# Price stabilization as a factor of competitiveness of agriculture

## *Cenová stabilizace jako faktor konkurenceschopnosti zemědělství*

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**Abstract:** Price fluctuations make agriculture a risky business. High price fluctuation of agricultural commodities may have through its income effect a very unfavourable impact on the economic situation of agricultural subjects. In finding corresponding instruments of agricultural policy to stabilize prices and incomes, it is necessary to distinguish between various types of price changes. However, important question for conception of adequate price policy is how to protect against high price fluctuations and not to restrain function of price as a signal about market situation. Application of partial equilibrium analysis to evaluate impact of price stabilization policies is an adequate method, especially if price changes in the market do not cause significant price fluctuation in other markets. Using this methodological approach is possible to prove that price stabilization brings for common net benefit consumers and producers. However in practical application some additional aspects must be taken into account if dealing with stabilization of agricultural products prices.

**Key words:** agricultural policy, price stabilization, partial equilibrium analysis

**Abstrakt:** Díky cenovým fluktuacím je zemědělství rizikovou činností. Velké cenové fluktuace zemědělských komodit mohou mít díky svému důchodovému efektu nepříznivý dopad na ekonomickou situaci zemědělských subjektů. Při hledání odpovídajícího nástroje zemědělské politiky pro stabilizaci cen a příjmů zemědělců je nezbytné rozlišovat příčiny cenové fluktuace. Klíčovou otázkou při tvorbě takové politiky je jak ochránit zemědělský trh před velkými cenovými fluktuacemi, aniž by byla omezena funkce ceny jak tržního signálu. Vhodným metodologickým aparátem pro posouzení dopadu politiky cenové stabilizace je analýza parciální rovnováhy. To platí především v případech, kdy cenové změny na sledovaném trhu nevyvolávají velkou cenovou odezvu na trzích s ostatními komoditami. S využitím tohoto metodologického aparátu je možné prokázat, že cenová stabilizace znamená pro spotřebitele a producenty čistý společný přínos. Při praktickém posuzování přínosu cenové stabilizace však musí být brán v potaz širší okruh determinujících faktorů.

**Klíčová slova:** zemědělská politika, cenová stabilizace, analýza parciální rovnováhy

As a result of fixed character of inputs in agriculture, especially land and partly labour force and because of character of production, agricultural producers very often are not able to react in adequate way to the changes in prices of agricultural products and inputs. These factors, of the consequence which is inelastic supply of agricultural products, together with inelastic demand for most agricultural and food products, lead to high fluctuation of agricultural product prices, which reflects in fluctuation of farmers income, leading to deteriorating of their welfare.

These fluctuations make agriculture a risky business. Even if inelastic supply of inputs is eliminated (e.g. their is increased flexibility of using of agricultural inputs) still many other factors as weather, diseases, pests etc. would be present. This means, that agriculture is always a risky industry. Consequence of the risk is existence of deviations from the balanced volume of agricultural production demanded by market, leading to price instability of this production.

On the other hand, some level of price fluctuation provides information signals about market situation and may serve as an instrument for adjustment of supply to demand.

One of the important objectives of agricultural policy is to stabilize income of agricultural producers. It means, that because of deteriorating impact of high price fluctuation on income of producers, using of agricultural policy instruments should lead to stabilizing agricultural product prices. When realizing these steps, the fact, that certain price fluctuation brings market information signals must be taken into account, just as the fact, that price stabilization has different impact on the welfare of producers, consumers and taxpayers. These are the reasons, why programs aimed at price stabilization must be always evaluated from the view of social welfare.

Waugh (1944) for the first time analysed problems of stabilization of agricultural product prices. His analysis of the impact of price stabilization on consumers was the first in the whole line of studies, using partial equilibrium anal-

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ysis of welfare for solution of price stabilization problems. A few years later Oi (1961) analysed similar problem from supply side.

Both approaches, however, considered welfare of only one side in the market. They ignored impact of price stabilization on second group in the market. Waugh's and Oi's arguments were integrated in one framework by Massel (1969).

Later Cox (1988) used partial equilibrium analysis to evaluate the impact of various political instruments on agricultural products price stabilization. He assessed impacts of price instability on agricultural product markets on allocation of agricultural inputs and on income and capital distribution within agricultural sector. Cox also analysed inevitable institutional and macroeconomic conditions, necessary for successful implementation of particular policy instruments for price stabilization in agriculture.

Frenz (1987) was engaged in specific characteristics connected with the policy of price stabilization in agriculture of the European Union. Glauber, Helmberger and Miranda (1989) evaluated efficiency of alternative programs of price stabilization in the market with soya.

