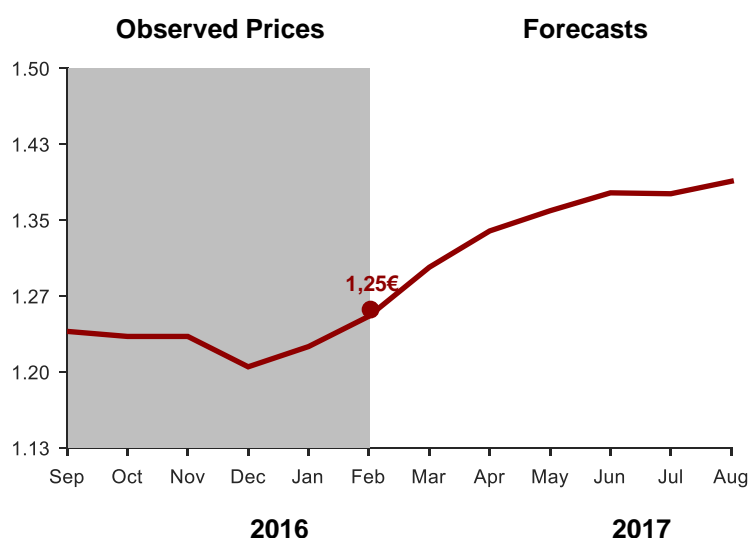


# Forecasting the Price of LDPE

<b>Commodity</b>	LDPE-GP Film (Spot FD NW Europe)
<b>Forecast Period</b>	March 2017 – August 2017
<b>Currency</b>	€
<b>Unit</b>	Kilogram
<b>Observations</b>	Monthly forecasts of the spot price in the first day of the month



## Forecasts



Month/Year	Forecast	Prob. Of Raise
Mar. 2017	1,30€	86%
Abr. 2017	1,34€	85%
Mai. 2017	1,36€	83%
Jun. 2017	1,38€	79%
Jul. 2017	1,38€	65%
Aug. 2017	1,39€	73%

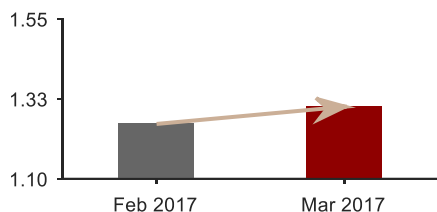
## Suggested Action for Procurement

Purchase Limit Month	Suggested Action
March 2017	Buy in February at 1,25€
April 2017	Buy in February at 1,25€
May 2017	Buy in February at 1,25€
June 2017	Buy in February at 1,25€
July 2017	Buy in February at 1,25€
August 2017	Buy in February at 1,25€

Disclaimer: This document was made for commercial purposes. All the contents of this document should be of the reader's consideration, so that none of the suggested actions represent incentives to act. Watson & Noble does not take responsibility for actions based in this document.

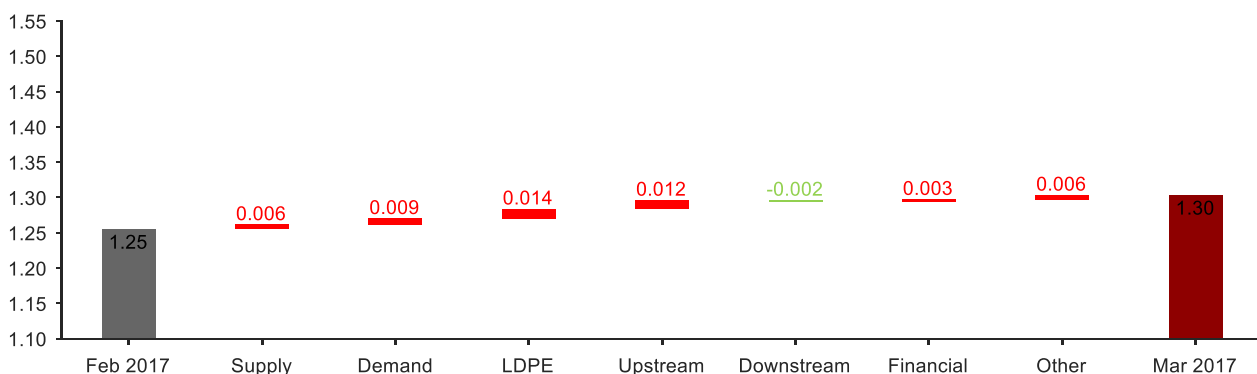
# Forecasting the Price of LDPE

## Impact Analysis: One Month Forecast



Our algorithm forecasts a higher price of LDPE in one month: it is expectable that the price increases 3,85% from 1,25€ to 1,30€ until the beginning of March.

