

# Investment in land – strategic decision

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**Abstract:** *Nowadays, there is a significant loss of arable land both on a global and national scale and that is why this production factor is becoming an interesting investment tool for the investor public also in the Czech Republic. A problem that occurs in the Czech market environment is the lack of knowledge of the issues related to the investment plans into this asset by the domestic as well as foreigner investors and the uncertainty in the decision-making and the assessment on how strategically profitable it is to own land. The article points out the investment opportunities in land in real form and disadvantages of land ownership resulting from valid legislation of the Czech Republic and from the supply and demand in the land market. The key attributes that encourage the interest in this asset by the investors and speculators are described, and it is shown, using model examples, how the current legislative and market conditions reflect in the price of land and if it is strategically appropriate for the landowners to keep the land or sell it. Given the fact that the Czech investor environment has an absolute lack of finance index of this asset, a methodology of land index creation is designed.*

**Keywords:** Land, Investment, Finance index, Investor, Production Factor

**JEL codes:** G10, M21, Q24, R30

## 1 Introduction

The land is a specific production factor without which man is not able to sustain its existence and it was the land management that led to the emergence of first comprehensive and organised economic sector which later became agriculture. Nowadays agricultural land is considered to be a key factor of global character, which is becoming more and more interesting for investors. Investor public understood that it is an undervalued investment with a significant potential which can generate a lot of revenues in the future. Investment in land offers many investor and business opportunities, both in real and finance form. Investment in land in real form is linked to improvement and expansion of business activity in plant or animal production, to development a property for business or commercial purposes including rent and also for speculative purposes with this asset. The land is becoming an important factor which influences several industries, especially the construction and related investment products. Land, like any other investment, comes with a certain level of risk.

In the context of agriculture, the business risk is among others related to global warming in the world which is reflected in reducing revenue from land in some areas as a result of climate change and unforeseen natural events. There is also a loss of agricultural land as a result of developers' efforts to change its use and use it for commercial purposes. The interest in land ownership is also connected to the process of globalisation and not only associated with the establishment of multinational corporations, but also with the migration of inhabitants in certain parts of the world. As a result of worldwide population explosion and unsuccessful land interventions, there are already some countries that are significantly dependent on the import of agricultural commodities and their dependency is only further deepening. This strengthens the investment plans of speculators. So far, Czech Republic has enough agricultural land in relatively good quality, even though a fair

amount of it is disappearing every day. The aim of this article is to draw attention to the investment possibilities of this asset in real form, to describe advantages and disadvantages of these investments from investor's long-term perspective and to assess whether it is reasonable or not to own or sell land under current conditions using a model example. Investors who invest in land in the Czech market environment have very limited and difficult conditions to obtain information in comparison to the amount of information on the joint-stock market, i.e. because of the lack of a land index. That is why the calculation of the land index is suggested further in this article.

Turrall, Svendsen and Faures (2010) define investment as an expenditure that creates conditions for the production of economic outputs. Investors who invest in land in the Czech market environment have very limited and difficult conditions to obtain information. Unlike the positive influence of dividend policy of joint-stock companies on stock purchase (see Sejkora, Duspiva (2015)) land in real form lacks this aspect; however, it is necessary to realize that it gives back additional revenue to the investors in the form of annuities. Land annuities in the Czech Republic are ranging between 2 and 3 % but it is stable in time. We shall not forget the relation of investors towards the risk, their economic conditions, education, age, profession and the gender gap. (Mohammadi, Shafi, 2018)

The Czech Republic is considered to be a very developed country, but there is a lack of information on the land market. The land is a production factor of a global character; therefore, its pricing policy is, according to the authors, influenced by other factors which lead to degradation and loss of soil, such as population growth and climate change in the world. This opinion is underlined by Meij, Havlík and coll. (2018), who claim that demand for agricultural products is influenced more by the population growth than GDP performance, and between 2020 and 2050 they for example expect an increase of the consumption of animal commodities by 20 per cent. According to Domanski and Heath (2007), the interest from speculators in commodity markets will rise.

