Price Discrimination and EU Dairy Policy: An Economic Evaluation of Policy Options

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Abstract: In a period of market liberalization and multilateral trade negotiations, price discrimination for commodities with distinct markets provides additional policy options to support farm income. While both the USA and Canada have implemented price discrimination policies in their domestic dairy sector, so far the European Union (EU) has not. This paper evaluates the options of developing a price discrimination policy in the EU dairy sector. The analysis is based on an interregional model of the EU dairy sector, involving milk production, dairy processing, and consumption of ten dairy commodities in nine regions. The paper shows that a price discrimination policy that increases prices for commodities with more inelastic demand (fluid milk, soft dairy products) would generate income that can be redistributed to dairy farmers. The results suggest that, while such a price discrimination policy can be a WTO-compatible way to support dairy farm income, the efficiency of the associated income transfers declines in the presence of significant supply response.

Keywords: EU, price discrimination, pooling, dairy policy

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1. Introduction

Over the last decade, agricultural policy has been heavily influenced by multilateral trade negotiations. In particular, World Trade Organization (WTO) negotiations have generated a significant move toward agricultural market liberalization. In agricultural policy, this has meant reductions in trade restrictions, import tariffs, and export subsidies. However, the European Union (EU) dairy sector remains heavily influenced by dairy policy which continues to support dairy farm income (e.g., Burrell, 1985, 1989, Hubbard, 1992; Oskam, 1989; Benjamin et al., 1999; Bouamra and Réquillart, 2000; Bouamra et al., 2001). EU dairy policy instruments involve import quotas, export subsidies, domestic production and consumption subsidies, intervention prices, as well as domestic production quotas. The 1995 GATT agreement placed constraints on the use of price subsidies, import tariffs and quotas, and export subsidies. Since such policy instruments have been historically used to support farm income, this raises interest in investigating alternative policies that are WTO-compatible.

Price discrimination is one tool available to increase income of market participants with market power. This can be done by increasing prices on markets with more inelastic demand. Such schemes are also available to policy makers. For example, the USA and Canada have implemented price discrimination policies in their dairy markets as a means of increasing dairy farm income (e.g., Sumner and Wolf, 1996; Cox and Chavas, 2001). This price discrimination involves increasing prices for fluid milk and other dairy products with inelastic demand to generate additional income that can be redistributed to dairy farmers. Such schemes do not necessarily create a price wedge between domestic and world markets; they do not involve direct

costs to the taxpayers; and their greatest price distortions occur on domestic markets for non-traded goods (e.g., fluid milk). As exemplified by the recent Canadian case in WTO, their exists a debate to determine if price discrimination policy among domestic markets is compatible with WTO rules.[2]

The objective of this paper is to investigate the prospects for developing a price discrimination policy in the EU dairy sector. This raises a number of questions. Can price discrimination policy be a substitute for more traditional policy instruments used to support dairy farm income? How much income might realistically be redistributed to dairy farmers at the expense of consumers? Finally, how efficient would price discrimination be as a means of increasing farm income?

This paper relies on an interregional model of the EU dairy sector, involving milk production, dairy processing and consumption of ten dairy commodities in nine regions (Bouamra et al., 2001). The model is used to simulate the effects of a price discrimination policy under alternative scenarios. We investigate the effects of increasing the price of commodities with more inelastic demand (fluid milk and soft dairy products), with the generated income being redistributed to dairy farmers. We evaluate the interaction effects between dairy production quotas and price discrimination policy.

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2 So far, the price discrimination policy implemented by US milk marketing orders has not challenged in Court. However, portions of Canada's Class 5 (Special Products Class) classified pricing scheme were found to violate Articles 9.1(a) and 9.3(v) of the WTO Agreement on Agriculture because it induced price wedges between domestic and world prices which benefited Canadian exports. This was deemed an export subsidy in violation of Canada's GATT commitments (see Dobson, 1999). Recent decision of Appeal court challenges some of these arguments.

The paper is organized as follows. We first briefly present price discrimination and its effects. The, using a spatial equilibrium model of the EU dairy sector we study the economic and welfare effects of alternative EU price discrimination policies. Implications of the results for EU dairy policy are finally discussed.