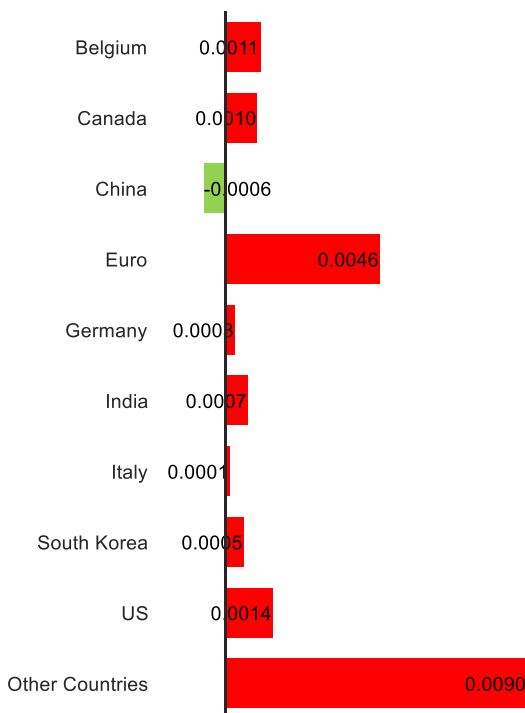
## Indices of Factors



### Interpretation

- **Decrease of Supply:** Positive pressure of the Supply index
- **Increase of Demand:** Positive pressure of the Demand index
- Positive pressure of the index of LDPE
- Positive pressure of the index of variables representing the market upstream
- Negative pressure of the index of variables representing the market downstream
- Positive pressure of the financial index
- Positive pressure of other commodities and other factors
- Focus on Euro, UK, and Mexico

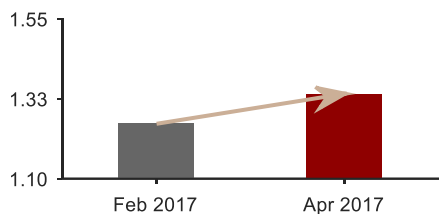
### Impact per Country



Disclaimer: This document was made for commercial purposes. All the contents of this document should be of the reader's consideration, so that none of the suggested actions represent incentives to act. Watson & Noble does not take responsibility for actions based in this document.

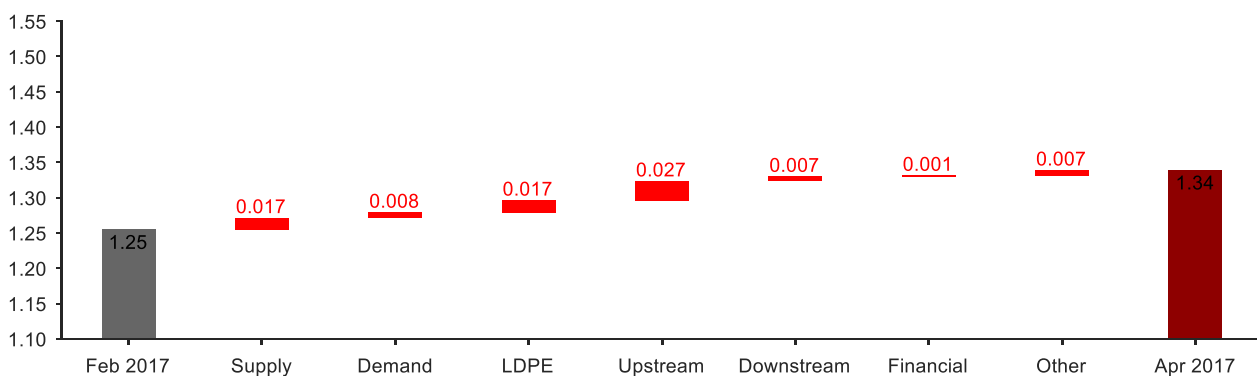
# Forecasting the Price of LDPE

## Impact Analysis: Two Months Forecast



Our algorithm forecasts a higher price of LDPE in two months: it is expectable that the price increases 6,70% from 1,25€ to 1,34€ until the beginning of April.

