Alla V. CHEREP
Zaporizhzhya National University, Ukraine

# TECHNICAL APPROACHES TO PROVIDING SELF-RECOUPMENT OF ENTERPRISES ON THE BASIS OF INCREASING THE EFFICIENCY OF AGRICULTURAL ENTERPRISES ACTIVITIES

**Summary.** Scientific researches showed that the regime of self-recoupment logically presents the policy of self-financing, when an enterprise is capable of financing the development of the real assets partly or fully due to own financial sources in the potential of self-financing.

If the regime of self-recoupment is not provided, an enterprise becomes a problem one with all the consequences that follow: crisis situations and actual bankruptcy.

The financial and economic efficiency characterizes the ability of an enterprise constantly generate the financial results by means of raising capital and use of real assets. Determining the indices of an enterprise's efficiency formally consists in comparing the quality indices which at the beginning characterize the money capital of an enterprise, and at the end – its financial results. We propose the system of indices recommended for use and estimation of the financial and economic efficiency of an enterprise.

In terms of methodology for the estimation of the efficiency of an enterprise's activities the alternative systems of indices can and must be proposed, the difference between them is in the chosen method of several terms implementation: full coverage of economic activities by the system of efficiency indices; choice of the formal description with the aid of which the system of efficiency indices is structured; choice of the indices which provide measuring of an enterprise's efficiency.

**Keywords:** independent corporate finance, capital, cash, indicators of financial performance and economic enterprise performance measurement

# TECHNICZNE PODEJŚCIE DO ZAPEWNIENIA MOŻLIWOŚCI ODZYSKIWANIA STRAT PRZEDSIĘBIORSTW NA PODSTAWIE ZWIĘKSZENIA EFEKTYWNOŚCI DZIAŁALNOŚCI PRZEDSIĘBIORSTW ROLNYCH

**Streszczenie.** Badania naukowe wykazały, że samodzielne finansowanie przedsiębiorstw jest możliwe częściowo poprzez rozwój rzeczywistych aktywów lub całkowicie z posiadanych środków finansowych przedsiębiorstwa, które decydują o jego potencjale. Jeśli wówczas zwrot nakładów nie jest możliwy, przed przedsiębiorstwem powstaje problem załamania finansowego lub upadłości rzeczywistej, ze wszystkimi tego konsekwencjami. Efektywność finansową i ekonomiczną przedsiębiorstwa charakteryzuje jego zdolność do generowania wyników finansowych (poprzez pozyskiwanie kapitału i wykorzystanie realnych aktywów). Określenie wskaźników efektywności funkcjonowania polega na porównywaniu wskaźników jakości, które na początku są charakterystyczne dla kapitału pieniężnego przedsiębiorstwa, a na końcu – wyniku finansowego. W artykule zaproponowano system wskaźników zalecanych do stosowania dla oceny finansowej i ekonomicznej efektywności przedsiębiorstwa. Pod względem metodologicznym szacowania efektywności przedsiębiorstwa zaproponowano alternatywne wskaźniki, które zapewniają właściwy jej pomiar.

**Słowa kluczowe:** samodzielne finansowanie przedsiębiorstw, kapitał pieniężny, wskaźniki oceny efektywności finansowej i ekonomicznej przedsiębiorstwa, pomiar efektywności

Providing self-recoupment of an enterprise is related both to its financial and economic capacities and to its performance, but the dominant factor is reaching high financial and economic efficiency of an enterprise. Self-recoupment characterizes the ability of an enterprise to cover the current expenses on the cost of sales due to the sales proceeds on the enterprise's clearing account.

Self-financing is understood as a financial strategy, during implementation of which the extended reproduction of the real assets of an enterprise is provided due to the use of own financial sources which are the potential of the enterprise's self-financing.

Self-financing provides an enterprise with a systematic increase in the cost of real assets due to their proper use; rise in its potential concerning reinvestments which provide an increase in fixed assets; replenishment of circulating assets, which allows to consider self-financing to be the maximum program for an enterprise.

We have ascertained that there is a close relation between self-recoupment and self-financing. The objective of self-recoupment is maximization of the eventual financial result, but the dominant and constant factor, which provides its increase, is financial and economic efficiency of an enterprise. When the gross profit is allocated, the net income of an enterprise is formed and the pre-conditions for providing self-financing are created, when the goal of self-recoupment "turns into" a means for self-financing.

Realization of the principles of self-recoupment and self-financing requires the use of economic methods at enterprises which work under the market management conditions (fig. 1).

```
        ┌─────────────────────────────────────────────┐
        │   Economic methods of running an enterprise │
        └─────────────────────────────────────────────┘
                              │
            ┌─────────────────┴─────────────────┐
  ┌──────────────────────────────┐   ┌──────────────────────────────┐
  │ Self-recoupment of an enterprise│ │ Self-financing of an enterprise│
  └──────────────────────────────┘   └──────────────────────────────┘
```
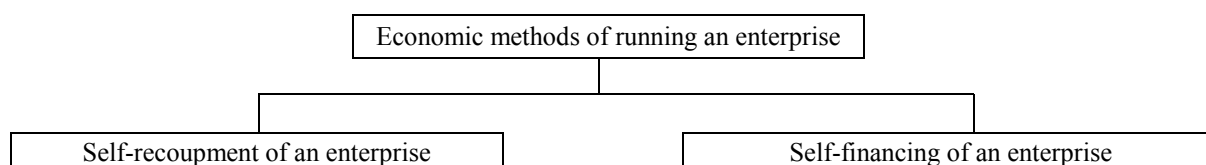
Fig. 1. Financial methods of managing an enterprise's activities
Rys. 1. Finansowe metody zarządzania działalnością przedsiębiorstwa
Source: Шамрін Р.В.: Вплив виробничої ефективності на формування фінансових результатів підприємства, [в:] Шамрін Р.В.: Економіко-статистичне моделювання та інформаційні технології в економіці. Т. 1, Матеріали Всеукр. наук.-практ. конф. ДНУ ім. Олеся Гончара, Дніпропетровськ 2012, с. 70-74.

