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# CONSTRUCTAL LAW AND MEDICINE CRISES IN ROMANIA

MIRCEA SCURTU

NCSU
mitch.scurtu@optimalglobalpricing.com +1 336 380 3363

The document discusses the application of Constructal Law and Optimal Global Pricing technology to resolve the medicine crises in low and high-priced markets, focusing on the case of Romania.

**Keywords:** Global medicine crises; Low-priced markets; High-priced markets; Resistance to flow.

## 1. INTRODUCTION

The document discusses the application of Constructal Law and a new technology called Optimal Global Pricing (OGP) to address the global medicine crises, with a focus on Romania. The main points are:

*Medicine Crises.* There is a global issue with medicine prices being too high in some markets and too low in others, leading to shortages and unaffordability.

*OGP Technology.* This new technology uses a finitely converging algorithm to optimize medicine pricing and distribution globally, aiming to resolve these crises.

*Romania's Situation*. The medicine crises in Romania are highlighted through surveys, reports, and research, showing significant shortages.

*Impact of OGP.* Implementing OGP in Romania could increase medicine consumption by an average of 58%, potentially normalizing the market and adding about $2 billion in consumption. Economic Theory: The document links economics to physics through Constructal Law, suggesting that economic transactions can be optimized using principles from physical sciences.

*Financial Plan.* A detailed financial plan outlines the expenses and investments needed over seven years to implement OGP and resolve the medicine crises in Romania.

The document emphasizes that technology, rather than political or legal measures, is key to solving the global medicine crises.

## 2. MATERIALS AND METHODS

Optimal Global Pricing (OGP) resolves the medicine crises by using a finitely converging algorithm to optimize the pricing and distribution of medicines across different markets. Here's how it works:

*Balancing Prices.* OGP addresses the disparity between low-priced markets, where medicines are often missing, and high-priced markets, where medicines are unfordable. By optimizing prices, and trade flows it ensures that medicines are available and affordable in both types of markets.

*Increasing Consumption.* In low-priced markets, OGP helps increase the availability of medicines, leading to a significant rise in consumption. For example, in Romania, the consumption of medicines increased by an average of 58% after implementing OGP, normalizing medicine consumption.

*Reducing Market Distortions*. OGP reduces global market distortions contributing to the medicine crises. By optimizing the flow and distribution of medicines, it ensures a more efficient and equitable distribution, reducing shortages and making medicines more accessible.

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*Financial Sustainability* The technology also provides a financial plan to support the normalization of medicine consumption. Investments in the first few years help resolve the immediate crises, while subsequent years focus on maintaining normalized consumption and supporting the re-industrialization of the Romanian economy.

Overall, OGP leverages technology and the principles of Constructal Law to create a sustainable solution to the global medicine crises, ensuring that medicines are both available and affordable across different markets. Below is our study with five medicines reported by Bucharest as being in short supply. Resolving the global market distortions will increase medicine consumption by $2 billion normalizing the medicine consumption.

*Table 1*

From one of our studies on five medicines reported by Bucharest to the European Medicine Shortage List, Adalimumab (Humira), Levothyroxine Sodium, Enbrel (Etanercept), Infliximab (DRY INF VIAL 100MG 1), Hydroxychloroquine

| Medicine | Consumption before solving parallel trade problem | Consumption after solving parallel trade problem | Net consumption gain after the parallel trade problem is solved |
|---|---|---|---|
| Adalimumab | $21,552,580.28 | $31,368,347.78 | 45.54% OR $9,815,767.5 |
| Levothyroxine Sodium | $1,995,759.0 | $3,326,265.00 | 66% OR $1,330,506.0 |
| Enbrel (Etanercept | $11,660,590.90 | $18,488,808.0 | 58.5% OR $6,828,217.1 |
| Infliximab (DRY INF VIAL 100MG 1) | $2,584,024.2 | $5,311,134.13 | 48.65% OR $2,727,109.93 |
| HYDROXYCHLOROQUINE | $287,864.82 | $495,767.19 | 72.2% OR $207,902.37 |
| Total consumption gains for medicines previously in short supply | | | $20,909,502.9 |
| Average medicine consumption gain after parallel trade problems are solved | | | 58.18% |
| Total consumption gains for the 494 medicines missing or in short supply as reported by Bucharest to the European Medicine Shortage List | | | $2.07 billion |

## 3. **RESULTS**

I wanted to share a key takeaway from the recent document on the Constructal Law Conference. The new technology called Optimal Global Pricing (OGP) could significantly address the global medicine crises by optimizing medicine prices and availability.

