



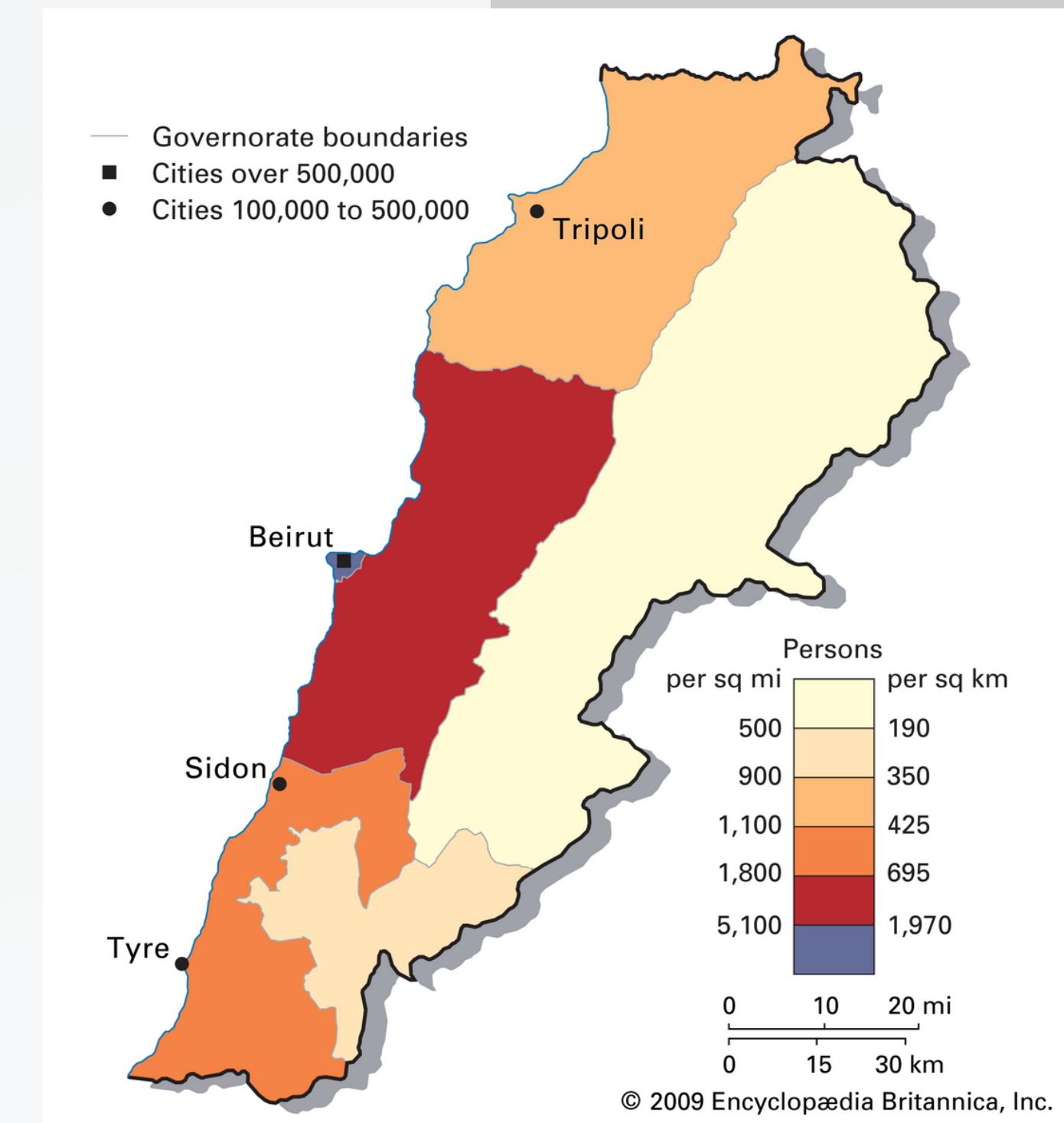
# **THE INFLATION CRISIS IN LEBANON: CAUSES, CONSEQUENCES, AND PATHWAYS FORWARD**