Self-recoupment of an enterprise which works under the market management conditions characterizes the way of financing, which is based on the compensation of the cost of sales due to the receipts sale proceeds. Self-recoupment maintains an enterprise's profitable activities and gross profit receipt as a result of an economic year, which allows to consider receiving it to be the minimum program for an enterprise.[1]

The index of the profitability use for estimating the efficiency of using the property and capital reinvested into business was practically absent in the models of the enterprise's management mechanism improvement in the second half of the previous century. Therefore we suggest applying the GARCH model for the purpose of determining the efficiency of agricultural enterprises' activities on the basis of self-recoupment and self-financing.[2]

GARCH is a generalized model of ARCH offered by T. Bollerslev and is an alternative modification of the ARCH model, which allows to obtain longer clusters with few parameters. The ARMA model often allows to obtain a "closer" description of time dependences for conditional mathematical expectation than the AR model. In the same way the GARCH model allows to use less parameters as compared to the ARCH model, as far as conditional variance is concerned.[3]

---

[1] Шамрін Р.В.: Вплив виробничої ефективності на формування фінансових результатів підприємства, [в:] Шамрін Р.В.: Економіко-статистичне моделювання та інформаційні технології в економіці: Матеріали Всеукр. наук.-практ. конф. Т. 1. ДНУ ім. Олеся Гончара, Дніпропетровськ 2012, с. 73.

[2] Шамрін Р.В.: Формування системи показників для оцінки ефективності роботи підприємств, [в:] Шамрін Р.В.: Реформування фінансової системи та стимулювання економічного зростання в нестабільності. Матеріали міжнар. наук.-практ. конф. Ч. І. ГО „Центр економічних досліджень та розвитку", Одеса 2011, с. 99.

[3] Вітлінський В.В.: Аналіз, моделювання та управління економічним ризиком: Навч. посіб. для самост. вивч. дисц. [в:] Вітлінський В.В., Верченко П.І.-К., Кнеу 2000, с. 107.

If to examine financial time series as a sequence of stochastic observations, this sequence can have some degree of correlation. We can apply this structure of correlations to forecast future values of the process proceeding from the previous ones. We will divide the values of the time series into determined and stochastic ones:

$$y_t = f(t-1, X) + \varepsilon_t, \tag{1}$$

where $y_t$ is the value of the time series at a moment of time $t$,

$f(t-1, X)$ is a determined element of the current profit value as a function of any information available at a moment of time $t-1$ including the previous variances $\{\varepsilon_{t-1}, \varepsilon_{t-2}, \dots \}$, previous observations $\{y_{t-1}, y_{t-2}, \dots \}$ as well as any additional description of the X series,

$\varepsilon_t$ – is a stochastic parameter.

The GARCH models characterize conditional division of $\varepsilon_t$ using the serial dependence of the conditional variance. In particular, the influence of past variances in the model of unconditional variance used in GARCH is calculated from:

$$E_{t-1}(\varepsilon_t^2) = \sigma_t^2 = k + \sum_{i=1}^{P} G_i \sigma_{t-1}^2 + \sum_{j=1}^{Q} A_j \varepsilon_{t-j}^2, \tag{2}$$

where $k$, $G_i$, $A_j$ are some constants.

In the equation (2), $\sigma_t^2$ is the forecast of the conditional variance for the next period which is a linear additive function from the squares of the previous variances $\sigma_{t-1}^2$ and previous realization of the stochastic value $\varepsilon_{t-j}^2$.

The set of the GARCH tools sets the following limitations for the parameters of the conditional variance model:[4]

$$\sum_{i=1}^{P} G_i + \sum_{j=1}^{Q} A_j < 1,$$
$$k > 0,$$
$$G_i \geq 0, i = 1, 2, \dots, P$$
$$A_j \geq 0, j = 1, 2, \dots, Q \tag{3}$$

The first limitation is necessary and sufficient for the existence of the limited time-independent variance of the variance process $\{\varepsilon_t\}$.

---

[4] Грядов С.И.: Риск и выбор стратегии в предпринимательстве. „Наука", 1994, с. 47.

When the parameters of conditional variance meet the in equation (3), unconditional variance of the variance process $\{\varepsilon_t\}$ is calculated from:

$$\sigma^2 = E(\varepsilon_t^2) = \frac{k}{1 - \sum_{i=1}^{P} G_i - \sum_{j=1}^{Q} A_j}, \tag{4}$$

A typical model used in Matlab is the model of simple conditional average with the GARCH parameters at P = 1 and Q = 1 which is based on correlations (1) and (2).

$$y_t = C + \varepsilon_t, \tag{5}$$

$$\sigma_t^2 = k + G_1 \sigma_{t-1}^2 + A_1 \varepsilon_{t-1}^2, \tag{6}$$

In the model of conditional mean (5) the parameter $yt$ consists of the sum of the constant and uncorrelated variances $\varepsilon_t$.