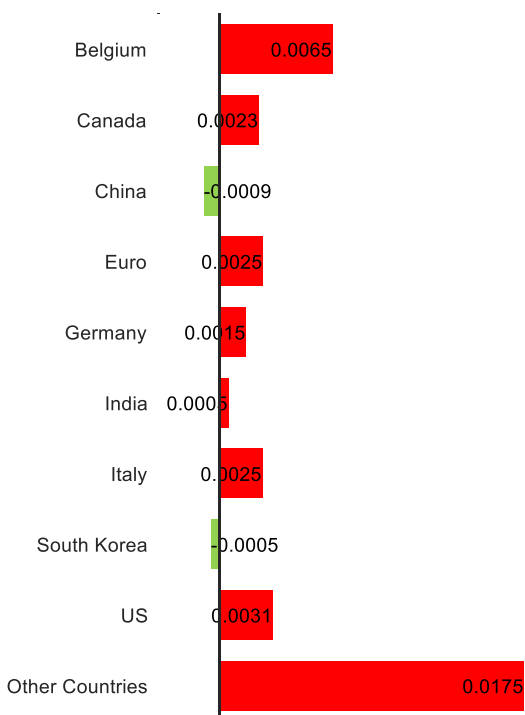
## Indices of Factors



### Interpretation

- **Decrease of Supply:** Positive pressure of the Supply index
- **Increase of Demand:** Positive pressure of the Demand index
- Positive pressure of the index of LDPE
- **Considerably positive pressure of the index of variables representing the market upstream**
- Positive pressure of the index of variables representing the market downstream
- Slightly positive pressure of the financial index
- Positive pressure of other commodities and other factors
- Focus on Japan, Belgium, and Qatar

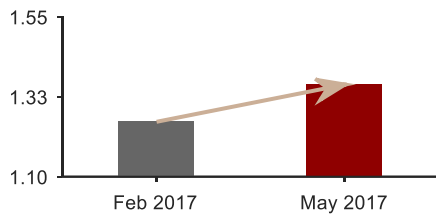
### Impact per Country



Disclaimer: This document was made for commercial purposes. All the contents of this document should be of the reader's consideration, so that none of the suggested actions represent incentives to act. Watson & Noble does not take responsibility for actions based in this document.

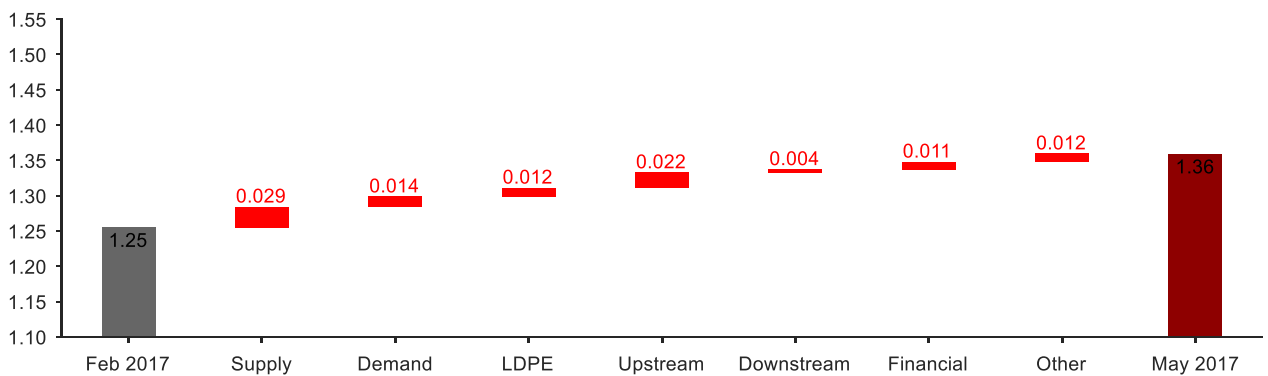
# Forecasting the Price of LDPE

## Impact Analysis: Three Months Forecast



Our algorithm forecasts a higher price of LDPE in three months: it is expectable that the price increases 8,29% from 1,25€ to 1,36€ until the beginning of May.

