sector.

Effects on Welfare

The analysis manifest clearly that the economy of Pakistan incur large annual welfare losses. Generally the losses are due to mis-allocation of resources which result from the agriculture pricing policies. The losses calculated are depending on elasticities and on the size of the price distortions which is measured by a proportional tariff rate. Supply Elasticities have been used to calculate the social loss in production. Where as uncompensated demand elasticities are applied. The results indicate that in comparison with economic output, distortions are generally more costly. Since the results are calculated from a partial equilibrium model therefore these present partial effects. As the results determine the most sizeable effects of the agricultural policies are the welfare transfers between consumers and procedures, we see, that the consumers generally gained from the type of price intervention, we are having in our country.

Effects on Government Revenue

Our results differentiate the revenue as the government is receiving increased

revenues from their interventionist policies. These results are based on the implicit assumption that the entire price distortion is attributable to taxes (or subsidies).

Effects on Trade

The effects on trade consist on the effects of both, production and consumption. Whereas, generally, we find that the pricing policies have negative effect on exports which results reduction in the exports (with NPCs smaller than 1) (Tables 1 and 2).

Effects on Foreign Exchange Earnings

Generally, the effects on foreign exchange earnings, on the level of development. Since it is the case here, therefore, according to the magnitudes for Basmati and IRRI Rice, foreign exchange earnings foregone as a proportion of non-intervention earnings are on average 27 percent and 13 percent respectively.

Effects on Value-added

Since the analysis have also been argumented on the effective protection rates, therefore, the study analysis the government intervention in input prices also. For instance; fertilizer subsidy in 1984-85 was equal to nearly 60 percent of the annual development expenditure in agricultural. Keeping in view the prevailing situation the task which has accounted for input subsidies as well as output price interventions, is to accomplish with value added. By calculating value added, we looked at effective protection rates; at domestic prices and at border prices, using equilibrium exchange rates. The average effects for the period under study are 65 percent for Basmati and 53 percent for IRRI rice. These are the proportions by which crop value added would have been higher in the absence of direct and indirect price interventions.

CONCLUSION

Prior to the 1970s, the rice trade was in the private sector, but the fall of Dacca in 1971, resulted in the diversion of the rice previously supplied to East Pakistan to the international markets. During this period the world wide commodity boom led the export price of rice more than double in 1973-74 compared to 1972-73, also. This was considered an opportunity for generating government revenue, which dominated the concept of procurement price of rice. Therefore, to maximise the revenue, the government, by restricting exports, created a large gap between the international price and the domestic price. As a result rice exports declined in 1972-

Table 1

NPC-NET Social Loss on Production, Consumption Welfare Gain of Producers and Consumers (000 Rs)

Year	Basmati	IRRI	Net Social Loss in Production		Net Social Loss in Consumption		Welfare Gain of Producers		Welfare Gain of Consumer
			NSLP(B) Basmati	NSLP(IRRI) IRRI	NSLC (B)	BSLC(IRRI)	WG(B)	WG(IRRI-6)	WGC(B)
1975-76	0.40	0.44	944769	776505	−73901	−82134	−3746773	−3135399	−318885
1976-77	0.59	0.71	9736	99759	−1139	−11499	−810902	−879131	−2375004
1977-78	0.52	0.81	379652	472428	−344806	−504753	−1214913	−1621716	−684694
1978-79	0.31	0.59	2705337	2459923	−1201445	−175707	−9586928	−7963028	1333115
1979-80	0.34	0.58	2412726	2154169	−478639	−146088	−8714153	−7596914	1035387
1980-81	0.40	0.51	1817256	1412349	−180738	−148777	−6058727	−5677839	697492
1981-82	0.36	0.53	1952305	1690863	−254468	−156130	−8256573	−7175096	1249877
1982-83	0.39	0.88	2173334	2261774	−972255	−38158	−9247350	−6834419	944133
1983-84	0.40	0.90	2210500	590270	−137279	−21708	−7552266	−5437890	921839
1984-85	0.33	0.75	3516342	1050699	−580468	−45362	−10566009	−8161807	2022760
1985-86	0.30	1.13	3880887	505529	−468261		−10745310	−2123893	1799669
1986-87	0.30	1.18	4564553	408135	−1005431		−13083339	−7145366	2948782
1987-88	0.37	0.88	4724112	421231	−1027621		−13291211	−7246253	3021751
1988-89	0.38	0.61	4992019	452541	−2135633		−14021421	−7432451	3214561
1989-90	0.40	0.50	5019095	499531	−2423562		−14032422	−8019432	3323451

Source: Calculatd on the basis of official Data.
Government of PakistanYear Book of Agricultural.
Government of Pakistan Statistics−various issues.
Government of Pakistan Economic Survey−various issues.