In the model of conditional variance of equation (6) the forecast of the variance $\sigma_t^2$ consists of the constant $k$ of the weighted forecast of the variance for the previous period $\sigma_{t-1}^2$ and of the square of the variance within the previous period $\varepsilon_{t-1}^2$. Although the series of the $yt$ parameters usually expose small correlation, their squares often show the existence of the constant substantial correlation. It witnesses the correlation of the variance process, and thus this series must be designed by means of the GARCH tools.

For the purpose of forecasting average prices of grain crops, cattle and poultry up to 2020, the dynamics of the average sale costs of agricultural produce by all the directions for the agricultural enterprises of the Kherson oblast from 1996 to 2011 was determined.[5]

For the estimation of the model parameters we will use the function of garchfit from Matlab. We will represent the parameters estimations and their standard deviations, using the garchdisp function. The use of these functions allowed to calculate the following value parameters for the prices of grain crops: $C = 0{,}00036061$; $k = 1 \cdot 10^{-10}$; $G_1 = 0{,}98421$; $A_1 = 1$, and for the prices of cattle and poultry: $C = 0{,}00036753$; $k = 1{,}4231 \cdot 10^{-10}$; $G_1 = 0{,}98909$; $A_1 = 1$.

Then

– for the prices of grain crops:

$y_t = 0{,}00036061 + \varepsilon_t$;

$$\sigma_t^2 = 1 \cdot 10^{-10} + 0{,}98421 \cdot \sigma_{t-1}^2 + \varepsilon_{t-1}^2,$$

– for the prices of cattle and poultry:

$y_t = 0{,}00036753 + \varepsilon_t$;

$$\sigma_t^2 = 1{,}4231 \cdot 10^{-10} + 0{,}98909 \cdot \sigma_{t-1}^2 + \varepsilon_{t-1}^2.$$

---

[5] Реалізація продукції сільськогосподарськими підприємствами за 2011 рік: статистичний бюлетень. Відп. за вип. О.М. Прокопенко – К., Державна служба статистики України, 2012, с. 6.

On the basis of the statistical data the forecast of the conditional standard deviations for 10 years was made and we calculated the unconditional standard deviation for the prices of grain crops from 2012 up to 2020: $\sigma_0 = 0{,}00036379$, and for the prices of animal produce: $\sigma_0 = 0{,}00029315$. It enables us to assert that the latest values fall below the asymptotic value $\sigma_0$.

The fact that the latest values fall below the asymptotic value shows that long-term forecasting is gradually reaching the steady value.

On the basis of the statistical data by means of regressive analysis we will determine the dynamics of dependence of the agricultural produce prices (figures 2, 3).
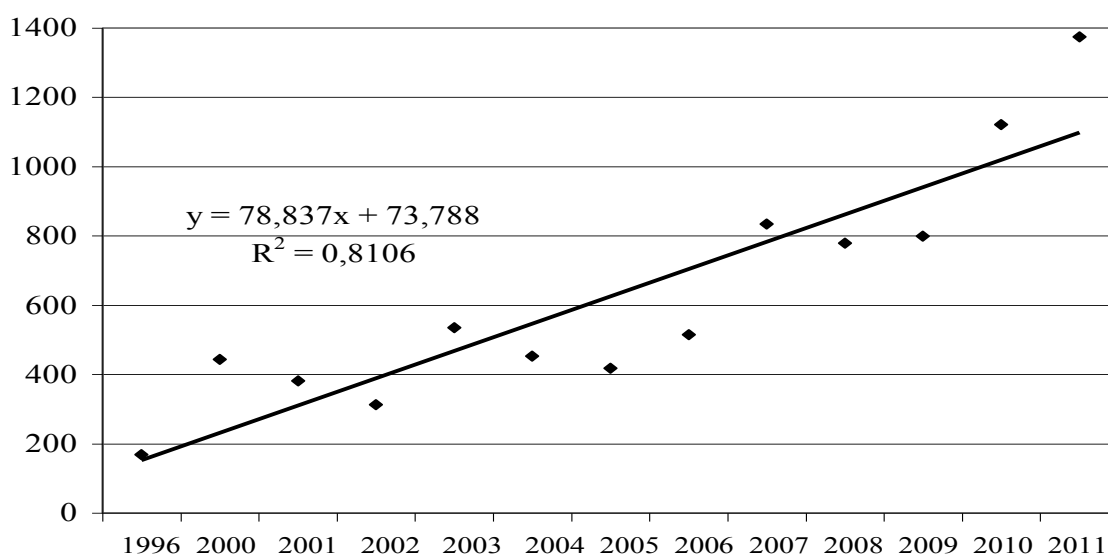


Fig. 2. Dynamics of the prices of grain crops at the agricultural enterprises of the Kherson oblast from 1996 up to 2011