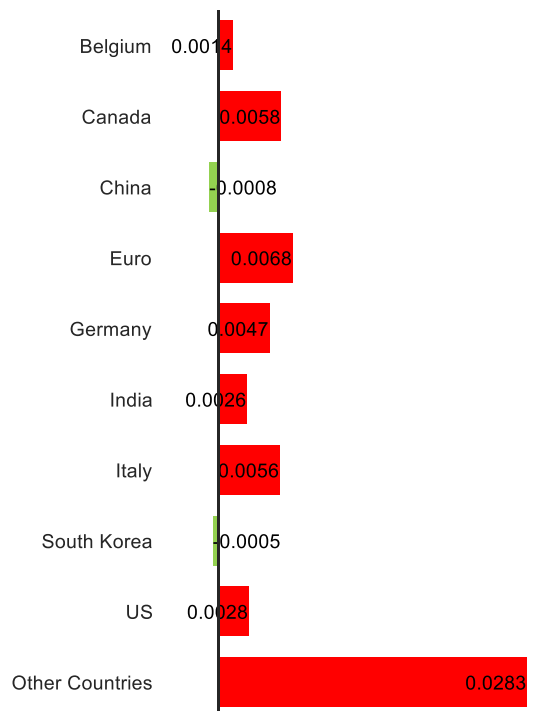
## Indices of Factors



### Interpretation

- **Decrease of Supply:** Positive pressure of the Supply index
- **Increase of Demand:** Positive pressure of the Demand index
- Positive pressure of the index of LDPE
- Positive pressure of the index of variables representing the market upstream
- Positive pressure of the index of variables representing the market downstream
- Positive pressure of the financial index
- Positive pressure of other commodities and other factors
- Focus on Japan, Singapore, and Euro

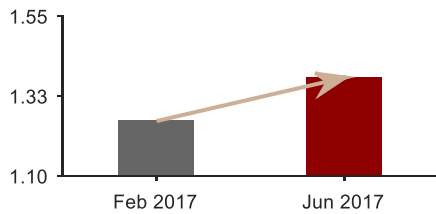
### Impact per Country



Disclaimer: This document was made for commercial purposes. All the contents of this document should be of the reader's consideration, so that none of the suggested actions represent incentives to act. Watson & Noble does not take responsibility for actions based in this document.

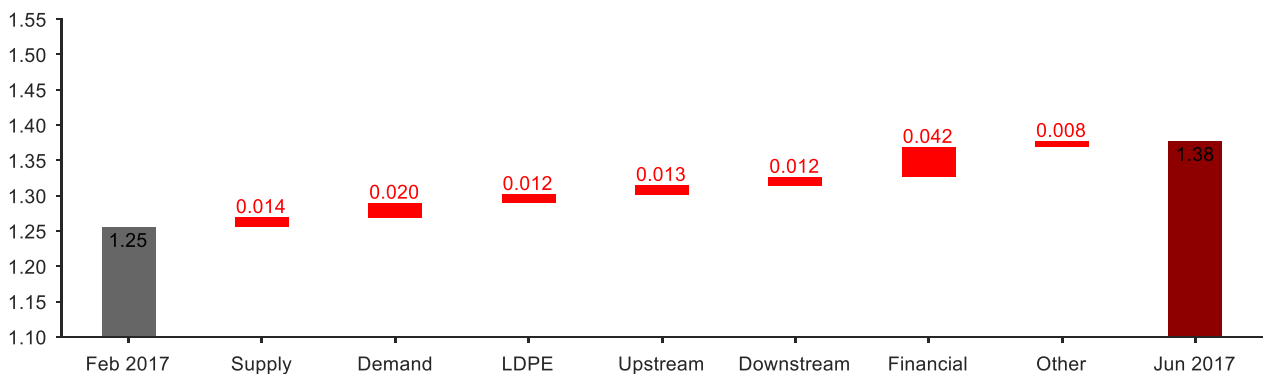
# Forecasting the Price of LDPE

## Impact Analysis: Four Months Forecast



Our algorithm forecasts a higher price of LDPE in four months: it is expectable that the price increases 9,70% from 1,25€ to 1,38€ until the beginning of June.