Specifically, in Romania, implementing OGP could increase medicine consumption by 58%, potentially normalizing the market and adding about $2 billion in consumption. This approach highlights the importance of leveraging technology to solve complex global issues.

### 3.1. **ECONOMICS IS PHYSICS**

*How does the Constructal Law apply to the medicine crises?* The Constructal Law applies to the medicine crises by providing a framework for optimizing the flow and distribution of medicines in both low and high-priced markets. By using the principles of Constructal Law, the new technology called Optimal Global Pricing (OGP)aims to resolve the disparities in medicine availability and affordability. In low-priced markets, where medicines are often missing, and in high-priced markets, where patients cannot afford them, OGP can help normalize consumption and optimize prices and flows. This approach ensures a more efficient and equitable distribution of medicines, addressing the global medicine crises by reducing market distortions and improving access to essential drugs.

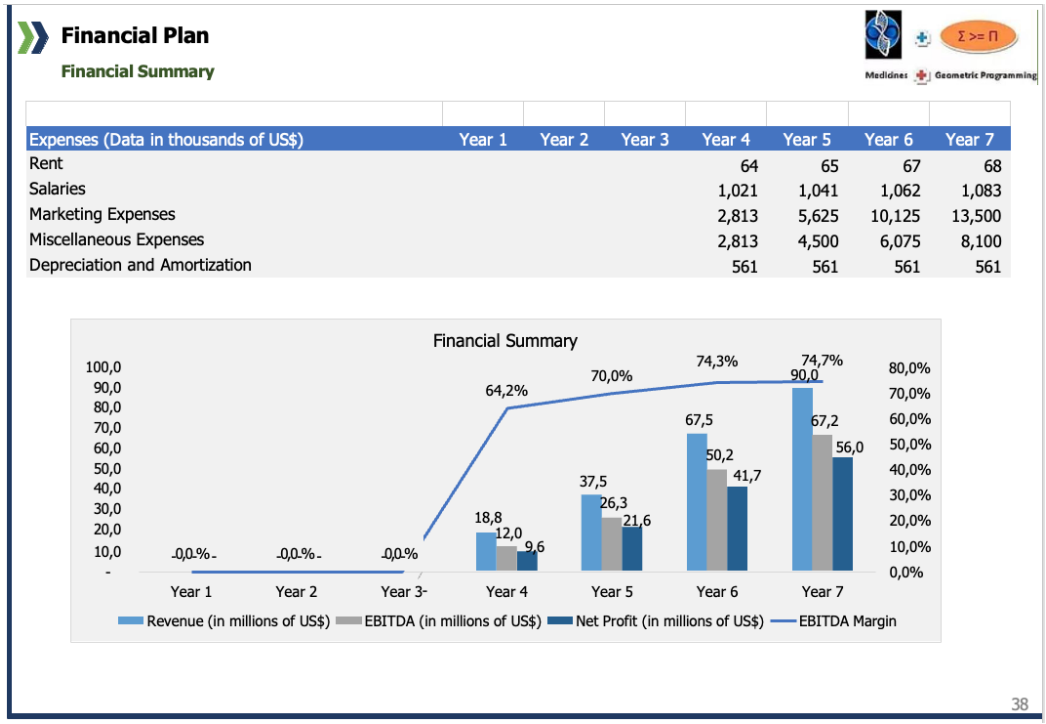
## 4. **DISCUSSION AND CONCLUSIONS**

The main causes of the medicine crises in Romania, as highlighted in the document, include: Price Disparities: There is a significant gap between high and low prices of medicines. In low-priced markets like Romania, medicines are often missing, while in high-priced markets, patients cannot afford them. Global Market

Distortions: These distortions fill the gap between high and low prices, sustaining the global medicine crises. The market inefficiencies and imbalances contribute to the unavailability and unaffordability of medicines. Parallel Trade Issues: Problems related to parallel trade exacerbate the shortage of medicines. Resolving these issues can significantly increase the consumption of medicines that are in short supply. Political, Administrative, and Legal Factors: The ongoing conversation around the medicine crises is often limited to political, administrative, and legal aspects, focusing primarily on prices rather than technological solutions.

By addressing these causes through the implementation of Optimal Global Pricing (OGP) and leveraging Constructal Law, the document suggests that the medicine crises in Romania can be effectively resolved.

Below financial projections resolving the medicine crises in Romania. First three years are dedicated to normalizing the medicine consumption, next 4 years are dedicated to earn Romania significant financial resources badly needed to re-industrialize the economy.