Effects of price stabilization of agricultural inputs on production decision making of farmers in competitive environment were analysed by Devadoss and Choi (1991).

Wright and Williams (1988) made out, that in most cases, it is not necessary to try to find the exact measure to express benefit for consumers, coming of price stabilization, but Marshall's and Hicks's consumer surplus is the sufficient tool to estimate the impact. According to these authors, both proper estimate of demand curve and supply behaviour and assessment of eventual impact of price stabilization on social welfare are more important.

## METHODOLOGY

Evaluations of impact of agricultural support programs on the level of social welfare and welfare of individual economic subjects within economy may be done using either partial equilibrium analysis or general equilibrium analysis approach.

If partial equilibrium analysis is used, each market is considered as a relatively independent segment, isolated from other markets, when relationships with other markets are ignored (Varian 1993). Basic characteristic of the approach based on analysis of partial equilibrium is, that prices and amount at individual markets are determined by supply and demand, considering ceteris paribus condition for other markets. Application of this methodological approach is adequate especially if price changes in the market do not cause significant price fluctuation at other markets.

In practice this assumption may sometimes lead to seriously deformed results. There is not any market to be able to adapt to external impacts, not having at the same time impact on market equilibrium at other markets. The impact may be sometimes even very extensive. In this case, it is more convenient to use general equilibrium analysis, which considers relationships between prices in individual markets. If there is an interdependence between particular economic subjects and markets, the equilibrium for all product markets, input markets and for participants at these markets must be determined simultaneously, to secure consistency.

Applying general equilibrium approach to analysis of the impact of agricultural policy instruments, various macroeconomic models are considered. However, with practical application of these models, there are very often connected many problems. These problems are usually represented by insufficient input data, very often are demand driven, which means that supply is taken as an endogenous variable, and usually are convenient only in cases of significant affection of aggregate production or public expenditures by agricultural support programs (OECD 1993). Thanks to the facts, these models are inconvenient for evaluation exogenous government interventions on supply side of the market, which is characteristic for majority of agricultural support programs.

Practically proved limitations of majority of the applied macroeconomic models show, that for evaluation of agricultural support programs, probably it is not reasonable to concentrate on application of exhaustive methodology. Especially if the impact of changes at analysed market is not very extensive, application of partial equilibrium analysis is an adequate form of policy instruments evaluation.

## RESULTS AND DISCUSSION

### Price instability of agricultural products

High price fluctuation of agricultural commodities may have through its income effect a very unfavourable impact on economic situation of agricultural subjects. Main problem of stabilization of this price fluctuation is in its elimination, without putting down the positive effect of small price fluctuations.

To find corresponding instruments of agricultural policy to stabilize prices and incomes, it is necessary to distinguish between various types of price changes:
– long-term changes, resulting from changing character of supply and demand;
– fluctuations resulting from general economic cycle;
– price fluctuations as a result of long term character of production cycle of most agricultural products;
– seasonal variations during the year;
– unpredictable, coincidental fluctuations.

An effort to stabilize prices and corresponding price policy must differ according to the character of price fluctuation. In case of long term price fluctuation price interventions may be justified especially by social and political arguments. From the economic point of view is long term price trend reflection of demand changes, changing production costs and changes in agricultural inputs supply. These changes provide economic signals for reallocation of inputs within economy. Similarly seasonal variations of regular character may serve as an effective means for balance of demand with seasonal

changes of production costs. However, seasonal price variation of irregular character may lead to formation of the improper stocks level and to imperfect distribution of production. In the latter case state interventions should be aimed at this kind of price fluctuation. Also price fluctuations because of long-term production cycle of many agricultural products have an undesirable impact on income distribution and inputs allocation. That is the reason, why these fluctuations should be moderated or eliminated. Similarly unpredictable fluctuations may have an adverse effect on income distribution and inputs allocation. Price fluctuation has also harmful influence as a result of economic cycle. However, in this case solution of this unfavourable impact cannot be limited only to agriculture, but all other industries within affected economy must be considered.

As was mentioned above, the main problem for conception of adequate price policy is how to protect against high price fluctuations and not to restrain function of price as a signal about market situation. However, it must be emphasized, that for any price policy, there exists a risk of sending wrong signals to agricultural producers.

High price fluctuation of food commodities has a deteriorating impact on the whole economy. The worst possibility is when the growing price level reflects the relative shortage of food items. In this case the whole economy and social structure are on very an unstable base.