The positive aspect in the real form of land is that it is over-inflationary because the production of agricultural commodities is underway in all stages of the economic cycle. Furthermore, land does not have any production cost, according to Walpole and coll. (1996), and it can be sold or rent can be collected from it. Due to societal changes also land in the rural areas is interesting (Alig, Kline, 1999), where residential, commercial and industrial development takes place as it does in urban areas. The disadvantage of land is its immovable character (Christophers, 2016), in other words, it cannot be transported as it is possible with agricultural commodities. This is complemented by Hubacek and Bergh (2006), who draw attention to the fact that land is not time constant. This inconstancy is caused by a human intervention.

## **2 Methodology**

To assess the investment opportunities and characteristics of the investment in land the research of academic literature was conducted, which included data from open databases to assess the investment potential of land; based on analysis and synthesis of the findings about the advantages and disadvantages of investments in land from investor's long-term perspective taking into account the specifics of investment in land. Based on the assessment of the current situation, a complex indicator for evaluation of land market is missing, that is why the methodology for the creation of Land price index is suggested. There are model examples created comparing the market and official prices of land that take into account the possibility of getting a subsidy. These examples can be used by the landowner to assess whether under current conditions it is better to keep the land or sell it. Taking into consideration all of the above, a research question was formulated: Is it more profitable to own or sell the land under current economic conditions in the Czech Republic?

## **3 Data and problem solving**

To answer the research question it is necessary to determine the land potential in the Czech Republic.

In the Czech market environment, land investment opportunities in the real form have longer tradition than in the financial form. In the case of investment into real land for appreciation of property assets, there are two options: first – to use the land for speculation, with the assumption that the price will rise or the land use plan will be changed or the land will be newly determined as industrial zone; second – to rent the land and collect annuities.

Investment in land for speculative purposes is more risky than renting, however, Czech land offers a high speculative potential in comparison with land in other countries. There are several key factors that back up the speculative investments. First one of them is the price of Czech land which is significantly undervalued in comparison to some other countries; see Table 1 (Eurostat, 2018).

**Table 1** Comparison of one hectare of land in selected countries in 2016

Country	Price for one hectare (EUR)	Comparison with CZ, in absolute terms (EUR)	Comparison with CZ, in absolute terms (%)
Czech Republic	5,463		
Poland	9,100	+ 3,637	+ 66.55
Slovenia	17,136	+ 11,673	+ 213.67
Denmark	21,202	+ 15,739	+ 288.10
Netherlands	62,972	+ 57,509	+ 1,052.70

Source: own data processing based on Eurostat, 2018

The market differences between Czech Republic and foreign countries are substantial which contributes to the speculators' interests also from abroad. For the sake of completeness we point out there are countries in Europe where the price for a hectare of land is lower than in the Czech Republic, for example, Bulgaria 3,937 EUR/ha, Estonia 2,735 EUR/ha and Croatia 2,809 EUR/ha. (Eurostat, 2018)

Another speculative factor is the population growth in the world which influences the growing consumption of agricultural commodities. According to the data from the Czech Fond půdy (2018), there may be only 0.18 hectares of land per capita in 2030 or even less. In the Czech Republic as well as in other European countries the population grows overall not only due to birth dates but mainly as a result of migration processes. In 2017, the number of inhabitants in the Czech Republic reached 10,610,000, i.e. increase by 31,000 inhabitants per year (ČSU (2017)) and this trend will probably be maintained. In the Czech Republic as of 31.12.2017, there were 7,887,027 hectares of land, of which 4,205,288 hectares were agricultural and 3,681,739 hectares non-agricultural. (ČSU, 2017). This means 0.74 hectares of land per capita and only 0.4 hectares of arable (agricultural) land per capita. Prolonging life expectancy and increase in the standard of living also contribute to the trend as well as construction industry as residential property business booms. For the investor public in the Czech market environment, a certain shortcoming is the fact that there is no complex indicator for evaluation of land market state and price trend of this production factor.

### **Suggestion of the Index for land price**

The goal of the index is to summarise the performance and risk of the researched asset into one number in the most objective way possible. The method of creating an index for the land price which would facilitate investment decision-making is described in four steps.

1. To create the index basis, selection of quality locations must be put into a basket which is the index basis. This should be done in a way so it reflects the land market most accurate possible. A number of selected locations: for example 10, with agricultural land. The index basis is constant for a certain time and the size of the basis is determined for that day.

2. Determination of the land price exchange rate in selected agricultural locations with good quality land that is in the basket, including the day for which will be taken into account for the calculation of the index.