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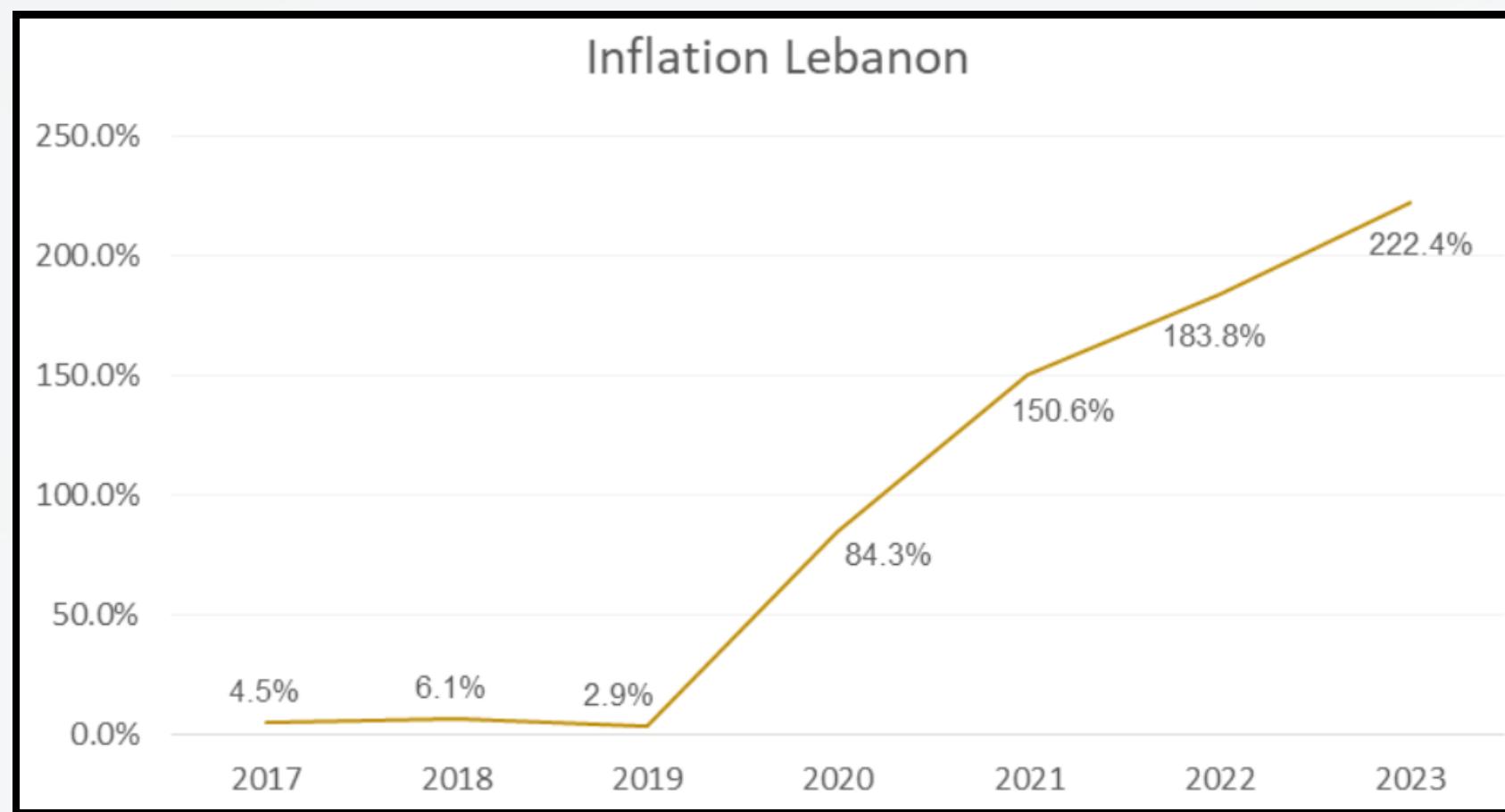
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# INTRODUCTION

- **Inflation Surge:** Lebanon's inflation has surged, reaching a staggering 222% in 2023, indicating severe economic challenges.
- **Ongoing Crisis:** The country has been grappling with a profound economic and financial crisis since 2019, marked by a government default on foreign debt.
- **Corruption Issues:** Significant issues of corruption and mismanagement have exacerbated the economic challenges faced by Lebanon.
- **Analysis Focus:** This presentation aims to analyze the circumstances leading to the crisis and proposes potential policies to remediate the situation.



