黑死病与大分流

Black Death & the Great Divergence

郑鑫 / 李崇宇 / 张银健 / 李菲

背景

黑死病是人类历史上最严重的瘟疫之一。起源于亚洲西南部喜马拉雅山区，一说起源于黑海城市卡法，约在14世纪40年代散布到整个欧洲，而“黑死病”之名是当时欧洲的称呼。这场瘟疫在欧洲成了大约2500万人死亡，根据估计，瘟疫爆发期间的中世纪欧洲约有占人口总数30%-60%的人死于黑死病。

第一次鼠疫：

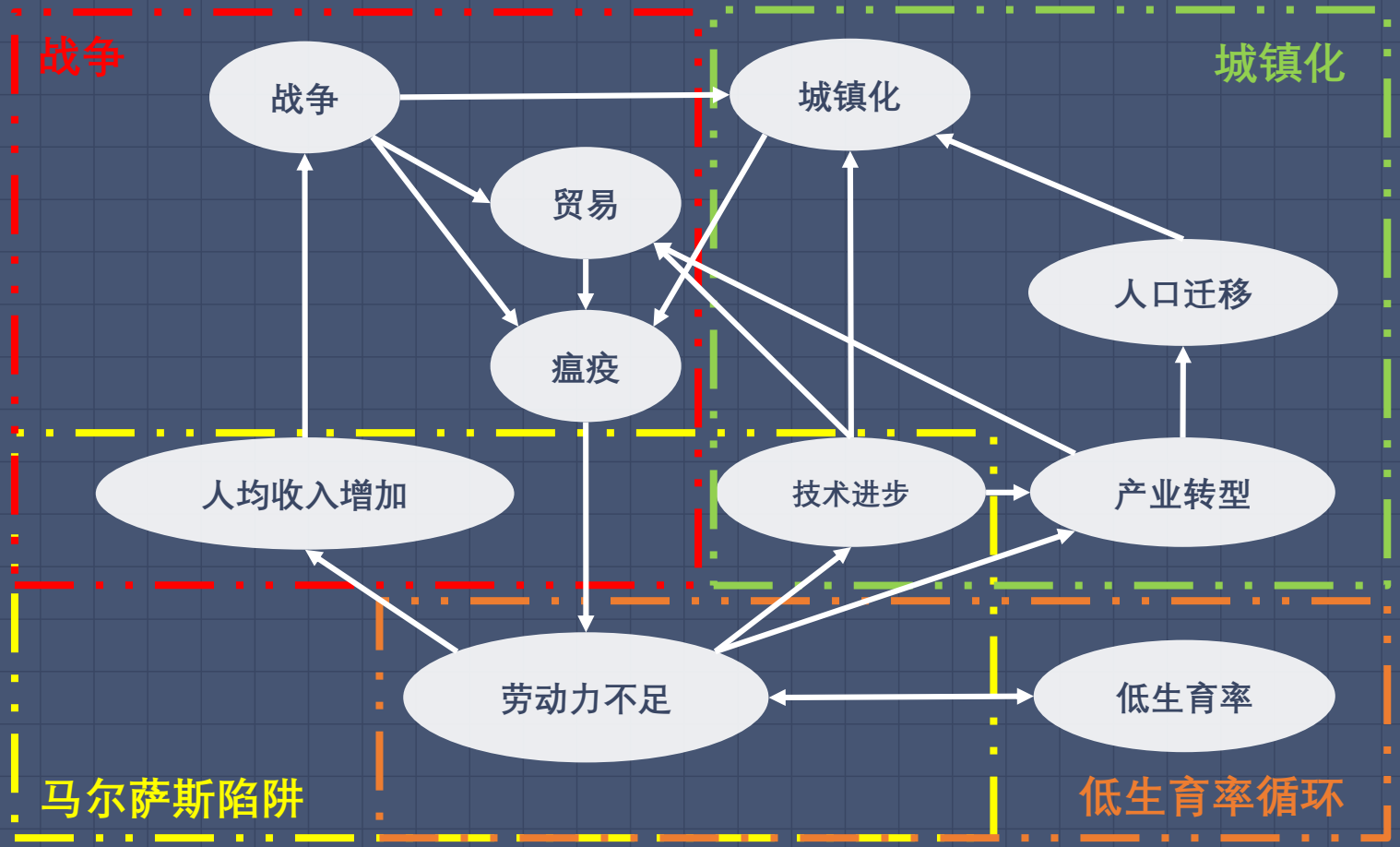
541-542 查士丁尼鼠疫，欧洲约2500万人死亡

第二次鼠疫：

1346-1350 欧洲黑死病，全球约5500万—7500万人死亡

第三次鼠疫：

1855-1959 中国云南，全球约1200万人死亡

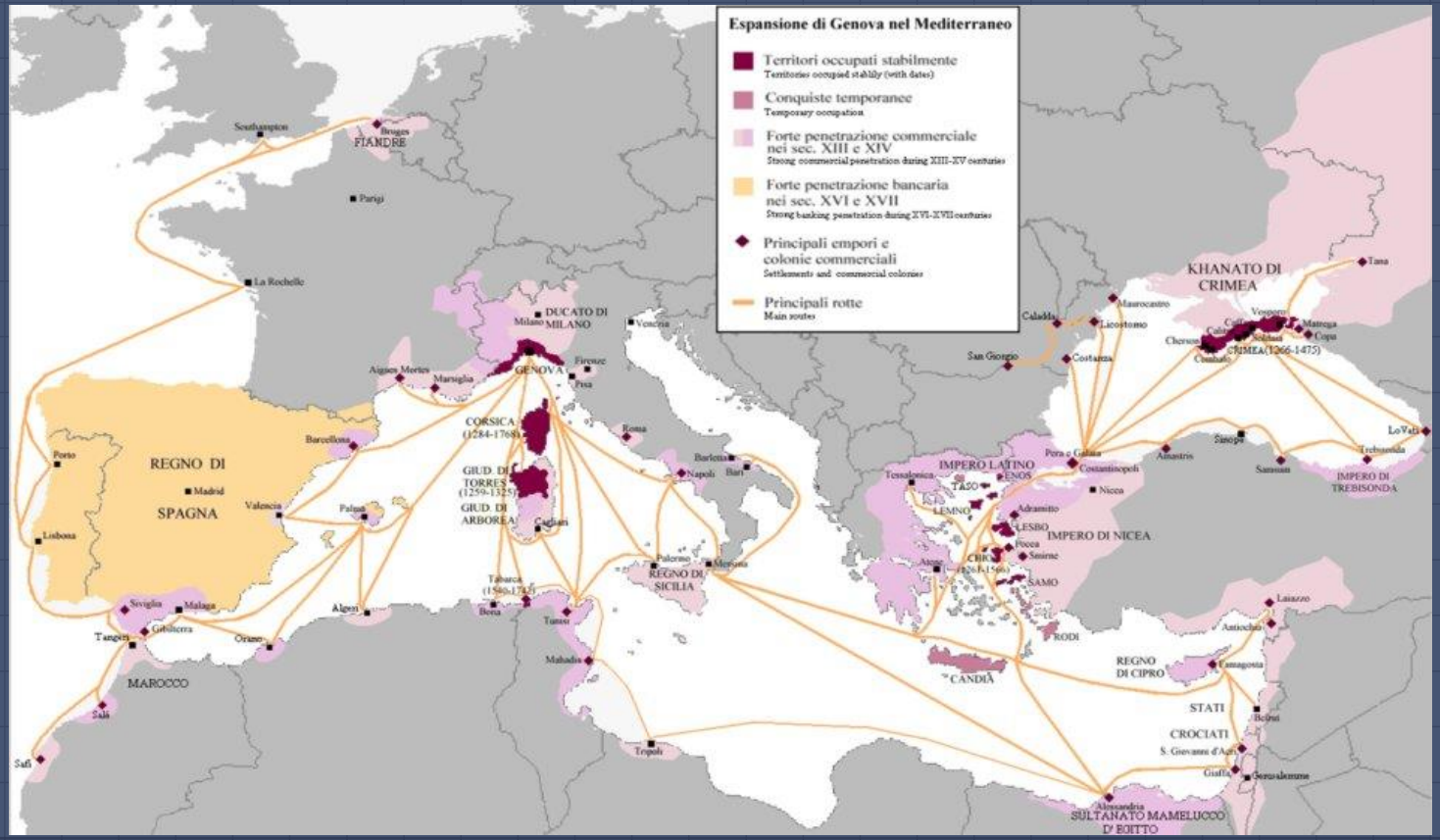

战争
城镇化
战争
城镇化
贸易
人口迁移
瘟疫
人均收入增加
技术进步
产业转型
劳动力不足
低生育率
马尔萨斯陷阱
低生育率循环

黑死病与战争