Rys. 2. Dynamika cen zbóż w przedsiębiorstwach rolnych w obwodzie Kherson w latach 1996-2011
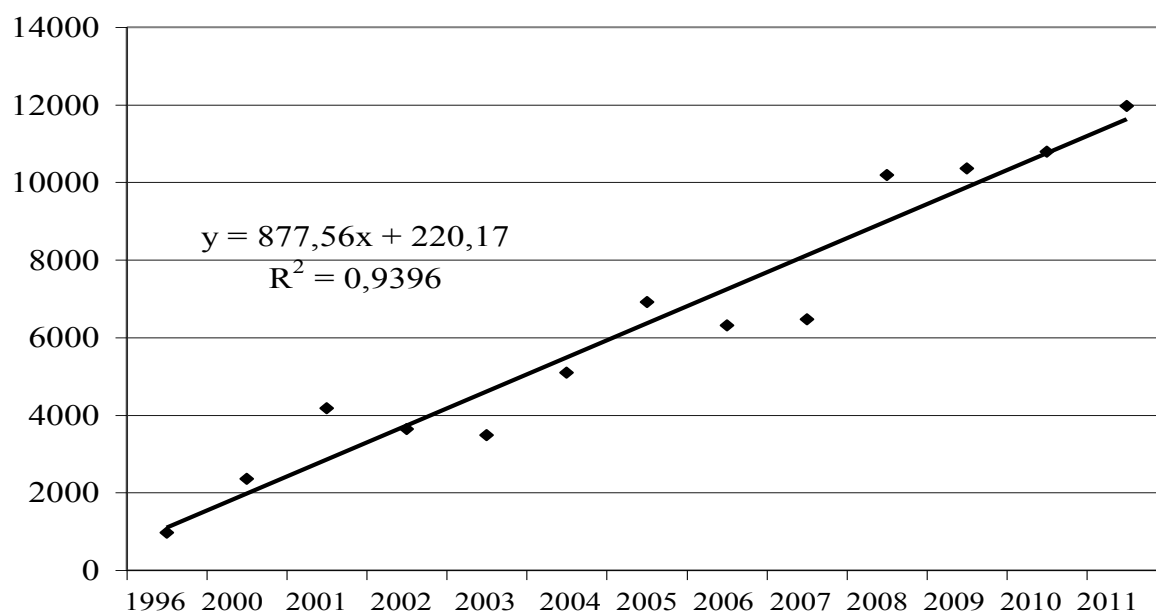
$$y = 877{,}56x + 220{,}17$$
$$R^2 = 0{,}9396$$

Fig. 3. Dynamics of the prices of cattle and poultry at the agricultural enterprises
of the Kherson oblast from 1996 up to 2011
Rys. 3. Dynamika cen bydła i drobiu w przedsiębiorstwach rolnych w obwodzie Kherson
w latach 1996-2011

By means of the determined equations of regression the average prices of agricultural produce for the period from 2012 up to 2020 were forecast (table 1).

Table 1

Forecast average sale prices of agricultural produce by all directions at the agricultural enterprises of the Kherson oblast for 2012-2020, hrn. per ton

| Years | Grain-crops | Rates of rise in prices, catenary, % | Cattle and poultry (live weight) | Rates of rise in prices, catenary, % |
|---|---|---|---|---|
| 2011 | 1374,2 | 100 | 11967,2 | 100 |
| 2012 | 1177,5 | 85,69 | 12506,01 | 104,50 |
| 2013 | 1256,3 | 106,69 | 13383,57 | 107,02 |
| 2014 | 1335,2 | 106,28 | 14261,13 | 106,56 |
| 2015 | 1414 | 105,90 | 15138,69 | 106,15 |
| 2016 | 1492,9 | 105,57 | 16016,25 | 105,80 |
| 2017 | 1571,7 | 105,28 | 16893,81 | 105,48 |
| 2018 | 1650,5 | 105,02 | 17771,37 | 105,19 |
| 2019 | 1729,4 | 104,78 | 18648,93 | 104,94 |
| 2020 | 1808,2 | 104,56 | 19526,49 | 104,71 |

The figures in table 1 show that in 2012 and the following periods an increase in the prices of grain crops and animal produce will be observed compared to the previous years, except for the prices of grain crops in 2012 compared to 2011, which can be explained by an unstable increase in the prices and their government regulation.

The norm of financing shows how many retained reinvested earnings are made by one hryvnia of profits from the agricultural produce sale. The norm of business income shows how much net income is obtained from one hryvnia of profits from the agricultural produce sale. The indices of profitability of agricultural enterprises' activities which take into account cash flows, reinvested profits and the net results of the investment use permit to calculate not only the total profitability of enterprises' activities but also the norm of self-financing (table 2).

Table 2

Determination of the profitability indices of agricultural enterprises' activities

| Denominator / Numerator | Production cost value | Profit yield from sales total assets | Total assets | Invested capital | Own (shareholders' equity) |
|---|---|---|---|---|---|
| **Profits** | | | | | 3.a. Total profitability of shareholders' equity |
| **Sales profits** | 1.c. Profitability of costs | 1.d. Profitability of sales | | | |
| **Retained (reinvested) earnings** | | 1.a. Norm of self-financing | | | |
| **Net income** | | 1.b. Norm of business income | | 2.a. Net profitability of enterprise | 3.b. Net profitability of shareholders' equity |
| **Cash flow** | | | 2.c. Profitability of the total capital | | |
| **Net result of investment use (NRIU)** | | | | 2.b. Total profitability of enterprise | |

Source: Воронкова А.Є.: Діагностика стану підприємства: теорія і практика. Вид-во „ІНЖЕК", Харків 2008, с. 311.

Informal descriptions of self-recoupment necessary and sufficient for an enterprise are shown in table 3.