3. Determination of the method of calculation of market capitalization  $B_t$  and  $B_0$  using weighted average market prices in selected agricultural locations per one hectare of land, including determination of starting period  $t_0$ . This method of calculation is based on the market price of land between 15 and 40 CZK per  $m^2$  in 2017. (Farmy, 2018).

4. Determination of the formula for the calculation of the index. Its advantage is that it takes into account time as one of the factors because then it shows not only the current state of the market but also the change in market prices in absolute terms (market trends) for a certain time period. The final formula for the index is:

$$I_t = (B_t/B_0) \times V \quad (1)$$

$I_t$  – land index value in time  $t$ ,

$B_t$  – market capitalization of the basis in time  $t$ ,

$B_0$  – market capitalization of the basis on the starting date of the index determination (in time  $t_0$ ),

$V$  – starting point value.

It is recommended to use 10,000 points as starting point value, given the fact that 1 hectare is 10,000  $m^2$ . This reflects the reality in land market the best.

In the model example below the Land price index is calculated using data in the Table 2. In total 12 locations were used for the basis and then an average market price per hectare was calculated for selected areas and multiplied by the total number of hectares in the selected location. That is how the market capitalisation was obtained. After that, the individual market capitalisations from all selected locations were summed up and that is how the total market capitalisation of the basis was calculated. This is also the market capitalization basis of the starting date for the index setting. The ratio of the market capitalizations is multiplied by the starting point value of 10,000 points. Data on the average market prices are valid as of January 2017 (Farmy, 2018), a number of hectares of agricultural land in selected locations as of 31. 12. 2016 (Ročenka půdního fondu, 2017).

**Table 2** Determining of the market capitalization of the starting date to calculate the Land price index

Location	The average market price for 1 hectare in CZK	Amount of hectares of agricultural land in a selected location	The market capitalization of the location in thousands of CZK	Weight in %
<b>Břeclav</b>	270,000	26,174	7,066,980	5.13
<b>Cheb</b>	315,000	28,367	8,935,605	6.48
<b>Kolín</b>	315,000	42,504	13,388,760	9.72
<b>Kroměříž</b>	315,000	31,864	10,037,160	7.28
<b>MB</b>	270,000	51,095	13,795,650	10.01
<b>Mělník</b>	270,000	28,305	7,642,350	5.55
<b>Nymburk</b>	270,000	24,957	6,738,390	4.89
<b>Prostějov</b>	315,000	43,289	13,636,035	9.90
<b>Přerov</b>	315,000	29,463	9,280,845	6.73
<b>Tachov</b>	315,000	43,132	13,586,580	9.86
<b>Vyškov</b>	315,000	24,263	7,642,845	5.55
<b>Znojmo</b>	315,000	82,711	26,053,965	18.91

<b>Total</b>	456,124.00	13,7805,165	100.00
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Source: own data processing

The market capitalization of the basis on the starting day of the index setting is 137,805,165,000 CZK as of January 2017.

The data in Table 3 is used to determine the current value of the index as of January 2018 and the source of it is the price map (Farmy, 2018). Number of hectares of agricultural land in selected locations was valid as of 31. 12. 2017 (Ročenka půdního fondu, 2018).

**Table 3** Determination of the market capitalization of the basis of the Land price index

Location	The average market price for 1 hectare in CZK	Number of hectares of agricultural land in a selected location	The market capitalization of the location in thousands of CZK	Weight in %
<b>Břeclav</b>	310,000	26,171	8,113,010	4.82
<b>Cheb</b>	360,000	28,342	10,203,120	6.06
<b>Kolín</b>	410,000	42,493	17,422,130	10.35
<b>Kroměříž</b>	405,000	31,861	12,903,705	7.67
<b>MB</b>	370,000	51,070	18,895,900	11.22
<b>Mělník</b>	280,000	28,301	7,924,280	4.71
<b>Nymburk</b>	325,000	24,953	8,109,725	4.82
<b>Prostějov</b>	465,000	43,270	20,120,550	11.95
<b>Přerov</b>	405,000	29,458	11,930,490	7.09
<b>Tachov</b>	310,000	43,102	13,361,620	7.94
<b>Vyškov</b>	395,000	24,265	9,584,675	5.69
<b>Znojmo</b>	360,000	82,698	29,771,280	17.69
<b>Total</b>		455,984.00	168,340,485	100.00