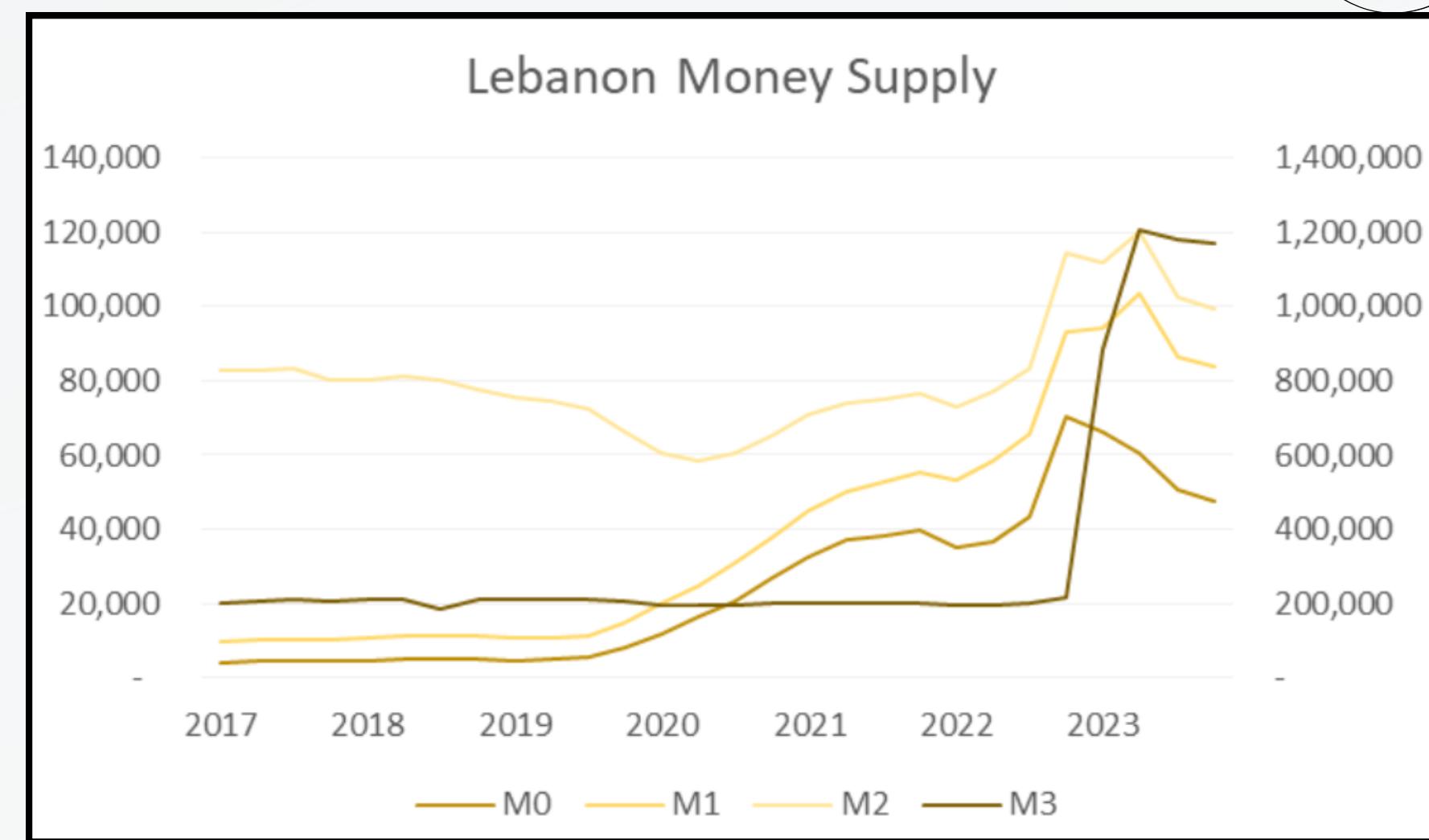
# INFLATION CRISIS



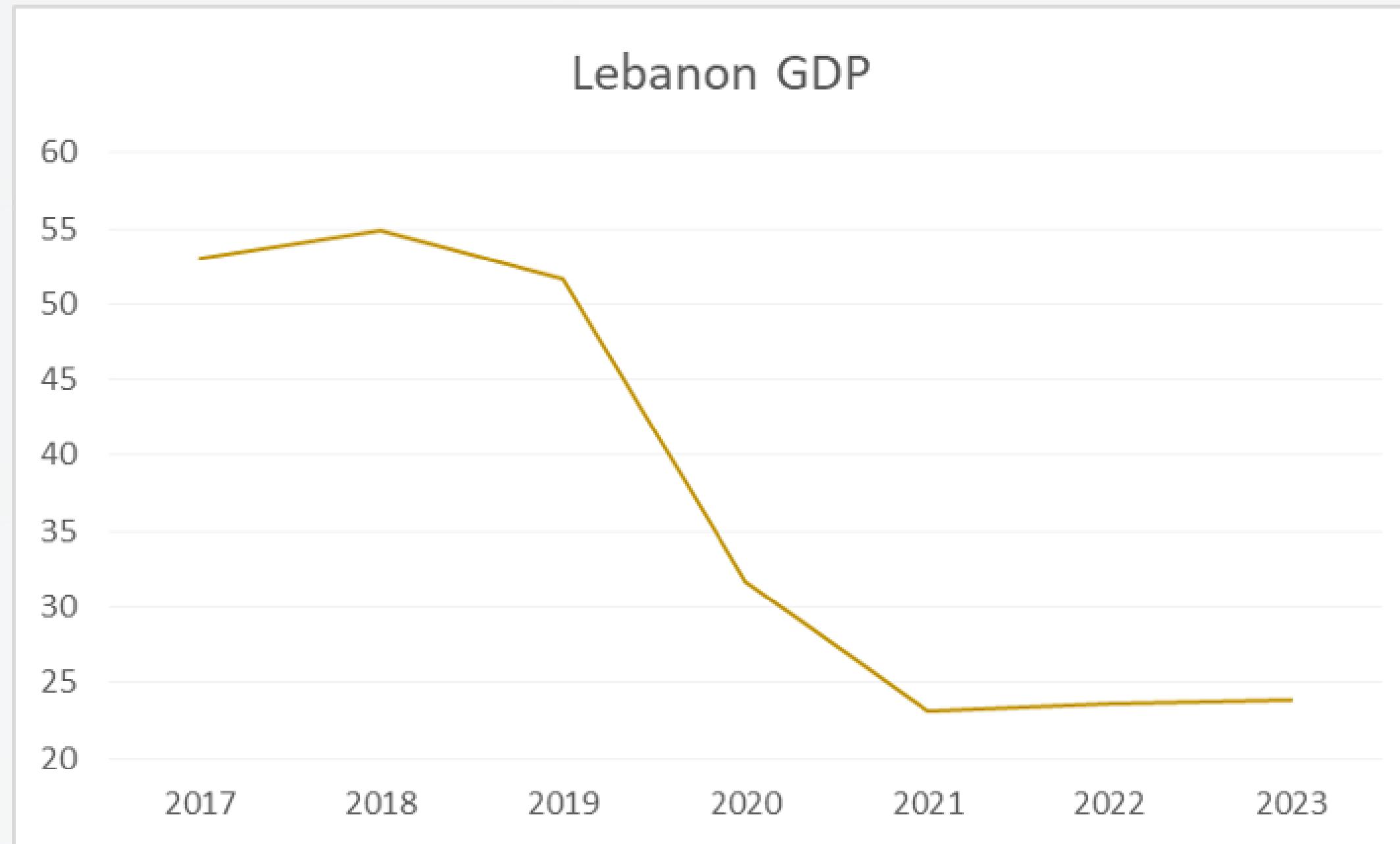
- **Budget Deficit (Preceding Decade):** Negative balance of payment = budget deficit.
- **Financial Engineering:** High-interest rates attracted foreign deposits, = liquidity crisis.
- **Banking System Collapse (2019):** Loss of confidence = collapse of Lebanon's banking system.
- **Lira Depreciation (2019):** Lebanese Lira depreciated by 25% in November 2019.
- **Remediation Efforts:** Government and Banque du Liban's policies led to a 90% Lira depreciation by July 2021.

# INFLATION CRISIS

- **M2 & M3 Trends (2020-2023)**: M2 surged, then declined; M3 increased sixfold.
- **Money Supply-Inflation Link**: Friedman's quote: "Inflation is a monetary phenomenon."
- **Quantitative Theory of Money**: Growing money supply and shrinking real GDP contribute to inflation.
- **COVID-19 and Beirut Explosion (2020)**: Both events worsened economic struggles.
- **Purchasing Power Decline**: Depreciated currency and high inflation led to a significant decline.



# CONSEQUENCES ANALYSIS



GDP had fallen by a staggering 58% between 2018 and 2021, dropping billion, and remained at from \$55 billion to \$23 billion since then.