Table 3

Informal descriptions of self-recoupment of an agricultural enterprise

| Purpose of activities | Mechanism of achievement | |
|---|---|---|
| | **Facilities** | **Factors providing** |
| Maximization of gross profits received as the annual result of financial and economic activities | Maximization of proceeds from the produce sale | Increase in the financial and economic efficiency of an agricultural enterprise |

Source: Воронкова А.Є.: Діагностика стану підприємства: теорія і практика. Вид-во „ІНЖЕК", Харків 2008, с. 313.

Providing an enterprise's self-recoupment is related both to its financial and economic facilities (money and productive assets) and to its annual performance (sale proceeds), but the dominant factor is still reaching high financial and economic efficiency of an enterprise (fig. 4).
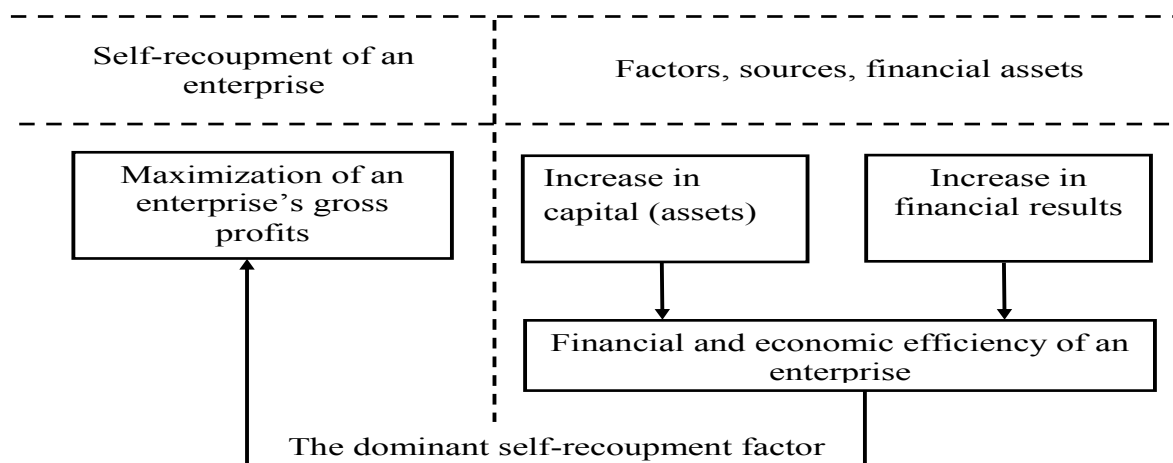


Fig. 4. Efficiency as a dominant factor of an enterprise's self-recoupment
Rys. 4. Efektywność jako dominujący czynnik odzyskiwania strat przedsiębiorstwa
Source: Стратегічні цілі і моделі ефективної діяльності підприємства: навч. посіб. Сіроштан М.А., Потапов В.І., Білявцев М.І. [та ін.]. – Х., Око, 1999, с. 86.

Self-financing is understood as a financial strategy, during implementation of which the extended reproduction of the real assets of an enterprise is provided due to the use of own financial sources which are the potential of the enterprise's self-financing. The potential of self-financing is defined as the net income which acts as a financial source of reinvestments in the extended reproduction of the real assets of an enterprise and annual depreciation charges capable of providing simple reproduction of capital production assets.

Informal descriptions of self-financing of agricultural enterprises are given in table 4.

Table 4

Informal descriptions of self-financing of agricultural enterprises

| Purpose of activities | Mechanism of achievement | |
|---|---|---|
| | Facilities | Factors providing |
| Development of an enterprise's real assets due to own financial sources | Maximization of the self-financing potential, which includes annual depreciation charges and net income of an enterprise | Reinvestments in the real assets of an enterprise including replenishment of the circulating assets and increase in the capital production assets |

Source: Стецюк П.А.: Методологія та механізми фінансового забезпечення розширеного відтворення аграрного виробництва. Вісник Сумського національного аграрного університету, № 2, 2010, с. 15.

Self-financing provides an enterprise with a systematic increase in the cost of real assets due to their proper use; rise in its potential concerning reinvestments which provide an increase in fixed assets; replenishment of the circulating assets, which allows to consider self-financing to be the maximum program for an enterprise (figure 5).
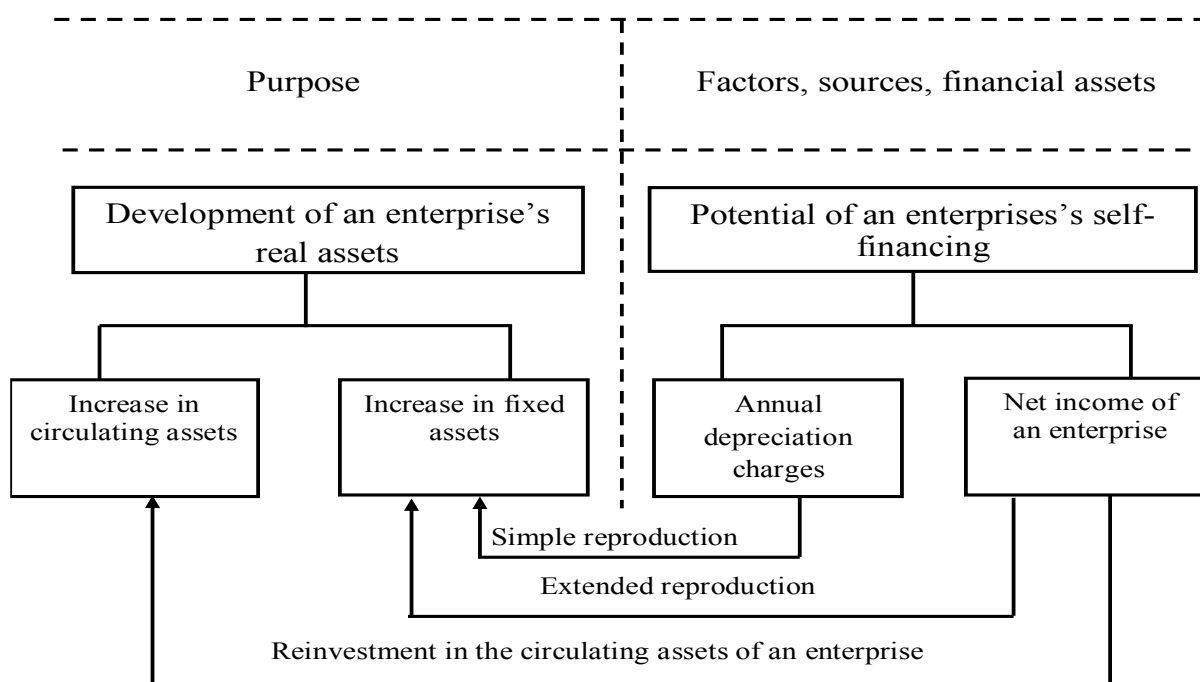