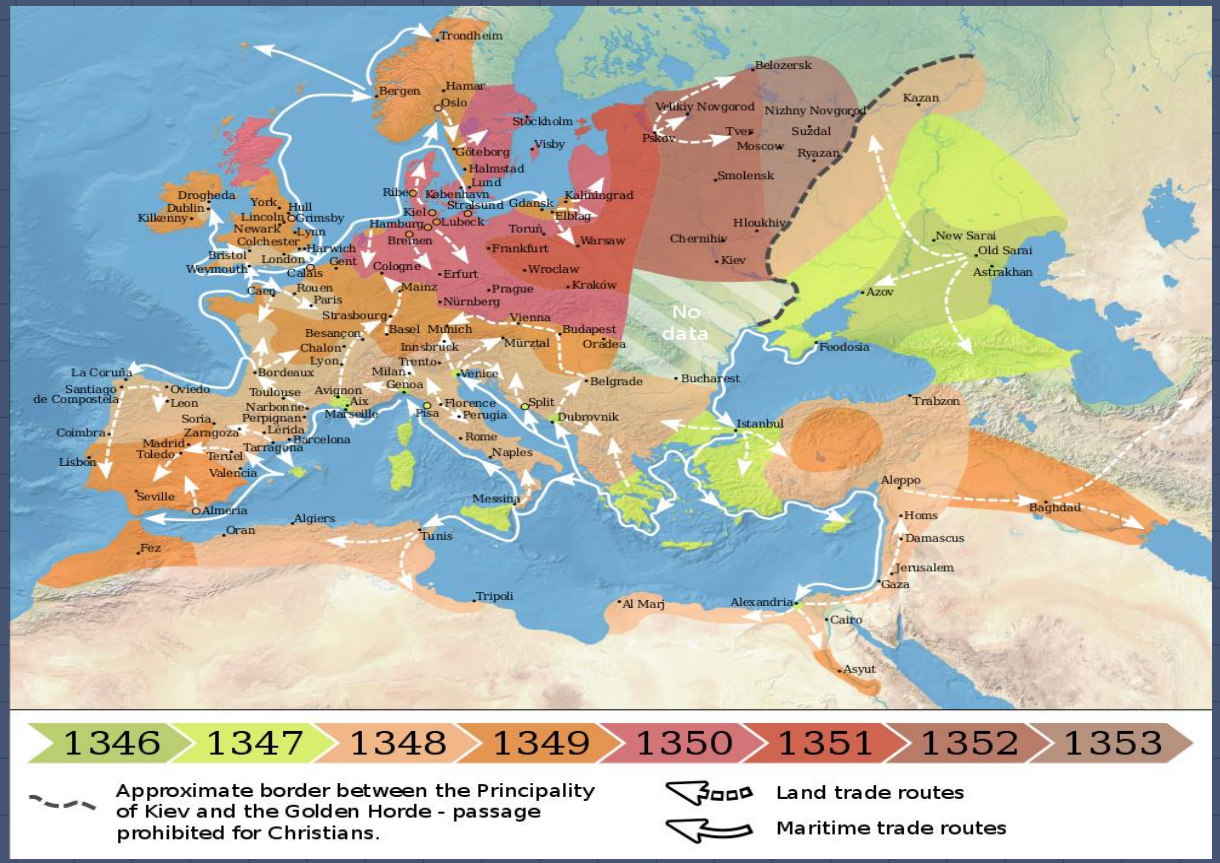
1

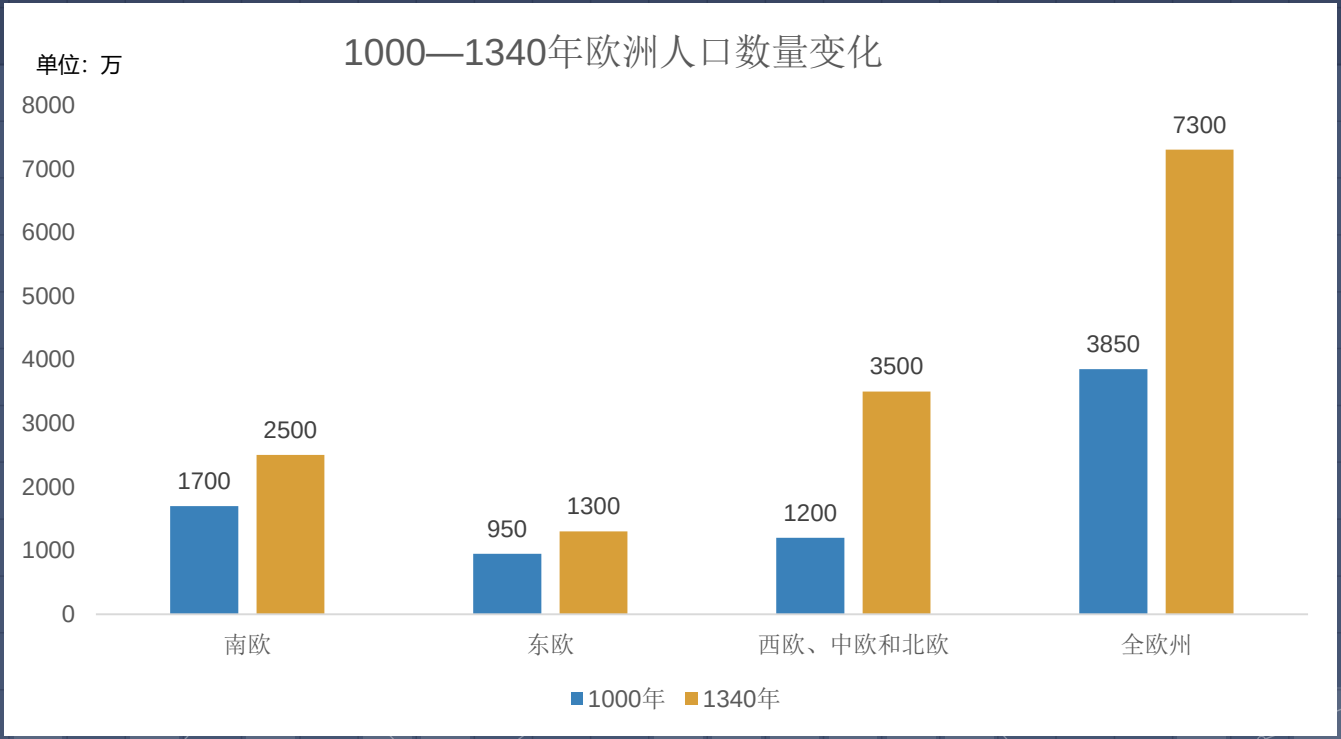
黑死病进入欧洲的起点

热那亚共和国


Espansione di Genova nel Mediterraneo
Territori occupati stabilmente
Territories occupied stablily (with dates)
Conquiste temporanee
Temporary occupation
Forte penetrazione commerciale nei sec. XIII e XIV
Strong commercial penetration during XIII-XV centuries
Forte penetrazione bancaria nei sec. XVI e XVII
Strong banking penetration during XVI-XVII centuries
Principali empori e colonie commerciali