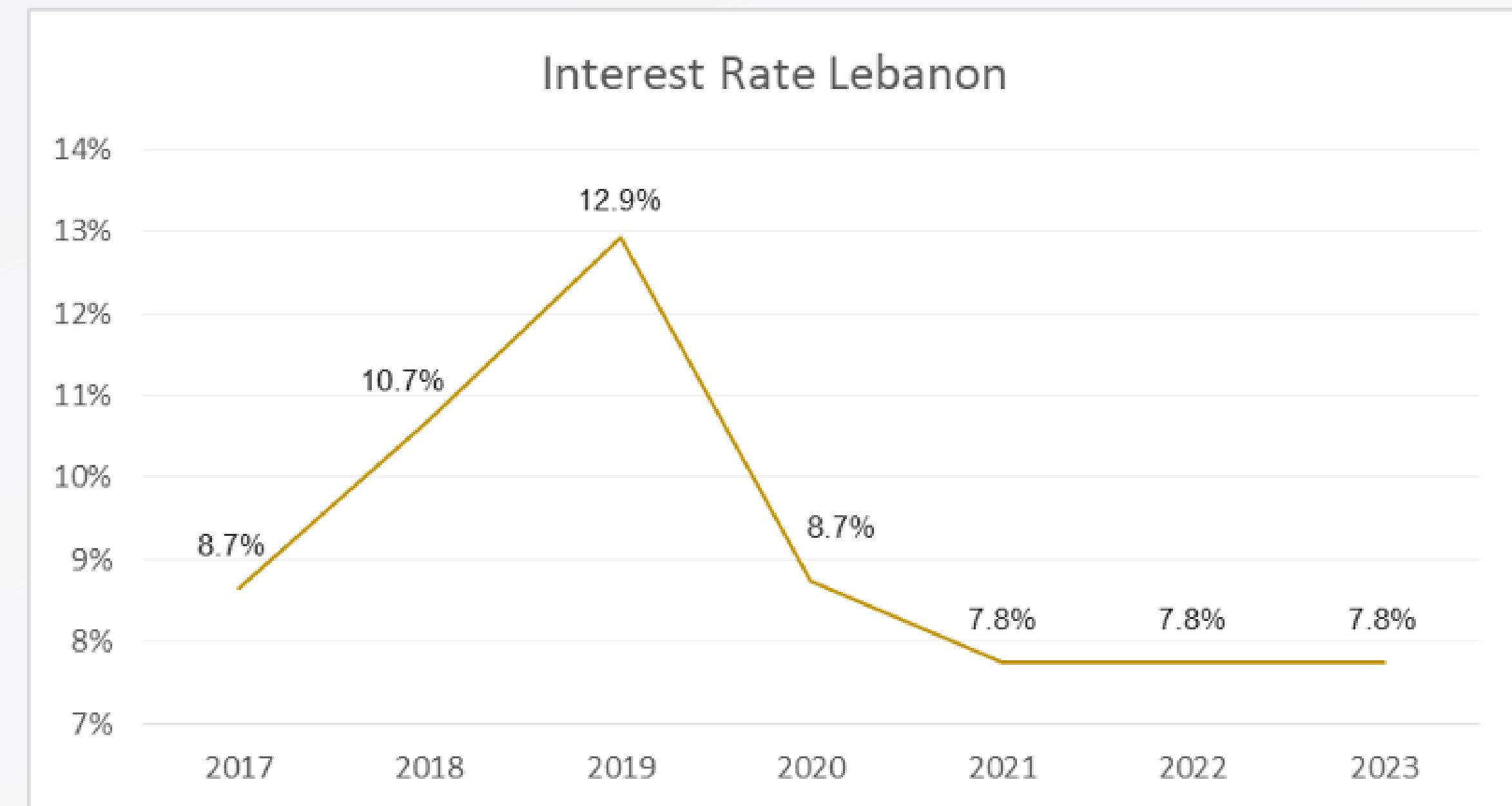
# CONSEQUENCES ANALYSIS

Shadow economy: corruption, bribery, and tax evasion

- The government lose about **25%** of its expected revenue
- **50-60%** of the total GDP is now in the shadow economy, with around \$8 billion exchanging hands outside the conventional financial radar.
- Include **60%** of the workforce operating without taxation and lacking social protections.

# CONSEQUENCES ANALYSIS

The Lebanon government has had deliberately inadequate fiscal and monetary policy responses to COVID-19 and the Beirut port explosion, which has plunged Lebanon into this profound crisis.