2. Price Discrimination in the EU Dairy Sector

The impact of price discrimination is illustrated in figures 1 and 2. As shown in Helmberger (1991), the figures show graphically for a single region the effects of price discrimination between two markets: a class I market with a more inelastic demand, and a class II market. The benefits of price discrimination are redistributed to producers through a farm "blend price." Figure 1 shows the effects of price discrimination with production quota. In contrast, figure 2 represents the market equilibrium conditions in the absence of production quota. Without price discrimination, the equilibrium price is P^0 and equilibrium production is Q^0. The discrimination scheme is implemented by increasing the class I price to a high level (P_I^F) while the class II price is determined by market conditions (P_{II}^F). The producers receive a blend price which is the weighted average of class I and class II prices and all producers receive this blend price. The processors of class I product have to pay a tax to the collecting/monitoring agency which then redistributes the generated revenue to the farmers. Assuming the agency makes neither profit nor losses, it means that area ABCD is equal to area DEFG in figures 1-2.

In figure 1, the price discrimination scheme has no impact on milk production since the production quota (Q) is binding. Compared to a no-price discrimination scheme, the producer price increases from P_0 to P_p^F, generating a higher quota rent and increasing milk revenue. Class I price increases while the class II price is reduced. Consequently, demand for class I products

decreases (from Q_I^0 to Q_I^F) and demand for class II products increases. We refer to these impacts as the indirect "spillover" effects of class I price discrimination on the class II markets. This generates gains to consumers of class II products at the expense of class I consumers. Because of the production quota, the negative impact on welfare is limited if demand for class I products is rather inelastic. Moreover, due to the quota, the supply price distortion does not induce an increase in production (if quotas are binding in the reference situation); therefore this price distortion does not create a deadweight loss.

Figure 2 represents the no-quota scenario. It shows that, under price discrimination, production increases from Q^0 to Q^F in response to an increase in the farm price. The increase in producer milk price is lower than in Figure 1 and the revenue generated to farmers is also reduced. Also, the increase in class II production and associated decrease in class II price are larger than in the presence of production quotas. The supply response tends to generate larger net welfare losses. We now present, using a spatial equilibrium model for the EU dairy sector, a quantitative analysis of the economic effects of such a price discrimination scheme in the EU dairy sector.

3. Simulation Results and Implications

The EU dairy sector model represents the production and allocation of milk to ten dairy commodities in nine regions. The dairy commodities are: (1) fluid milk, (2) butter, (3) skim milk powder, (4) fresh dairy products, (5) whole milk powder, (6) condensed milk, (7) casein, (8) hard and semi-hard cheese, (9) processed cheese, and (10) soft cheese, blue cheese and fresh cheese. The nine EU production/consumption regions are: (1) France, (2) Germany and Austria, (3) Belgium and Luxembourg, (4) Netherlands, (5) Denmark, (6) Spain and Portugal, (7) Italy and

Greece, (8) Sweden and Finland, and (9) United Kingdom and Ireland. Each region produces milk, consumes dairy products, and trades with other regions. To these regions, we add the rest of the world. The inclusion of the rest of the world allows linkages between EU and world dairy markets, where the EU is treated as a "large country".[3] The reader will find a description of the model as well as elements on the performance of the model in Bouamra et al 2001, 2002.

The model represents supply/demand conditions for 2000. In order to determine if price discrimination could be a substitute for traditional policy instruments, we define two "base scenarios". They both assume no production or consumption subsidies, no government intervention on the butter and nonfat dry milk markets, and no dairy export subsidies.[4] In Base I, we assume that milk production quotas are maintained while in Base II they are removed. As compared with 2000 EU dairy policy which combines quotas, export subsidies, domestic subsidies and intervention prices, the EU milk price would decrease by 24% in Base I and 28% in Base II. In base I, due to the quota system, milk production does not change while in base II it marginally increases by roughly 1%. Due to drop in milk price, milk producers would loss €7 billions in base I (as compared to current policy) and more than €8 billions in base II.