Fig. 5. Mechanism of an enterprise's self-financing
Rys. 5. Mechanizm samofinansowania przedsiębiorstwa
Source: Шебанін В.С.: Зміцнення та ефективне функціонування ресурсного потенціалу
        сільськогосподарських підприємств, [в:] Шебанін В.С., Шебаніна О.В., Червен
        I.I., Кареба M.I., Монографія. МДАУ, Миколаїв 2010, с. 85.

The rate of self-financing is calculated by the following formula (7):

$$\text{Rate of self-financing} \quad = \quad \frac{\text{Reinvestments from net income}}{\text{Real assets of enterprise}} \tag{7}$$

The orientation of administrative decisions to attaining the objective (increase in the net income) permits to consider the criteria of their acceptance to be the commercial margin maximization (rate of return RR):

$$I_{RR} \to 1{,}0 \to \max \tag{8}$$

The rate of return related to the turnover profitability (TP) which takes into account the policy of gross profit as for its distribution structure is calculated by the following equation:

$$\overline{I_{\ddot{i}\ddot{o}}} = \overline{Đ_{\hat{A}\ddot{A}}} \times \beta, \tag{9}$$

where β – part of the net income at disposal of an enterprise.

Self-recoupment characterizes the ability of an enterprise to cover the current expenses on the cost of sales due to the sales proceeds on the enterprise's clearing account.

$$\frac{Rate\ of\ self-}{recoupment} = \frac{sales\ proceeds}{cost\ of\ sales} \tag{10}$$

The rate of self-recoupment characterizes the ratio of the sales proceeds to the cost of sales expressed as financial ratio, which characterizes the coverage of the current production costs by own profits of an enterprise related to the sales of the product manufactured.

We will use the GARCH model for forecasting the rate of self-recoupment and the rate of self-financing of agricultural enterprises of the Kherson oblast. For the estimation of the model parameters we will use the function of garchfit from Matlab. Thus, for the rate of self-financing we have the following equations:

- for the Yuzhtransitservice-Agroproduct company, ltd.:

$$y_t = -0{,}0051482 + \varepsilon_t;\ \sigma_t^2 = 0{,}97876 + \varepsilon_{t-1}^2,$$

- for the Slavutich Plus private company:

$$y_t = -0{,}093841 + \varepsilon_t;\ \sigma_t^2 = 0{,}59068 + 0{,}041686 \cdot \sigma_{t-1}^2 + \varepsilon_{t-1}^2,$$

- for the Kalininosilske agricultural company, ltd.:

$$y_t = 0{,}10822 + \varepsilon_t;\ \sigma_t^2 = 1{,}1603 + \varepsilon_{t-1}^2,$$

- for the Zolota balka agricultural company, ltd.:

$$y_t = -0{,}0064085 + \varepsilon_t;\ \sigma_t^2 = 0{,}14669 + 0{,}68958 \cdot \sigma_{t-1}^2 + \varepsilon_{t-1}^2,$$

- for the Eden farm enterprise:

$$y_t = -0{,}0075771 + \varepsilon_t;\ \sigma_t^2 = 0{,}67497 + \varepsilon_{t-1}^2,$$

- for the Niva farm enterprise:

$$y_t = 0{,}00090672 + \varepsilon_t;\ \sigma_t^2 = 0{,}21868 + \varepsilon_{t-1}^2,$$

- for the Zhytnytsya farm enterprise:

$$y_t = -0{,}024604 + \varepsilon_t;\ \sigma_t^2 = 1{,}4015 + \varepsilon_{t-1}^2,$$

- for the Lan farm enterprise:

$$y_t = -0{,}15039 + \varepsilon_t;\ \sigma_t^2 = 1{,}1929 + \varepsilon_{t-1}^2,$$

We will make the forecast of the conditional standard deviations for the ten-year's period (tab. 5).