# Cagan Model of Hyperinflation as applied to Lebanon

We begin the model with the commonly used exchange equation  $MV = PC$ :

$$MV = PC, \text{ henceforth written as: } m_t + v_t = p_t + c_t$$

From this, we can rearrange to obtain:

$$m_t - p_t = c_t - v_t$$

We can conceptualize the velocity of money as some coefficient on the nominal interest rate:

$$v(i) = \alpha i, \quad \text{where } \alpha > 0$$

The nominal interest rate above is the same as that constituted by the Fisher equation:

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$$i_t = r_t + \pi_t^e$$

$$m_t - p_t = c_t - \alpha(r_t + \pi_t^e)$$

# Cagan Model of Hyperinflation as applied to Lebanon

Cagan defines hyperinflation as a greater than 50% month-on-month increase in inflation; in Lebanon monthly inflation has in recent times eclipsed 200%.

Cagan posits that in situations of hyperinflation it is the change in the nominal component which is rapid, while the real component is slower to change.

Cagan thus adjusts for consumption and real interest levels held constant, and we can then derive a money demand equation with consumption and real interest rates held at 0:

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$$m_t - p_t = -\alpha \pi_t^e$$



# Cagan Model of Hyperinflation as applied to Lebanon

Cagan expands on this equation by making a further adjustment to include adaptive expectations:

$$\pi_t^e = \lambda\pi_{t-1}^e + (1 - \lambda)(p_t - p_{t-1}), \quad \text{where } 0 < \lambda < 1$$

- As  $\lambda$  approaches 1, individuals inflation expectations are heavily weighted by the past and are anchored
- As  $\lambda$  approaches 0, inflation expectations are heavily weighted by the present, representing a situation where inflation expectations are unanchored and can vary erratically between periods.

# Cagan Model of Hyperinflation as applied to Lebanon

Cagan then inverts the money demand equation derived earlier in order to obtain a new definition for expected inflation at a given time:

$$\pi_t^e = -\frac{1}{\alpha} (m_t - p_t)$$

where it logically follows that:

$$\pi_{t-1}^e = -\frac{1}{\alpha} (m_{t-1} - p_{t-1})$$

Using this definition, we can re-write expected inflation with adaptive expectations to obtain an expression in terms of prices and money supply:

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$$-\frac{1}{\alpha} (m_t - p_t) = -\frac{\lambda}{\alpha} (m_{t-1} - p_{t-1}) + (1 - \lambda)(p_t - p_{t-1})$$
$$m_t - p_t = \lambda(m_{t-1} - p_{t-1}) - \alpha(1 - \lambda)(p_t - p_{t-1})$$

Cagan now solves for  $p_t$  to obtain:

$$p_t = \frac{\lambda - \alpha(1 - \lambda)}{1 - \alpha(1 - \lambda)} p_{t-1} + \frac{1}{1 - \alpha(1 - \lambda)} m_t - \frac{\lambda}{1 - \alpha(1 - \lambda)} m_{t-1}$$



# Cagan Model of Hyperinflation as applied to Lebanon

Note that the general form of this solution is linear, with coefficients measurable using regression methods:

$$p_t = \beta_1 p_{t-1} + \beta_2 m_t - \beta_3 m_{t-1}$$

where:  $\beta_1 = \frac{\lambda - \alpha(1 - \lambda)}{1 - \alpha(1 - \lambda)}$        $\beta_2 = \frac{1}{1 - \alpha(1 - \lambda)}$        $\beta_3 = \frac{\lambda}{1 - \alpha(1 - \lambda)}$

These  $\beta$  coefficients can be measured through empirical means to track inflation and expectations of inflation over time. Cagan shows that so long as the magnitude of the  $\beta_1$  coefficient is less than 1 ( $|\beta_1| < 1$ ) inflation dynamics can still be dynamically stable, and if money supply process  $m_t$  can be stabilized by the central bank, then prices  $p_t$  will also stabilize.

However, if  $|\beta_1|$  is too large even if money supply process  $m_t$  can be stabilized through monetary policy, the momentum of individuals' unanchored inflation expectations will continue to perpetuate higher levels of inflation. This situation can be conceptualized as expectations formed under conditions of collective panic regarding current (and future) levels of inflation.

# SUMMARY

- Severe economic and financial crisis
  - 2023 Inflation 2022%
  - Lebanese Lira devaluated
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- Covid-19 - Beirut Port explosion
  - GDP -58%
  - 80% Lebanese in poverty

# CONCLUSION

- Cash-based economy
- Growing informal sector
- Inadequate policy response



- Cagan Model of Hyperinflation
- Loss of confidence in government abilities
- Need for a new currency

# **THANK YOU!**



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