Even if growth of food prices is not very rapid, its impact on economy may be still devastating, because growing food prices create a pressure on growth of wages in all other industries, which leads to inflation pressures and to decreasing demand for non-agricultural products, regardless the impact of income distribution. Growing food prices may lead to lower real incomes and higher costs in all industries and the consequent growing rate of unemployment.

The problem of price instability and connected income fluctuation has to be necessarily analysed both from short and long term view. Short-term price instability, regardless whether of unpredictable or seasonal character, may have, thorough changes in real income, unfavourable impact on the whole economy.

There is generally a long time between investments resulting from price signals and reflection in supply. That is why long-term ineffective allocation of inputs (capital, investments) may have a consequence in cyclical character of production, especially productions with longer production cycle.

Rapid price decline could lead to inscrutable reallocation of inputs in agricultural sector, which could seriously damage production ability and international competitiveness of this industry. If agricultural product prices are too low, situation in the industry could be deteriorated by the consequent outflow of qualified labour force to other sectors of economy and by migration of population to urban areas and so could support depopulation of rural areas.

**Impact of small price fluctuation on partial equilibrium**

As was said above, high price fluctuation of agricultural commodities should be solved by state interventions. On the other hand, small price fluctuations should be preserved as market signals for economic subjects. However the question is, what is the impact of this small price fluctuations on agricultural producers and consumers.

Using partial equilibrium analysis, it is possible to prove, that benefit of consumers, coming of price decline as a result of shifted supply, is higher, than a loss as a result of the same price increase. That is why small price fluctuation brings consumers benefit, while price stabilization means a loss. On the other hand, producers earn on small price fluctuations as a result of changed demand, while lose on price stabilization. These facts lead to conclusion, that if small price fluctuation as a result of coincidental shifts in supply and demand is allowed, total welfare effect is positive. The question is a compensation of those who loose from this fluctuation by those who are beneficiaries.

These results are presented in Figure 1 and in Figure 2. In Figure 1, there is depicted the situation when consumers face two different prices $p_1$ and $p_2$. Considering prices $p_1$ and $p_2$ consumer surplus is $CS(p_1) = ABF$, respec-

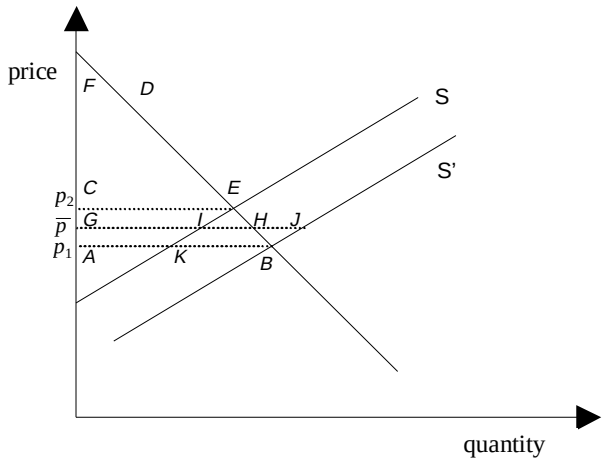


Figure 1. Price stabilization under supply changes

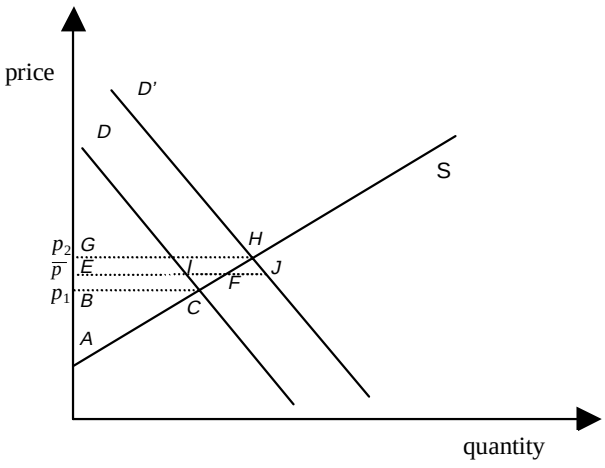


Figure 2. Price stabilization under demand changes

tively $CS(p_2) = CEF$. Suppose, that prices $p_1$ and $p_2$ will have the same frequency, expected value of consumer surplus will be $E(CS,p) = CEF + 0.5\ ABEC$.

If the price is stabilized at the level $\overline{p}$ , expected value of consumer surplus, considering this fixed price, is $E(CS, \overline{p}) = GHF$. It is clear, that $E(CS, \overline{p}) < E(CS,p)$ and reducing of welfare is $0.5(ABHG - GHEC) > 0$.

