SELECTED IMPORTANT MACROECONOMIC FACTORS AND DEVELOPMENT OF IRONWORKS PRODUCION PRICES

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Abstract

The paper deals with the influence of important macroeconomic parameters on development of ironworks production prices. Macroeconomic factors and their effect on final prices (and pig nod foundry charge iron) are often undervalued next to closer surrounding forces inside industrial branch. There was applied evaluative partial PEST analysis and three factors considered as important were highlighted and closely observed: Ukraine civil war conflict, Czech central bank (CNB) currency interventions and quantitative easing. Significant timeline dates on 2012 - 2015 pig iron production price trend line were pointed and discussed. Necessary statistical calculations as correlations were provided. Kind advice and data of industrial partner were utilized. Results are presented and conclusions are proposed.

Keywords: Macroeconomic factors, quantitative easing, Ukraine, ironworks production, prices

1. INTRODUCTION

First motivation of the paper was a trial of ex-post analyses of pig nod prices for the purpose of searching for macro-surrounding influences affecting the price of foundry iron charge.

Conclusions of the paper should help explain if we are able to foresee the development trend of the prices of raw materials used by ironwork (steelwork) companies in production (compare to [1]) and particularly those raw materials which form a significant part of the costs (and hence final price of the product). Previous research [2] evaluated impact of electric power prices on total costs of foundry casting production and discovered that percentage of charge (pig nod, liquid iron and additives) is about 67 % of foundry variable costs.

Companies aim to reduce working capital (especially funds tied up in inventories and receivables), but if the company is able to predict at least price trends, it may decide to buy a larger quantity of (speculative) stocks at the expense of worsening working capital indicator.

The question remains whether the typical company is able to consider all relevant factors affecting the price of raw materials (the product).

1.1. Contribution and goals of the paper

Main goal of the paper is to analyze selected factors and determine if they influenced change in pig nod (foundry charge iron) prices and how. There were formulated two research questions:

> Q1: Were pig nod prices influenced by currency intervention of Czech National Bank and are these effects remaining?

Q2: Were pig nod prices influenced by Ukraine conflict and are these effects remaining?

Secondary goal was to carry out related analyses as comparison to index of industrial production prices for basic metals and fabricated metal products or calculation of mutual correlation coefficients and provide some more detailed information.

2. THEORY AND METHODOLOGY

2.1. PEST(L*E*) analysis

PEST(L*E*) analysis is an analytical technique used for the strategic analysis of organizational outer (macro) surroundings. PESTL*E* (sometimes also PEST*E*L, SLEPT*E* etc.) is an acronym and each letter represents a different type of external factors (Political, Economic, Social, Technological, Legal, and Ecological) [3].

Full PEST(L*E*) analysis was not possible to perform due to big number of possible influences. Table 1 brings list of some important possibly affecting forces. We realized weighting of impact strength and selected for partial analysis three factors categorized under political and economical forces.

Table 1 PEST(L*E*) analysis – important factors (Data source: own processing)

Political and Legislative Factors (PL):	***Political stability***
Enforcing law and anti-corruption	Business and employment legal codex
Tax politics	Customer protection, antimonopoly laws
Economic Factors (E):	Economic cycles
GDP trends, inflation, bank interest	***Currency politics, exchange rates***
Average wage, purchasing power	Trends in power prices, tax burden
Social Factors (S):	Unemployment
Level of education	Demographical trends of population
Lifestyle changes	Approach to work and leisure time
Technological and Environmental Factors (T*E*):	New findings and discoveries
Changes and developments of technologies	Global situation in technology
Infrastructure, ICT level	Government support of R&D

There were selected factors to examine: Ukraine conflict (political factor), quantitative easing and CNB interventions (economic factors). Partial PEST(L*E*) analysis is than provided and factors are discussed later.