Source: (own data processing)

Market capitalization basis ( $B_t$ ) as of January 2018 was 168,340,485,000 CZK, market capitalization basis of the starting date ( $B_0$ ) was determined to 137,805,165,000 CZK and the starting point value to 10,000. So the Land price index is following:

$$I_t = (B_t / B_0) * 10,000 = (168,340,485,000 / 137,805,165,000) * 10,000 = 12,215.83$$

Value of the Land price index, therefore, increased from April 2017 to August 2018 by 2,215.83 points, i.e. by 22.16 %. Given the one year period, it can be said that this is an investment with good prospects. This is underlined by inverse relation of the number of hectares of land and the increase of the price of land in selected locations. The Tables 2 and 3 show that in April the selected locations had 456,124 hectares, but a year later they had 140 hectares of agricultural land less, which is 455,984 hectares. Furthermore, it is necessary to periodically recalculate the percentage for each location because any change in the percentage of the basis of the index can significantly affect the increase or decrease of the Land price index.

### Assessment of the investment in land from the investor's perspective

Land-related intentions influence investor's decision-making. It can be either an active farmer or landowner who uses the land for rent. In both cases, it is favourable to combine as many hectares of land as possible as it makes the investment more profitable. Recommended minimum for investment purposes is 10 ha which is not easy at all in the Czech market environment because an area of 10 ha is owned, by average, by 30 owners.

When assessing the investment in terms of its implementation or its rejection it is necessary to evaluate whether the investment can produce the expected benefit. In connection to the information above, there was one balance sheet model that uses historical prices selected as a starting point. The carrying value of the asset (in the balance sheet model as the value of the asset), in this article referred to as the theoretical value of land, is determined based on the prices of land in the Czech Republic.

There are two types of prices for land in the Czech Republic, firstly the official price and secondly the price of land according to the cadastral area. The official price serves for tax purposes, for selling and buying land that is owned by the state and for the changes in land use. The official prices are updated based on qualitative changes in land characteristics and subsequent changes in the BPEJ (bonited soil-ecological unit) as well as the development of the situation in market relations and expenses. The price of land according to the cadastral areas is used to determine the property tax (land tax) to set the amount of annuity for land that is a part of the agricultural land fund in cases when the owner and the renter do not agree on its rental price and to determine the purchase price for the transfer of agricultural and forest land from the state ownership to another entity. In this article, the theoretical price of land is calculated using the official price.

Generally, if the ratio of the actual market price per 1 m<sup>2</sup> of land to the theoretical determined price of land per 1 m<sup>2</sup> is higher than 1, then in at that time the investors value the land more than it is valued by the state – therefore it is profitable to own the land. In practice, it is necessary to modify this assessment because the selling and buying of land are not by 1 m<sup>2</sup>, but areas much larger and usually the land quality varies, even within a few acres of land.

The land quality is assessed by BPEJ (bonited soil-ecological unit). The authors express the Price-to-Theory Value ratio (PTV) of the above-mentioned facts in mathematical formula:

$$PTV = \frac{PV}{\sum_{i=1}^n w_i TV_i} \quad (2)$$

PV is Price (marketed) value of land for the total area,

w<sub>i</sub> is the weight of the i sub-area when taking into account its quality, expressed as % of the area of the total area,

TV<sub>i</sub> is the quality of i area in official price per m<sup>2</sup>,

n is a number of sub-areas with various quality.

In the case of land ownership as a part of a business property, the calculation will simplify. The carrying amount of asset (in theoretical land price model) will be expressed as the cost of land acquisition which does not change (because according to the Czech legislation the historical prices are used and the land belongs to the assets that cannot be depreciated). It is true that if an indicator PTV shows the value higher than 1, the land is over-appreciated; the current owner should not consider selling it. For a potential investor, the investment is not profitable. However, let's not leave out other aspects that decide about the ownership change, such as financial distress, speculative intention, and others. An owner or potential investor assesses the amount of profitability of an investment compared to an alternative profitability of other investments. In the Czech Republic, the profitability is determined by the land annuity of 2-4 %, according to the cadastral areas. The profitability of an investment is different for a landowner, an active farmer (tenant or owner) as a result of subsidies (especially so-called direct payments) that are provided for entities in agricultural sector.