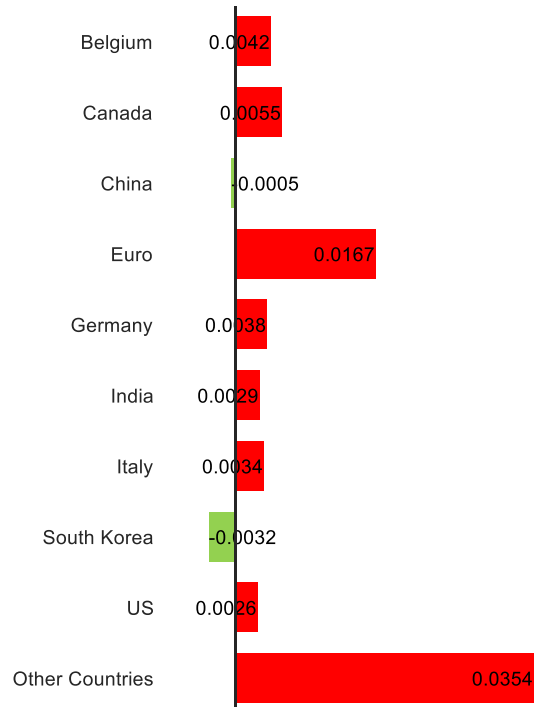
## Indices of Factors



### Interpretation

- **Decrease of Supply:** Positive pressure of the Supply index
- **Increase of Demand:** Positive pressure of the Demand index
- Positive pressure of the index of LDPE
- Positive pressure of the index of variables representing the market upstream
- Positive pressure of the index of variables representing the market downstream
- **Considerably positive pressure of the financial index**
- Positive pressure of other commodities and other factors
- Focus on Euro, Japan, and Netherlands

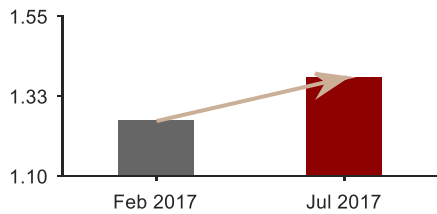
### Impact per Country



Disclaimer: This document was made for commercial purposes. All the contents of this document should be of the reader's consideration, so that none of the suggested actions represent incentives to act. Watson & Noble does not take responsibility for actions based in this document.

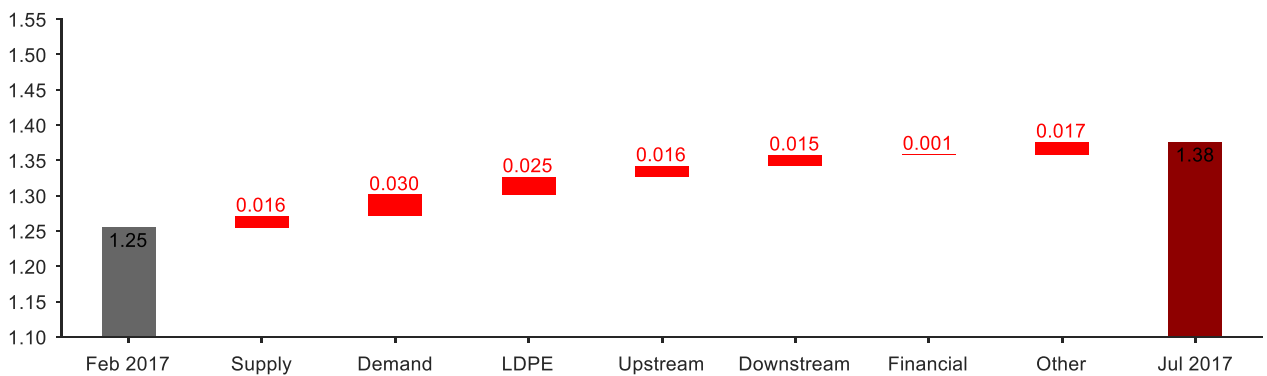
# Forecasting the Price of LDPE

## Impact Analysis: Five Months Forecast



Our algorithm forecasts a higher price of LDPE in five months: it is expectable that the price increases 9,63% from 1,25€ to 1,38€ until the beginning of July.