2.2. Political factors regarding Ukraine conflict (P)

The ongoing unrest in Ukraine affects entire European Union at least, by developing a negative cost effect on inputs in the form of oil and gas. Czech Association of Exporters also suggests that the major issues may not lead to a direct decrease in exports of Czech companies to countries in crisis, but also the risk of indirect damages such as unrealized import of Ukrainian iron ore. 23 billion CZK of imported goods in 2013 had consisted of raw materials, especially iron ore created more than half, about 13 billion CZK. Shortfall in imports of raw materials could adversely affect entire Czech industry, especially automotive [4].

Important milestones of Ukraine conflict can be observed at figure 1. Especial negative effect had ceasing of EU approximation dialogues and later Maidan square incidents. Quite positive effect can be attributed to elections won by Petro Poroshenko and later Minsk peace agreements and armistice [5].

2.3. Economic factors regarding currency intervention of Czech National Bank (E)

The CNB has an inflation target of 2 % ± 1 %. This objective could not be fulfilled, since the main monetary instrument was on so called technical zero (0,05 %), therefore have been on 7. 11. 2013 opened interventions in order to weaken the Czech crown (CZK) at a value of circa 27 CZK per Euro. These interventions should last until disappear inflationary pressures, but at least until the end of 2016. The reason of CNB interventions was imminent deflation in the CR that would last at least two to three quarters, which was a very optimistic assumption [6]. CNB intervention and CZK/EUR exchange rate effect is well apparent at figure 1.

2.4. Quantitative easing (E)

Reducing the cost of loans will cause that banks will have an incentive to provide more loans and therefore companies should begin to spend more and invest. These are the main reasons why the American central bank FED launched quantitative easing. This mechanism is aimed to support higher demand for labor and thus to reduce the unemployment rate. FED explicitly stated that the bond purchase is aimed for job creation. Employment growth is the main task of the FED, unlike the CNB, which is aimed at monetary stability. FED on 29.10.2014 completed a third round of quantitative easing, which inflated its balance sheet of 1,66 trillion dollars to more than 4,5 trillion USD, which is eight times the pre-crisis levels .

Dollar price

Year 2014 and early 2015 were typical by strengthening of US dollar, which caused a good condition of the US economy and the favorable macroeconomic data. This trend confirmed on 29 April 2015 US central bank (FED). In the very question of monetary policy normalization FED reiterated its position, on the labor market expects further improvement, in inflation a sufficient conviction on the gradual shift to the target of 2 %.

2.5. Methodology applied

Following methodology was applied in course of creation of presented article and related analyses. After formulation of questions implied from industrial company based on assumptions mentioned above, there were done research of theory and relevant information sources as internet newsletters, statistical and industrial partner enterprise data. Data analyses, comparisons and correlations (MS Excel 2010®) were performed and composite x-y chart was constructed (figure 1). Trends in timeline were compared to actual events and results together with discussion were formulated.

3. RESULTS AND DISCUSSION

Following paragraphs present most important findings followed by chart and correlation analysis. Later final results, answers to research questions and discussion can be found.

3.1. Pig nod prices time chart including PE factors

The situation of pig nod (foundry charge iron) prices index (I_{PNP}) together with index of industrial production prices (ICPV) section CH (basic metals, fabricated metal products) is depicted at figure 1. Index of pig nod prices was normalized at 1.000 on 1.1.2012 and show change in prices in CZK – data were provided by industrial our partner. Both indexes are drawn at *y1* axis. There are depicted exchange rates of CZK/EUR and CZK/USD too - both indexes are drawn at *y2* axis. Obviously is exchange rate CUK/USD much less stable then CZK/EUR. Time period covered by data is since 1.1.2012 to 30.1.2015.

There are also present text boxes with arrows pointing specific dates, where some important event occurred having apparent or expected influence on price indexes. Red bordered boxes are characterizing Ukraine crisis milestones and blue box is describing CNB intervention. Green box characterize the “big fall” price effect.