As suggested in figures 1 and 2, these two base scenarios (with and without production quotas) will allow us to compare the impact of price discrimination policy under alternative

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3 In 1999, EU share of world dairy trade was 27 percent for butter, 45 percent for cheese, 26 percent for skim milk powder, and 48 percent for whole milk powder.

4 This policy context involves greater market liberalization than current EU dairy policy. The base scenarios reflect situations that may be obtained under further multilateral WTO negotiations.

reference situations. We consider a price discrimination scheme where the price wedges are set equal to €0.05/kg for fluid milk (or 11.6 percent of the base price), and €0.10/kg for soft dairy products (or 5.4 percent of the base price).[5] We assume that the price discrimination scheme is implemented at the EU level. It means that the redistribution constraint (the agency makes neither benefits nor losses) is imposed at the EU level (this is called a pooling scheme in opposition with a non pooling scheme where such a constraint would be imposed in each country for example). Thus, two scenarios are presented. In the first one, price discrimination is associated with no supply response as milk production quotas are binding. In the second one, we investigate possible interactions between price discrimination policy and milk production quotas. With milk supply elasticities in the range 1.0 to 1.5, this corresponds to a long run situation allowing for large supply response to changes in milk price.

Impact on markets

The simulated effects of price discrimination on the EU dairy sector are presented in tables 1 and 2. Table 1 provides the change in milk price and production, the difference in the blend price received by farmers and in the milk price for class II products, as well as the impact on some dairy products' markets. In table 2, we report the welfare effects of price discrimination.

The impacts of price discrimination on farm prices correspond to $(P_P^F - P^0)$ in figures 1 and 2. Table 1 indicates that, in the presence of milk production quotas, milk price would increase by 6-7 percent on average. Interestingly, the results are quite different in the absence of

5 These wedges were calculated to correspond to the equivalent of a 25 percent tax on the value of the components found in fluid milk and soft dairy products.

milk production quotas. Here, the impact of price discrimination generates only a 1.4 percent increase in EU average milk price. The reason is that, in the longer term, significant milk supply response takes place, which reduces price adjustments as well as the ability of producers to benefit from price discrimination. This shows how supply response can affect the ability of government price policy to redistribute income to producers. These wedges correspond to (P_P^F - P_{II}^F) in figures 1 and 2.

When production quotas still exist, milk production adjustments are very limited as supply response to farm price changes is prevented. Production adjustments become more important in the absence of production quotas. This explains why the impact on milk price is lower when there is no constraint on production. As expected, price discrimination generates significant price increases for fluid milk (and fresh dairy products, not reported in table 1). The indirect induced spillover effects reduce prices for class II dairy products. For example, skim milk powder (SMP) prices are found to decrease by 1.2% in the presence of production quotas and 4.2 percent in the absence of production quotas. These induced price effects give the EU some additional advantage on world markets. For example, SMP exports would increase by 11 percent under scenario 1, and 32 percent under scenario 2. In response world market prices will be negatively affected because EU is a large exporter. This shows that domestic price discrimination on fluid milk and fresh dairy products would put some downward pressure on the price of traded dairy products and that such induced price distortions would help the EU export on world dairy markets. Such effects are smaller in the presence of production quotas, but would increase as supply response becomes more important. This illustrates that, while EU dairy price discrimination would affect the EU dairy sector directly, it would also have some induced effects on export incentives and world prices. It remains to be seen whether these indirect spillover

effects on world markets would raise questions concerning the legality and/or desirability of such price discrimination schemes in future WTO negotiations.

Impact on welfare

Table 2 evaluates the welfare effects of price discrimination, as measured by changes in producer surplus and consumer surplus. Class I consumers would be made worse off by price discrimination, as the price they pay for class I products rises. In contrast, consumers of class II products would enjoy an implicit consumption subsidy generated by the lower class II prices. However, the losses to class I consumers dominate and aggregate consumer welfare falls. The higher class I prices generate revenues that are redistributed to farmers. In the presence of production quotas, EU producer surplus would increase by €1.5-1.7 billions.6 This indicates that price discrimination schemes can generate significant income transfers from consumers to farmers without involving taxpayers (except for administrative costs). These welfare gains can be compared to the estimated €7-9 billions loss in producer surplus generated by extensive market liberalization (as reported above; see Bouamra et al. 2001). It suggests that price discrimination would not suffice to compensate EU dairy farmers for the lower milk price they would face under liberalization of EU dairy markets. As such, price discrimination policy may be an imperfect substitute for more traditional policy instruments supporting farm income.