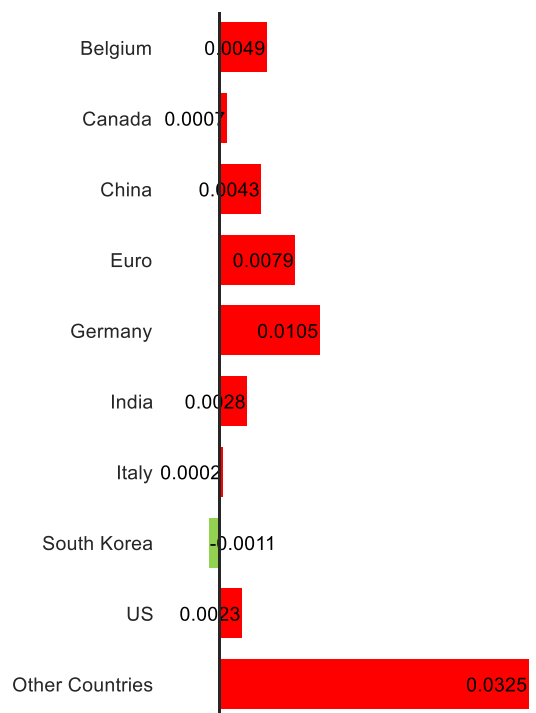
## Indices of Factors



### Interpretation

- **Decrease of Supply:** Positive pressure of the Supply index
- **Increase of Demand:** Positive pressure of the Demand index
- Positive pressure of the index of LDPE
- Positive pressure of the index of variables representing the market upstream
- Positive pressure of the index of variables representing the market downstream
- Slightly positive pressure of the financial index
- Positive pressure of other commodities and other factors
- Focus on Japan, Mexico, and Germany

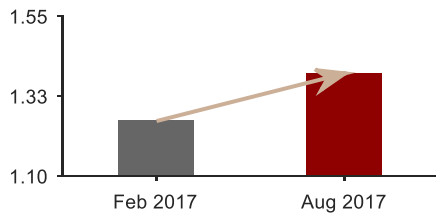
### Impact per Country



Disclaimer: This document was made for commercial purposes. All the contents of this document should be of the reader's consideration, so that none of the suggested actions represent incentives to act. Watson & Noble does not take responsibility for actions based in this document.

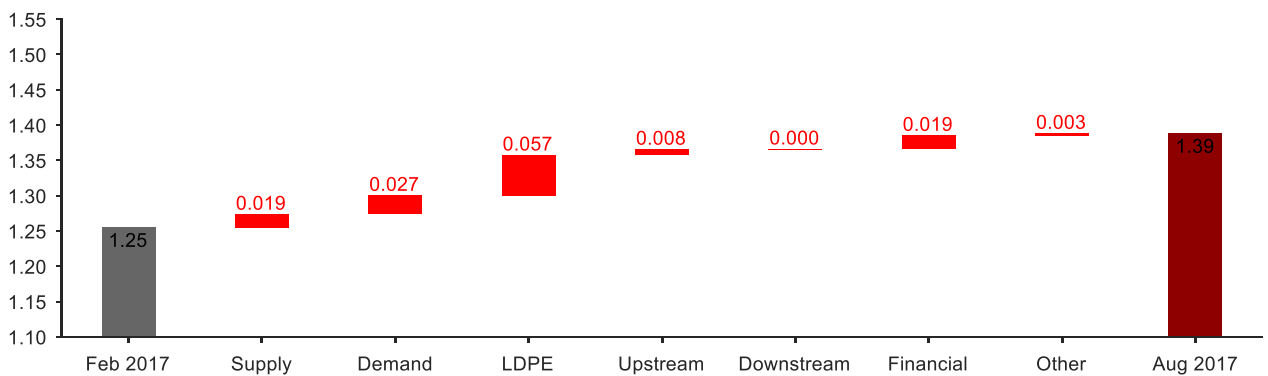
# Forecasting the Price of LDPE

## Impact Analysis: Six Months Forecast



Our algorithm forecasts a higher price of LDPE in six months: it is expectable that the price increases 10,62% from 1,25€ to 1,39€ until the beginning of August.