**Financial Plan**

**Financial Summary**

| Expenses (Data in thousands of US$) | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 |
|---|---|---|---|---|---|---|---|
| Rent | | | | 64 | 65 | 67 | 68 |
| Salaries | | | | 1,021 | 1,041 | 1,062 | 1,083 |
| Marketing Expenses | | | | 2,813 | 5,625 | 10,125 | 13,500 |
| Miscellaneous Expenses | | | | 2,813 | 4,500 | 6,075 | 8,100 |
| Depreciation and Amortization | | | | 561 | 561 | 561 | 561 |



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## REFERENCES


1. Scurtu M., Aplicarea teoriei elasticității din fizică la studiul ciclurilor economice ale unei economii de piață la nivel macroeconomic, Academia de Studii Economice, Facultatea Relații Economice Internaționale, edițiile XIX, XX, Sesiunile Cercurilor Științifice Studențești, Aprilie 1975, 1976, Rector.
2. Scurtu M., *An Empirical Study of Spatial Economic Equilibria via Geometric Programming*, Doctoral Thesis, North Carolina University, Raleigh, USA, 1986.
3. Bejan A., *Freedom, and Evolution. Hierarchy in Nature, Society, and Science*, Basel, Springer, 2020.
4. Bejan A., *The Physics of Life: The Evolution of Everything*, New York, St. Martin's, 2016.
5. Fang S. C., Peterson E.L., Generalized Variational Inequalities, *Journal of Optimization Theory and Applications*, **38**, *3* 1982, 363–38.
6. General Network Equilibrium Analysis, *International Journal of Systems Science*, **14**, *11*, pp. 1249–1275 (1983).
7. An Economic Equilibrium Model on a Multi-commodity Network, *International Journal of Systems Science*, **16**, *4*, pp. 479–490 (1985).
8. Irwin C.L., Yang W.C., Iteration and Sensitivity for A Spatial Equilibrium Problem with Linear Supply and Demand Functions, *Operations Research*, **30**, *2* (1982).
9. King R.A., Gunn J., Reactive Programming User Manual: A Market Simulating Spatial Equilibrium Algorithm, Economic Research Report, No. 43, Dept. Of Ec. & Bus. NCSU Raleigh N.C., Dec 81.

10. McCarl B.A. *et al*., Sebend: A computer Algorithm for the Solution of Symmetric Multi-commodity spatial Equilibrium Problems Utilizing Benders Decomposition. Special Report 708, Agricultural Experiment Station Oregon State University, March 1984.
11. The Conical Duality and Complementarity of P and Quantity for Multi-commodity Spatial and Temporal Network Allocation Problems, Center For Math. Studies in Economics and Management Science: Disc, Paper #207, Northwestern University, Evanston, 111, March 1976.
12. Peterson E.L., Eaves B.C., Asmuth R., Computing Economic Equilibria on Affine Networks with Lemke's Algorithm, *Mathematics and Operations Research*, **4**, *3*, pp. 209–214 (1979).
13. O'Rourke A.D., Casavant K.L., Interregional and Intertemporal Competition in Fresh Sweet Cherries, College of Agriculture Research Center, Washington State University, Bulletin 803, November 1974.

## ADDENDUM

SUBJECT – *Key Insights from the Constructal Law Conference Document*

I wanted to share some important points from the recent document on the Constructal Law Conference, which discusses the application of Constructal Law and Optimal Global Pricing (OGP) technology to address the global medicine crises, with a focus on Romania.

KEY POINTS

*Global Medicine Crises*: There is a significant issue with medicine prices being too high in some markets and too low in others, leading to shortages and unaffordability.

*OGP Technology*: This new technology uses a finitely converging algorithm to optimize medicine pricing and distribution globally. It aims to balance prices and trade flows, ensuring medicines are available and affordable in both low-priced and high-priced markets.

*Impact on Romania*: Implementing OGP in Romania could increase medicine consumption by an average of 58%, potentially normalizing the market and adding about $2 billion in consumption.

*Economic Theory*: The document links economics to physics through Constructal Law, suggesting that economic transactions can be optimized using principles from physical sciences.

*Financial Plan*: A detailed financial plan outlines the expenses and investments needed over seven years to implement OGP and resolve the medicine crises in Romania. The first three years focus on normalizing medicine consumption, while the next four years aim to support the re-industrialization of the Romanian economy.

*Benefits of OGP*: Balances medicine prices across different markets. Increases the availability and consumption of medicines in low-priced markets. Reduces global market distortions, ensuring efficient and equitable distribution. Provides a sustainable financial plan to support long-term solutions. This approach highlights the importance of leveraging technology to solve complex global issues rather than relying solely on political, legal and administrative measures.