When production quotas are removed, we show that significant supply response greatly reduces the ability of price discrimination to enhance farm income. In the absence of quotas,

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6 Alternative scheme of price discrimination could be implemented. For example, without pooling across countries, the impact on producers' surplus at the EU level would not change while the impact on producers' surplus at the regional level would change depending of the importance in the area of the production of classI products.

supply response reduces the increase in EU producer surplus to only €320 millions. This illustrates the strong interaction effects between production quotas and price discrimination. It suggests that, while price discrimination can help increase dairy farm income in the short run, its ability to support farm income may deteriorate significantly in the longer term in the absence of production quotas. Table 2 also indicates that consumer surplus decreases more than producer surplus increases, implying that price discrimination would generate a decline in total EU welfare. However, the net welfare loss is found to be small when production quotas are in place (€22 millions) while in the absence of production quotas, the net EU welfare loss is larger (€162 millions).

Under production quotas, Table 2 shows that price discrimination is a relatively efficient way of redistributing income to producers. Excluding administrative costs of implementing a price discrimination scheme, the net welfare loss of transferring €1 to EU dairy producers ranges from €0.012 and €0.038. Snow and Warren (1996) estimated that the welfare cost of 1 unit of public funds is in the range -0.09 to 0.25. This suggests that the welfare cost of price discrimination policy could be as low as, or lower than fully decoupled payments when the opportunity cost of public funds is taken into consideration. Conversely, when production expands, price discrimination becomes a less efficient income redistribution tool. The net welfare cost of transferring €1 to producers then rises to €0.50, which would be greater then the cost associated with a direct payment. This shows that milk production quotas improve the efficiency of transferring income to farmers through price discrimination.

4. Concluding Remarks

This paper has explored the economic and welfare implications of implementing a price discrimination policy among EU dairy markets. One of the motivations is to examine whether

price discrimination could help support farm income. This may be particularly relevant for future WTO negotiations that may stimulate further market liberalization, leading to significant reductions in farm prices. As long as price discrimination does not involve an administered and targeted price differential between domestic and world markets, it may be seen to be WTO-compatible. As such, price discrimination policy could possibly serve as a partial substitute for more traditional policy instruments under multilateral market liberalization.

In a market equilibrium context, we present results of a model simulating the effects of price discrimination policy in the EU dairy sector. We show that, by increasing prices in markets with more inelastic demand, such a policy generates income that can be redistributed to dairy farmers. We develop scenarios generating up to a €1.7 billions increase in EU producer surplus. However, such results are obtained in the absence of milk supply response (under binding milk production quotas). In the presence of significant supply response, the increase in EU producer surplus is reduced to €320 million. This suggests that the magnitude of supply response greatly affect the ability of price discrimination to transfer income to farmers. Marketing quotas could be one way to limit the increase in production: even with relatively high supply elasticity, they would allow farmers to maintain the benefits of price discrimination. We show that, due to "large country" effects, EU price discrimination would affect world prices. We find that it could reduce the world price of skim milk powder by 1-4 percent. In addition, our analysis indicates that the net welfare loss to society is smaller in the absence of supply response (e.g. with production quotas), but that the efficiency of the transfers declines significantly with supply response.