By an analogy with Figure 1, there are in Figure 2 producers confronted with two different prices $p_1$ and $p_2$. Each of these prices may occur with the same probability. The corresponding producer surplus is $PS(p_1) = ACB$, respectively $PS(p_2) = AHG$. Then the expected producer surplus $E(PS, p) = ABC + 1/2\ BCHG$. If price is stabilized at level $\overline{p}$, $E(PS, \overline{p}) = AFE$. Welfare is in this case reduced by $E(PS, p) - E(PS, \overline{p}) = 1/2(EFHG - BCFE) > 0$.

Using Figure 1, it is possible to present combination of these two results, when mutual compensation of consumers and producers in case of welfare loss is considered. Price reduction from $p_2$ to $\overline{p}$ represents benefit for consumers *GHEC*, while for producers this price decrease means cost *GIEC*. Result is net benefit *IHE*. Price increase from $p_1$ to $\overline{p}$ has a consequence in benefit for producers *ABJG* and a loss for consumers *ABHG*. Total result is net benefit *BJH*. It can be stated, that price stabilization at level $\overline{p}$ brings consumers and producers common net benefit (*IHE* + *BJH*). Similar result can be obtained from Figure 2, considering price stabilization at level $\overline{p}$. Net common benefit for consumers and producers equals *CFI* plus *FJH*.

## CONCLUSION

Regardless of the theoretical value of this approach to evaluate impact of price fluctuation on producers and consumers, based on partial equilibrium analysis, some additional aspects must be taken into account if dealing with stabilization of agricultural products prices. More detailed view on profits and loses as a result of price fluctuations, respectively profits and loses of price stabilization, must be considered.

Profits and loses from price fluctuation are implicitly based on presumption of convexity of profit functions. It is possible to suppose that if producers expect increasing of particular product price, they revise their production plans in the way to increase the volume of production. On the other hand, if price decline is expected, production plans are reduced. Profit as a result of this accommodation of production scale, as a consequence of expected price fluctuation, overweights profit, which would be reached by producers if the produced amount is unchanged with stabilized prices. It is because of the convexity of profit function, laying above "passive" linear profit function, which is its tangent. If prices of agricultural inputs are going up, an active producer, trying to maximize his profit, will shift to cheaper inputs. If prices of agricultural inputs go down, he will try to find new production possibilities. In both cases is the profit higher than profit in case of passive approach. That is why if price fluctuation exists, average profit is higher than with price stabilization. The result is valid only if a firm tries to maximize profits and accommodates its production to price changes. However, if is a high share of fixed costs there in the cost structure, which is typical for most of agricultural products, state interventions for price stabilization may bring net benefit to these productions.

It is possible to say, that from the theoretical view it is impossible to unambiguously decide, if price stabilization would mean growth or decline of social welfare. The final result will be to the great extent depending on the character of the particular production.

## REFERENCES


Bosch R.A. (1985): The Economics of Agricultural Subsidies. University of Wageningen Press.

Cox M. (1988): Agricultural Price Stabilization Policies and Income Distribution. Estudios Publicos, no. 23, pp. 93–106.

Devadoss S., Choi E.K. (1991): Factor Price Stabilization and the Competitive Firm. American Journal of Agricultural Economics, no. 3, pp. 749–758.

Frenz K. (1987): Price Stabilization in Agricultural Markets under Particular Consideration in the EC. Agrarwirtschaft, *25*, pp. 206–212.

Grega L. (1996): Teoreticko-metodologické aspekty ekonomických nástrojů zemědělské politiky. [Doktorandská disertační práce], MZLU, Brno.

Newbery D.M.G., Stiglitz J.E. (1981): The Theory of Commodity Price Stabilization. Clarendon Press, Oxford.

Massel B.F. (1969): Price Stabilization and Welfare. The Quarterly Journal of Economics, *83*, (2): 284–298.

OECD (1983): Positive Adjustment Policies. Paris, pp. 67–72.

Oi W. (1961): The Desirability of Price Instability Under Perfect Competition. Econometrica, *29,* pp. 58–64.

Turnovsky S.J. (1978): The Distribution of Welfare Gains from Price Stabilization. A Survey of Some Theoretical Issues. In: Adams F.G., Klein S.A.: Stabilizing Worlds Commodity Markets. Lexington Books, Lexington.

Varian H.R. (1978): Microeconomic Analysis. Norton, 34 p.

Waugh F.V. (1944): Does the Consumer Benefit from Price Instability? Quarterly Journal of Economics, *59*, pp. 602–614.

Wright B.D., Williams J.C. (1988): Measurement of Consumer Gains from Market Stabilization. American Journal of Agricultural Economics, pp. 816–827.



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