Forecast of conditional standard deviations for the rate of self-financing for the agricultural enterprises of the Kherson oblast for the ten-year's period from 2012 to 2020

| Enterprises | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | $\sigma_0$ |
|---|---|---|---|---|---|---|---|---|---|---|
| Yuzhtransitservice-Agroproduct company, ltd | 1,321 | 1,1123 | 1,078 | 1,0728 | 1,072 | 1,0719 | 1,0719 | 1,0719 | 1,0719 | 1,0719 |
| Slavutich Plus private company | 1,0401 | 1,1249 | 1,1747 | 1,2048 | 1,2231 | 1,2344 | 1,2415 | 1,2458 | 1,2458 | 1,253 |
| Kalininosilske agricultural company, ltd | 2,325 | 1,9525 | 1,7409 | 1,6271 | 1,5682 | 1,5385 | 1,5237 | 1,5164 | 1,5128 | 1,5093 |
| Zolota balka agricultural company, ltd | 0,8791 | 0,8601 | 0,8453 | 0,8337 | 0,8247 | 0,8177 | 0,8124 | 0,8082 | 0,805 | 0,7943 |
| Eden farm enterprise | 0,8683 | 0,9209 | 0,9325 | 0,9352 | 0,9358 | 0,9359 | 0,936 | 0,936 | 0,936 | 0,936 |
| Niva farm enterprise | 0,7839 | 0,6212 | 0,5689 | 0,5538 | 0,5496 | 0,5485 | 0,5482 | 0,5481 | 0,5481 | 0,5481 |
| Zhytnytsya farm enterprise | 1,3946 | 1,2614 | 1,2477 | 1,2464 | 1,2462 | 1,2462 | 1,2462 | 1,2462 | 1,2462 | 1,2462 |
| Lan farm enterprise | 2,1508 | 1,7926 | 1,6113 | 1,5254 | 1,4863 | 1,4689 | 1,4613 | 1,4579 | 1,4564 | 1,4553 |

We calculated the rate of self-recoupment as well:

– for the Yuzhtransitservice-Agroproduct company, ltd.:

$$y_t = -0{,}0017515 + \varepsilon_t; \ \sigma_t^2 = 0{,}0064404 + \varepsilon_{t-1}^2,$$

– for the Slavutich Plus private company:

$$y_t = -0{,}0005155 + \varepsilon_t; \ \sigma_t^2 = 0{,}010581 + \varepsilon_{t-1}^2,$$

– for the Kalininosilske agricultural company, ltd.:

$$y_t = -0{,}00065826 + \varepsilon_t; \ \sigma_t^2 = 0{,}14669 + 0{,}68958 \cdot \sigma_{t-1}^2 + \varepsilon_{t-1}^2,$$

– for the Zolota balka agricultural company, ltd.:

$$y_t = -0{,}000020752 + \varepsilon_t; \ \sigma_t^2 = 0{,}000035468 + 0{,}97838 \cdot \sigma_{t-1}^2 + \varepsilon_{t-1}^2,$$

– for the Eden farm enterprise:

$$y_t = 0{,}00026521 + \varepsilon_t; \ \sigma_t^2 = 0{,}00032649 + 0{,}3990 \cdot \sigma_{t-1}^2 + \varepsilon_{t-1}^2,$$

– for the Niva farm enterprise:

$$y_t = 0{,}00093525 + \varepsilon_t; \ \sigma_t^2 = 0{,}0016477 + 0{,}23035 \cdot \sigma_{t-1}^2 + \varepsilon_{t-1}^2,$$

– for the Zhytnytsya farm enterprise:

$$y_t = 0{,}00098494 + \varepsilon_t; \ \sigma_t^2 = 0{,}001699 + 0{,}00060236 \cdot \sigma_{t-1}^2 + \varepsilon_{t-1}^2,$$

– for the Lan farm enterprise:

$$y_t = 0{,}0002716 + \varepsilon_t; \ \sigma_t^2 = 0{,}00028293 + \varepsilon_{t-1}^2.$$

We made the forecast of the conditional standard deviations for the ten-year's period.

The calculated conditional standard deviations for the rates of self-financing and self-recoupment of all the enterprises permit us to assert that the latest values fall below the asymptotic value $\sigma_0$, that is the latest values fall below $\sigma_0$ and it means that the long-term forecast is gradually reaching the steady value.

The forecast values of the self-recoupment and self-financing rates calculated with the aid of the GARCH model permits us to assert that there is a positive trend at the enterprises, which in recent years have focused on aggressive strategy.

The scientific researches and calculations made allow us to offer the mechanism of relation between self-recoupment and self-financing (figure 6). When organizing settlements, the cause-and-effect relation between self-recoupment of an enterprise and the mechanism of its self-financing is realized.
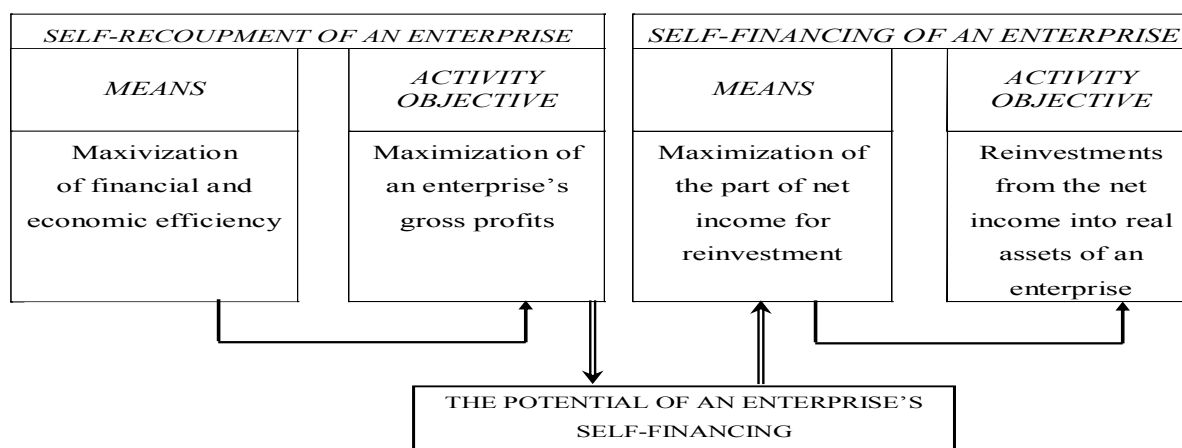