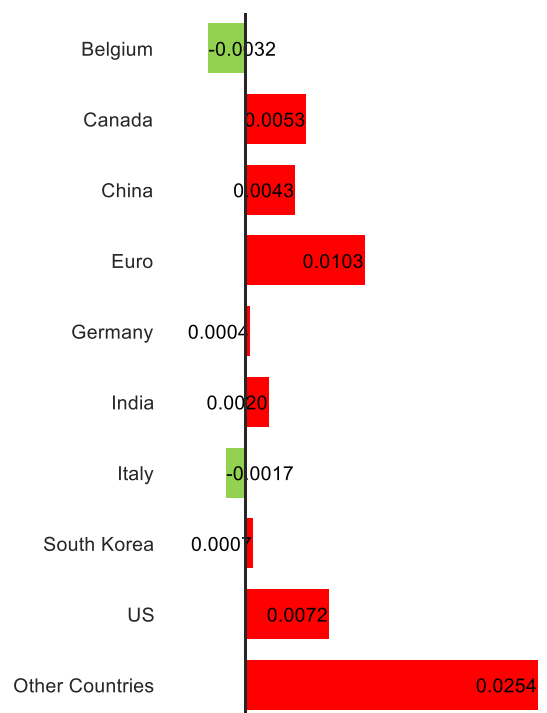
## Indices of Factors



### Interpretation

- **Decrease of Supply:** Positive pressure of the Supply index
- **Increase of Demand:** Positive pressure of the Demand index
- **Considerably positive pressure of the index of LDPE**
- Positive pressure of the index of variables representing the market upstream
- Slightly positive pressure of the index of variables representing the market downstream
- Positive pressure of the financial index
- Slightly positive pressure of other commodities and other factors
- Focus on Japan, Netherlands, and Euro

### Impact per Country



Disclaimer: This document was made for commercial purposes. All the contents of this document should be of the reader's consideration, so that none of the suggested actions represent incentives to act. Watson & Noble does not take responsibility for actions based in this document.

# Forecasting the Price of LDPE

## APPENDIX I – Technical Explanation of the Impact Analysis

In this appendix, we explain the impact analysis of the factors that most contribute for our forecasts.

This Impact Analysis is conducted individually for **each time horizon**, allowing for a distinction between the indices of variables that contribute for our forecasts at short and medium run.

For each time horizon, our analysis has **two components**: first, we present the impact of variables grouped by **indices of factors**; second we present the impact of variables grouped by **indices of countries**.

### Indices of Factors

**Indices of factors** are indices of the weighted contributions of the variables grouped in those factors.

**Supply Index:** composed of macroeconomic variables of the producing and exporting countries. It includes variables such as production, exchange rates, inflation, monetary policy, and wages. For example, an increase in wages implies higher production costs which should (in linear, general, and *ceteris paribus* terms) generate an incentive to increase prices;

**Demand index:** composed of macroeconomic variables of the consuming and importing countries. It includes variables such as production, exchange rates, inflation, monetary policy, and wages. For example, a decrease in a consumer confidence index should (in linear, general, and *ceteris paribus* terms) increase savings and decrease demand, leading to lower prices;

**LDPE Index:** composed of variables related to LDPE. It includes variables such as the price of LDPE in different regions of the world and exports, imports, and producer prices of LDPE in some countries. For example, an increase in the price of LDPE in other region may imply an increase in the price of LDPE in Europe due to arbitrage movements;

**Upstream index:** composed of variables related to Ethylene, Ethane, Propane and Natural Gas. It includes variables such as the price and exports, imports, and producer prices of the inputs in some countries. For example, an increase in the price of Ethylene should (in linear, general, and *ceteris paribus* terms) generate an increase in the price of Polyethylene;



# Forecasting the Price of LDPE

## APPENDIX – Technical Explanation of the Impact Analysis

**Downstream index:** composed of variables related to downstream industries, such as Packaging. It includes variables such as the exports, imports, and producer prices of the Plastic Industry in some countries. For example, an increase in the demand of Plastic should (in linear, general, and *ceteris paribus* terms) generate an increase in the price of LDPE;

**Financial Variables Index:** composed of financial market variables. It includes the share price of companies that produce LDPE. It also includes financial indices related to this sector. For example, a positive change in the share price of a LDPE producer should (in linear, general, and *ceteris paribus* terms) imply an increase in expected profitability of the firm. This may signal an expectation of increase in the price of LDPE;

**Other Variables Index:** composed of variables related to other commodities, such as Oil and other polymers. It includes the price, exports and imports of these commodities. For example, a positive change in the price of a substitute commodity, should (in linear, general, and *ceteris paribus* terms) imply an increase of demand of LDPE, and thus, of the price of LDPE.

## Country Indices

**Country Indices** are indices of the weighted contributions of the macroeconomic variables of each country. The countries we present are the most relevant countries in the production, consumption, and international commerce of LDPE.

## Interpretation Warning

It is important to note that the contribution of individual variables and indices of variables is not linear. The interaction between variables and between variables of different factors may not be neglectable, which means that the importance of each variable and indices of variables is determined together with the importance of all other variables.

Furthermore, the analysis of changes in variables is not linear. This means that the same variable with the same change in different moments of time may have different impacts given its previous evolution. For example, the algorithm contrasts the change in a variable with its expected change. A positive change but inferior to the expected change may originate an effect of price correction.