Figure 1: Price discrimination scheme and blend price with production quota

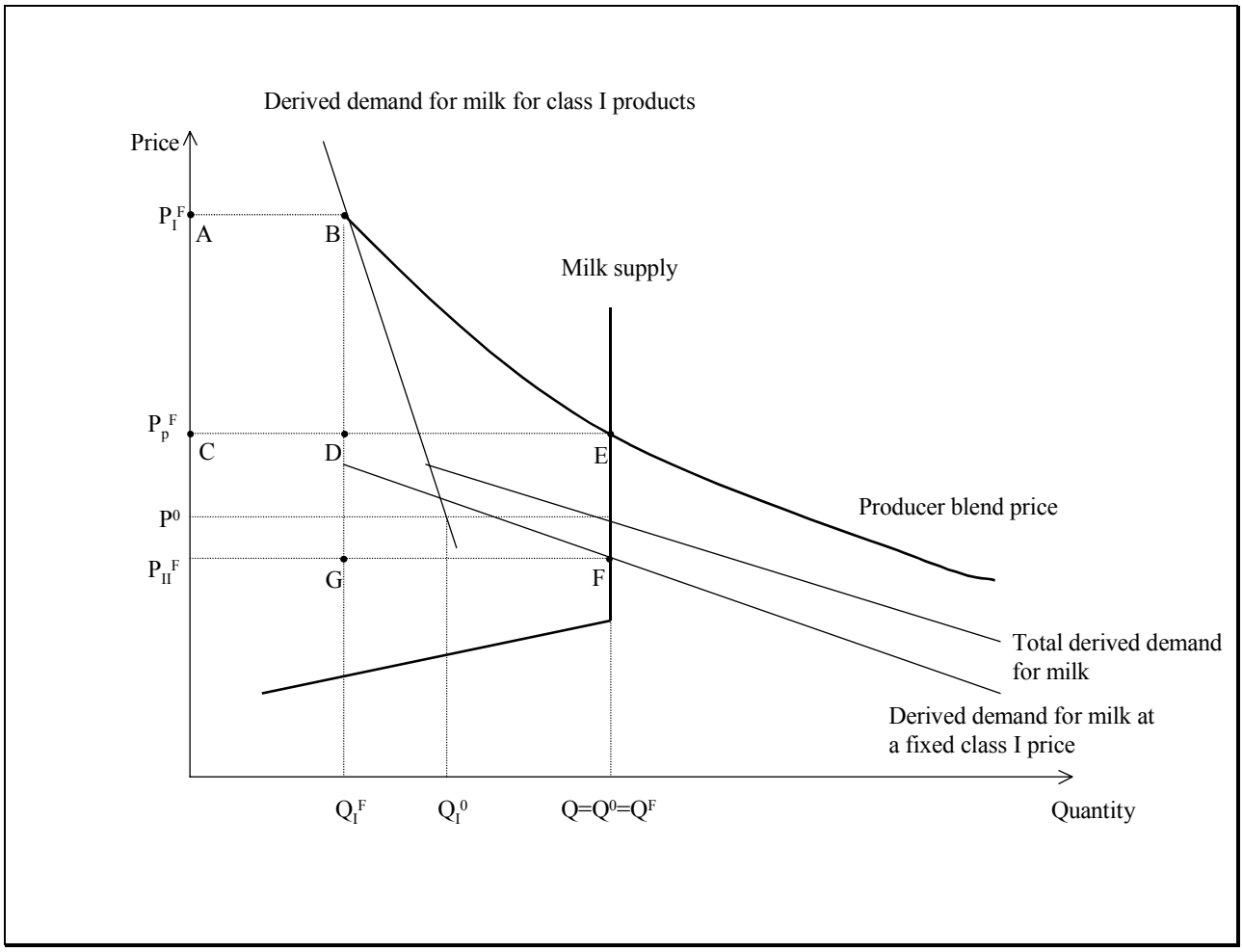

Figure 2: Price discrimination scheme and blend price without production quota

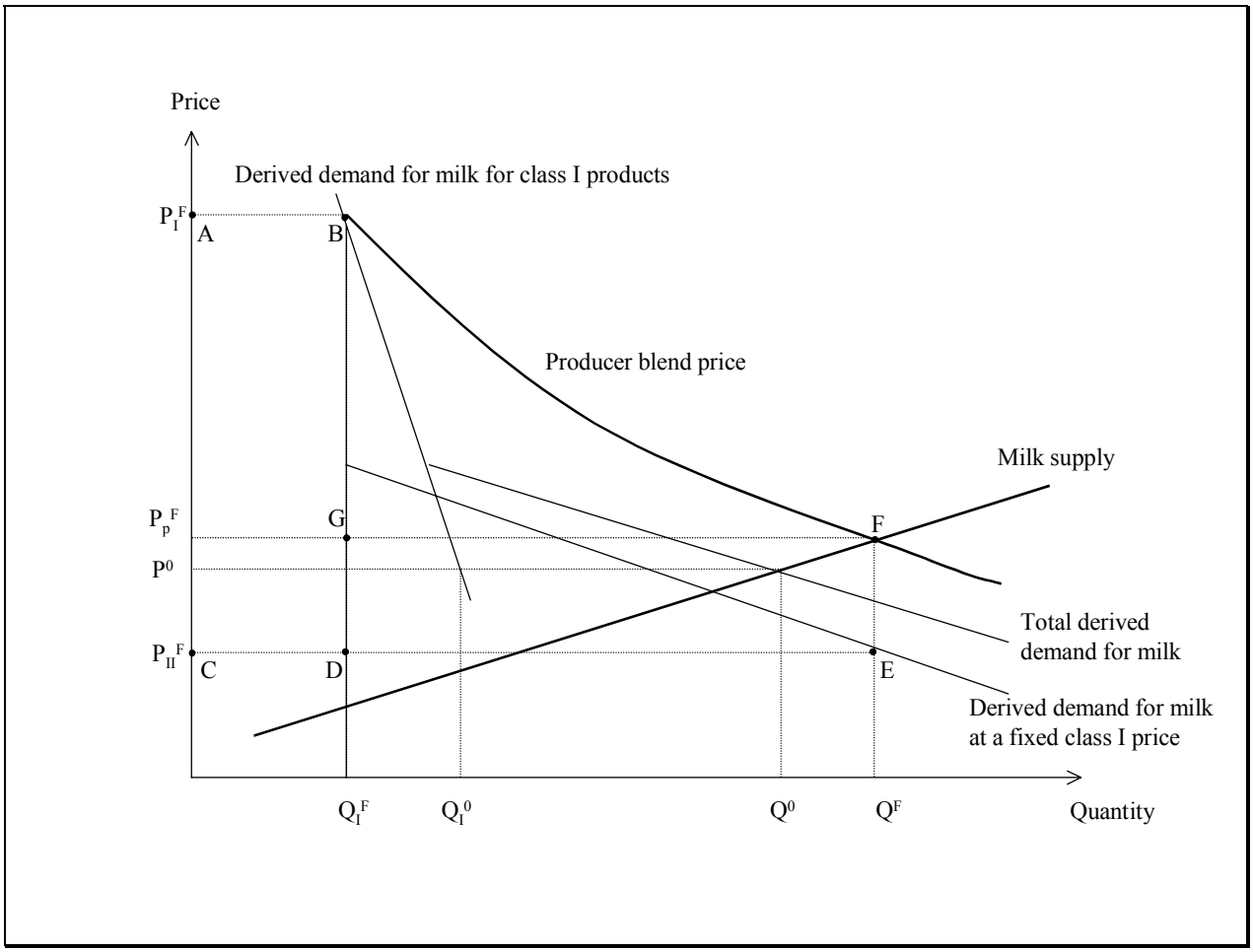

Table 1: Changes in milk and dairy products markets induced by price discrimination

	Production Quota	No Production Quota
Farm milk price	7.3%	1.4%
Milk production	0.2%	1.7%
Milk price differential	9.6%	10.0%
Fluid milk price	10.2%	8.2%
Fluid milk consumption	-1.1%	-0.8%
SMP price	-1.2%	-4.2%
SMP production	2.2%	7.3%
SMP exports	11.5%	31.6%
SMP world price	-1.1%	-4.0%
Hard ½ hard cheese price	-0.8%	-3.4%
Hard ½ hard cheese production	0.5%	2.1%
Hard ½ hard cheese exports	1.9%	7.2%
Hard ½ hard cheese world price	-0.8%	-3.3%

Table 2 : Impact on surplus and welfare of a price discrimination scheme

	Production Quotas	No production Quotas
Producers	1778	321
Consumers	-1821	-652
Total EU welfare	-22	-162

Change in € millions relative to the base.

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