Table 2

Output, Consumption, Export, Foreign Exchange Effects, Effective Protection

Year	Short Run Total Output Effects		Long Run Total Output Effects		Consumption Effects		Export Effects		Foreign Exchange Effects		Effective Protection	
	Basmati	Irri	Basmati	Irri	Basmati	Irri	Basmati	Irri	Basmati	Irri	Basmati	Irri
1975-76	−0.13	−0.12	−0.36	−0.34	0.18	0.01	0.59	−0.89	−0.29	−0.18	−0.71	−0.65
1976-77	−0.06	−0.06	−0.31	−0.29	−0.08	0.00	−0.39	−0.09	−0.13	−0.13	−0.41	−0.39
1977-78	−0.11	−0.11	−0.31	−0.30	0.08	−0.01	−0.53	−0.58	−0.15	−0.18	−0.61	−0.62
1978-79	−0.14	−0.12	−0.35	−0.32	0.32	0.03	−0.79	0.56	−0.41	−0.21	−0.76	−0.65
1979-80	−0.13	−0.11	−0.37	−0.33	0.27	0.04	−0.68	−0.59	−0.27	−0.16	−0.74	−0.66
1980-81	−0.12	−0.12	−0.36	−0.34	0.16	0.08	−0.63	−0.57	−0.23	−0.16	−0.69	−0.70
1981-82	−0.12	−0.11	−0.37	−0.33	0.17	0.03	−0.75	−0.63	−0.30	−0.19	−0.67	−0.61
1982-83	−0.12	−0.06	−0.36	−0.29	0.20	−0.06	−0.76	−0.58	−0.22	−0.09	−0.67	−0.40
1983-84	−0.13	−0.08	−0.38	−0.27	3.14	−0.09	−0.63	−0.50	−0.20	−0.08	−0.70	−0.44
1984-85	−0.13	−0.08	−0.39	−0.27	0.22	−0.08	−0.82	−0.61	−0.25	−0.09	−0.73	−0.50
1985-86	−0.13	−0.03	−0.39	−0.21	3.27	−0.18	−0.74	−0.30	−0.20	−0.03	−0.75	−0.24
1986-87	−0.14	−0.04	−0.40	−0.18	0.28	−0.23	−0.83	−0.24	−0.21	−0.02	−0.72	−0.24
1987-88	−0.15	−0.06	−0.41	−0.19	0.29	−0.25	−0.85	−0.25	−0.23	−0.04	−0.73	−0.26
1988-89	−0.17	−0.08	−0.42	−0.20	0.31	−0.24	−0.88	−0.27	−0.25	−0.05	−0.79	−0.29
1989-90	−0.19	−0.09	−0.44	−0.22	0.33	0.26	−0.90	−0.29	−0.27	−0.07	−0.80	−0.30

Source: Calculatd on the basis of official Data.
Government of PakistanYear Book of Agricultural.
Government of Pakistan Statistics–various issues.
Government of Pakistan Economic Survey–various issues.

73 could not price up till 1975-76 despite the increasing trend in output. Secondly, 'Rice Export Corporation'; and the absence of other business opportunities, a large number of small traders rendered unemployed. On the other hand the government allowed the dealers to sell a quota of Basmati Rice (1/5th total delivered to the procurement centres) in the local market. This, by creating scarcity in the market, dropped the procurement price, the consumer prices went up. The estimates of output, export and foreign exchange earnings effects of price interventions indicate that-maximum output losses were 32 percent for Basmati and 25 percent for IRRI; export costs (in terms of reduced exports) were 40 percent for Basmati and 37 percent for IRRI, where as maximum export losses were 65 percent for Basmati and 68 percent for IRRI rice; however, the intervention effects on foreign exchange earnings as a proportion of Pakistan's total foreign exchange earnings was 17 percent was as, in the long run, with the direct and indirect intervention, the losses rose to almost 150 percent.

The analysis of the effects of Rice Price distortions indicates that the main factors resulting in negative transfers to producers have been price support and state trading followed by implicit taxation through over valued exchange rate. On the other hand, the consumers have been the consistent beneficiaries of government intervention.

Comments on "Economic Analysis of the Effects of Rice Price Distortions in Pakistan: 1975–90 "

The paper is a good attempt at the quantification of various effects of distorted rice prices. It is commendable for its elaborate theoretical construct and detailed methodology. On the basis of the theoretical literature and the results, the paper concludes that the rice price distortions in Pakistan have been responsible for immense loss of production which is in excess of consumption gains and has led ultimately to alarmingly high welfare losses throughout the period under consideration from 1975-76 to 1989-90.

In spite of these qualities of the paper, many limitations and deficiencies may also be noted. To pursue them systematically, they can be discussed under four heads as follows:

First, compared to its elaborate theoretical construct, the paper remains weak in the application of the theoretical construct for the quantification of results. Whatever empirical results have been obtained, only a futile attempt has been made to discuss them meaningfully. Although the paper has generated time-series data on the effects of rice price distortions, there is no corresponding emphasis on discussion of the trends of various effects with the passage of time. Thus the casual attention to discussion of results in an appropriate manner makes things cumbersome for the readers of the paper.

Second, the paper is beset by the poor labelling of diagrams and tables. For example, diagrams 1 and 2 make repeated use of the same words to refer to various points of each diagram and cause hardship in closely comprehending the text. Both tables of the paper go without specification of the units and leave the task of interpreting the reported data to the reader.

Thirdly, in spite of the fact that there has been a flood of literature on the subject on Pakistan in recent years [Ali (1992); Chaudhry and Kayani (1991); Dorosh and Valdes (1990); Ender (1992); Nabi, Hamid and Nasim (1990) and Qureshi (1987)], the paper missed a large part of the latest works. Had such literature been consulted, the analytical quality and precision of results would have witnessed substantial improvements.

Finally, while one is tempted to agree with the results and conclusions of the paper, some doubts as to the precision of estimated effects can be raised if one

compares them with the results of the various studies reported above. If this is done, the paper seems to have been characterised by the considerable over-estimating of the various effects especially the production effects. How this overestimation has crept into the paper is difficult to say without access to unreported data which went into the calculation of the various effects.

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