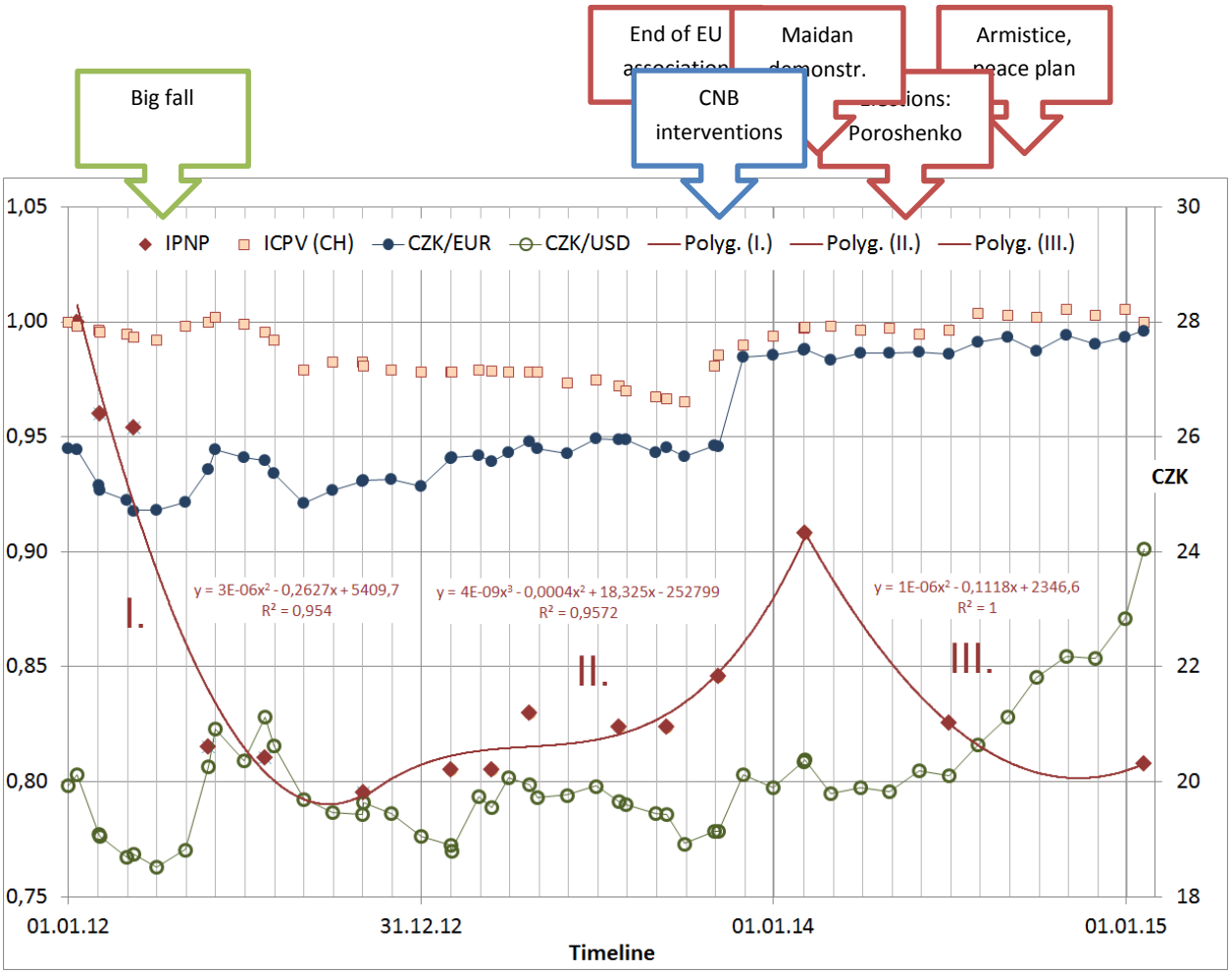

Fig. 1 Timeline 2012-2015. IPNP is index of pig nod prices, ICPV (CH) is index of industrial production prices (basic metals, fabricated metal products), CZK/EUR and CZK/USD are exchange rates. IPNP data are interposed by polynomic trends (Data source: own processing with data of ArcelorMittal Engineering Products Ostrava, s.r.o., CNB [7] and CSO [8]).