### **Case study: profitability of sale or purchase of land?**

The real situation accepts both official and market price in the Czech Republic valid as of January 2018. Land – arable land – is located in the Polabská lowland and its area is 169,710 m<sup>2</sup>. Other data is stated in Table 4, in connection to the Formula 2. Market price in this area ranges between 26-36 CZK/m<sup>2</sup>. The buyout offer in January 2018 was

5,261,010 CZK, i.e. 28 CZK/m<sup>2</sup> (data obtained from an anonymized source). The land is currently rented, at 3 % of the official price of land which is 10.20 CZK/m<sup>2</sup> in the cadastral area (CUZK, 2018). The tenant pays the land tax and that is why the annuity is increased by the amount of the annual tax, so the net annual yield of 3 % can be considered only while maintaining the current situation (see Table 4).

**Table 4** Market and official price of land, annual annuities

	<b>BPEJ</b>	<b>The area in m<sup>2</sup> (TV<sub>i</sub>)</b>	<b>Price for m2 (w<sub>i</sub>)</b>	<b>Total official price</b>	<b>Market price</b>	<b>Annual annuities</b>
	32,051	52,210	7.28	380,088.8		
	32,001	22,010	9.34	205,573.4		
	31,000	82,650	17.92	1,481,088		
	31,010	12,840	16.52	212,116.8		
<b>Total</b>		169,710		2,278,867.8	5,261,010	68,366 CZK

Source: (own data processing)

Current market price is considerably higher than the official price (Table 4), so  $PTV = 5,261,010/2,278,867.8 = 2,3$ . Again, if PTV is bigger than 1, then it is profitable to sell the land. Rental contracts are concluded for approx. 10 years, the rent does not increase during the duration of the contract, so the landowner receives 383,660 CZK in this time period (so his revenues do not cover the difference between market and official price). However, it is important to take into consideration the risk related to holding of this asset at the minimum and the revenue of 3 % in the current situation is interesting for the landowners. Moreover, in the case of proper care, the value of land does not decrease and its market price in the Czech Republic grows steadily (as the suggested Land price index shows). Therefore the market value can be predicted using the actual market price and trend which is obvious from the Land price index. If it is an individual owner, then decision making plays an important role in whether to sell the land, as well as the economic situation, age, family members and other subjective factors.

Why there is a significant investors' interest in land for 'theoretically' very unfavourable price? Because of all the reasons stated above, especially when buying land with speculative intentions. Furthermore, the loss of agricultural land threatens the business of agricultural cooperatives who face buyouts by foreigner investors. From the perspective of farmers, unified payments for the farmers are also important. The payment rate for agricultural land is 3,388.15 CZK per hectare in 2018. The subsidy policy together with the quality of land provides a good prerequisite for a successful entrepreneurial activity.

#### 4 Results and Discussion

The land fun in the Czech Republic is decreasing due to the change of purpose of land in the surrounding residential and industrial zones. The price of land compared to other countries is still low, whereas the quality of land in the Czech Republic is very high. Therefore the demand exceeds the supply and the land is becoming a strategic investment. A complex indicator for evaluation of land market is missing, that is why there is a suggested methodology for the creation of Land price index which can be described as an indicator suitable for the market with this asset. Based on the results stated above, it is obvious that the value of land assessed using this index is increasing and it is a very profitable asset. The authors are aware of the fact that the observed time period is not very long, however, there is not enough data from previous years to assess a longer time period. It is absolutely clear that the market price of land significantly exceeds its official price which is due to the growing demand for this asset. There is no clear answer to the research question because the approach of the investor and the owner plays a great role in it, and not only when it comes to expected revenue. Apart from the high market price of land in the Czech Republic, the most important factors are psychological factors that decide on the sale of land of individual owners. In the case of

active farmers, there is mostly the effort to meet their need which is to ensure a sufficient amount of this production factor that is in risk of transferring ownership to a foreign entity.

## 5 Conclusions

Land can be seen as a specific production factor that shows zero or minimal depreciation but also as a strategic asset which generates profit for its owner in the form of rent and provides revenue for its use as a result of their business activities. At the same time, it is a very profitable investment for which we can assume appreciation in the future. Therefore investment in land may have a speculative character and it is necessary to observe the price trend of this asset. Unfortunately there is not enough information available so far to compare the price trend in time and space in individual locations in the Czech Republic. There are only partial data for the past two years.

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