Fig. 6. Relation between self-recoupment and self-financing of an enterprise
Rys. 6. Relacja możliwości samofinansowania przedsiębiorstwa
Source: Якимчук Т.В.: Соціально-економічна ефективність підприємства та її значення
в сучасних умовах. Вісник ЖДТУ, № 2(56), 2011, с. 26.

Between self-recoupment and self-financing there is a close relation, namely:

First, the objective of self-recoupment is maximization of the eventual financial result (gross profits), but the dominant and constant factor, which provides its increase, is financial and economic efficiency of an enterprise.

Second, when the gross profit is allocated, the net income of an enterprise is formed and the pre-conditions for providing self-financing are created, when the goal of self-recoupment (maximization of gross profits) "turns into" a means for self-financing (maximization of net income).

Third, reinvestments in the development of the real assets financed from the net income

of an enterprise determine the quality of self-financing, whose dominant factor is a share of net profits intended for reinvesting into the business for development of its real assets.

We suggest that the estimation of the relation of self-recoupment and self-financing of agricultural enterprises' activities should be carried out according to the technique given in table 6. The diversity of the economic results explains different levels of self-recoupment, which can be attained by enterprises as a result of their annual performances.

Table 6

Alternative estimation of the relation of self-recoupment and self-financing
of agricultural enterprises' activities

| Name | Ratio between sales profits and cost of sales | | |
|---|---|---|---|
| | SP > C | SP = C | SP < C |
| Financial and economic results | $\bar{\bar{I}} > 0$ | $\bar{\bar{I}} = 0$ | $\bar{\bar{I}} < 0$ |
| | Psp > 0 | Psp = 0 | Psp < 0 |
| | Rs-r > 1,0 | Rs-r = 1,0 | Rs-r < 1,0 |
| | Rs-f > 0 | Rs-f = 0 | Rs-f < 0 |
| Description of self-recoupment of an enterprise | An enterprise provides the regime of self-recoupment and self-financing | Boundary condition of self-recoupment and self-financing for enterprises | The regime of self-recoupment and self-financing is not achieved by an enterprise |

The regime of self-recoupment logically presents the policy of self-financing, when an enterprise is capable of financing the development of the real assets partly or fully due to own financial sources in the potential of self-financing.

If the regime of self-recoupment is not provided, an enterprise becomes a problem one with all the consequences that follow: crisis situations and actual bankruptcy.

This technical approach to determining the relation of self-recoupment and self-financing of agricultural enterprises' activities on the basis of increasing the efficiency of their activity was tested at the agricultural enterprises of the Kherson oblast.

**Bibliography**

1. Шамрін Р.В.: Вплив виробничої ефективності на формування фінансових результатів підприємства, [в:] Шамрін Р.В.: Економіко-статистичне моделювання та інформаційні технології в економіці. Т. 1. Матеріали Всеукр. наук.-практ. конф. ДНУ ім. Олеся Гончара, Дніпропетровськ 2012.

2. Шамрін Р.В.: Формування системи показників для оцінки ефективності роботи підприємств, [в:] Шамрін Р.В.: Реформування фінансової системи та стимулювання економічного зростання в нестабільності. Ч. І. Матеріали міжнар. наук.-практ. конф. ГО „Центр економічних досліджень та розвитку", Одеса 2011.

3.  Вітлінський В.В.: Аналіз, моделювання та управління економічним ризиком. Навч. посіб. для самост. вивч. дисц. Вітлінський В.В., Верченко П.І. – К., КНЕУ, 2000.

4.  Грядов С.И.: Риск и выбор стратегии в предпринимательстве. „Наука", 1994.

5.  Реалізація продукції сільськогосподарськими підприємствами за 2011 рік. Статистичний бюлетень, Відп. за вип. О.М. Прокопенко – К., Державна служба статистики України, 2012.

6.  Воронкова А.Є.: Діагностика стану підприємства: теорія і практика, монографія, А.Є. Воронкова. Вид-во „ІНЖЕК", Харків 2008.

7.  Стратегічні цілі і моделі ефективної діяльності підприємства, навч. посіб., Сіроштан М.А., Потапов В.І., Білявцев М.І. [та ін.]. – Х., Око, 1999.

8.  Стецюк П.А.: Методологія та механізми фінансового забезпечення розширеного відтворення аграрного виробництва. Вісник Сумського національного аграрного університету, № 2, 2010.

9.  Шебанін В.С.: Зміцнення та ефективне функціонування ресурсного потенціалу сільськогосподарських підприємств, Шебанін В.С., Шебаніна О.В., Червен І.І., Кареба М.І., Монографія. МДАУ, Миколаїв 2010.

10. Якимчук Т.В.: Соціально-економічна ефективність підприємства та її значення в сучасних умовах. Вісник ЖДТУ. № 2(56), 2011.