There can be observed three periods according trend of index of pig nod prices:

I. Period (Q1-Q3.2012): characteristical by big fall of pig nod prices
II. Period (Q4.2012-Q1.2014): slow growth of pig nid prices culminated by CNB interventions and Ukraine crysis
III. Period (Q2.2014-Q1.2015): corrective fall of pig nod prices typical by Ukraine stabilistion and massive growth of US dollar

Big fall (period I)

In 2012 were the fall of iron ore prices mostly associated with the slowdown in GDP growth and the related drop of demand in China and the crisis in Europe [9]. Iron ore processors in China have started to sell their stocks for cash, which they then used to finance and sustain its operations. This increased the pressure on prices to fall further. Some mining companies have subsequently fallen into operating losses. On figure 1 is visible about 21 % fall of pig nod prices caused by mentioned events.

Culminated growth (period II)

Period II can be characterized first by slow corrective growth caused by economic recovery of markets and later by culmination, which we assign to combination of political and economic factors, connected with Ukraine crisis and CNB interventions – see text boxes above the figure 1. Total change in pig nod prices is about 12 % growth.

Corrective fall (period III)

Third period is characteristic by approximate 10 % fall of pig nod prices attributed to stabilization of political situation in Ukraine and growth of USD caused (at least partially) by quantitative easing. The fall of exchange rate CZK/USD in period III is about 20 %.

3.2. Correlations

Correlation coefficients among index of pig nod prices, index of industrial production prices (basic metals, fabricated metal products), CZK/EUR and CZK/USD exchange rates were calculated (see table 2).

Table 2 Triangular matrix of Pearson product-moment correlation coefficients calculated by MS Excel 2010® (Data source: own processing).

Kc	I_{PNP}	ICPV (CH)	CZK/EUR	CZK/USD
I_{PNP}	-	0,429	-0,195	-0,253
ICPV (CH)		-	0,491	**0,536**
CZK/EUR			-	0,680
CZK/USD				-

The result show, that highest correlation is between CZK/EUR and CZK/USD currency exchange rates (0,680). This indicates interdependence of CZK on these two important currencies. Average correlation (0,536) is between index of industrial production prices ICPV (CH) and CZK/USD exchange ratio (0,536) and similar CZK/EUR (0,491) exchange ratio. Index of industrial production ICPV (CH) is so more dependent on CZK/USD exchange ratio than CZK/EUR exchange ratio. Next correlation between index of pig nod prices (I_{PNP}) and index of industrial production prices ICPV (CH) is 0,429. The value indicates weak bond between these two indicators. In other hand correlation of index of pig nod prices (I_{PNP}) to CZK/EUR (-0,195) and CZK/USD (-0,253) is small, but rather negative.

Answering research questions Q1 and Q2

We can consider that pig nod prices were influenced by mix of currency intervention of Czech National Bank and Ukraine conflict which occurred simultaneously. These increase prices more than 12% during one year (2013/2014). These effects however disappeared and pig nod prices seem to stabilize at prices of 2012/2013 before CNB interventions and Ukraine conflict.

CONCLUSION

Contribution of the paper lies in tracing of some important political and economic factors with apparent influence at price indexes. Interesting is, that Ukraine conflict did not influenced ICPV (CH) index but quite strongly influenced I_{PNP} index. In other hand CNB interventions visible influenced both price indexes – but I_{PNP} only temporarily and ICPV (CH) effect looks more permanent.

One of scientific conclusions can be that the direction of research is promising, but for better and more accurate future results it is necessary to develop wider and deeper data processing and sophisticated

system of analyses. As an example can be mentioned reasoning and decision making at milestone of November 2013. On the basis of accessible information available at that time, buying reasonable speculative stock in advance could positively influence company economics in perspective of real price trend development in next months.

There would not be so difficult to create a computer program (compare to [10]), where can simply be entered basic PEST parameters and output can bring a kind of probabilistic trend that can serve as a tool for economic decisions.

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