Settlements and commercial colonies
Principali rotte
Main routes
Southampton
Bruges
FIANDRE
Parigi
La Rochelle
DUCATO DI MILANO
Milano
Venezia
Aigues Mortes
Marsiglia
GENOVA
Firenze
Pisa
CORSICA (1284-1768)
GIUD. DI TORRES (1259-1325)
GIUD. DI ARBOREA
Cagliari
Roma
Barcellona
Porto
REGNO DI SPAGNA
Madrid
Valencia
Palma
Lisbona
Siviglia
Malaga
Gibilterra
Tangeri
Orano
Algeri
MAROCCO
Sali
Safi
Tabarca (1540-1742)
Bona
Tunisi
Mahadia
Tripoli
Barletta
Napoli
Bari
Palermo
Messina
REGNO DI SICILIA
IMPERO LATINO
Tessalonica
TASO
ENOS
LEMNO
Adramitto
LESBO
Focea
Smirne
CHIO (1263-1566)
SAMO
Atene
RODI
CANDIA
Pera e Galata
Costantinopoli
Nicea
IMPERO DI NICEA
Almastris
Sinope
Samsun
IMPERO DI TREBISONDA
Trebisonda
LoVati
KHANATO DI CRIMEA
Tana
Maurocastro
Licostomo
Calaida
San Giorgio
Costanza
Vosporo
Matrega
Copa
Cherson
Soldaia
Cimbalo
CRIMEA (1266-1475)
Laiazzo
Antiochia
Famagosta
REGNO DI CIPRO
STATI CROCIATI
Beirut
S. Giovanni d'Acri
Giaffa
Gerusalemme
Alessandria
SULTANATO MAMELUCCO D'EGITTO

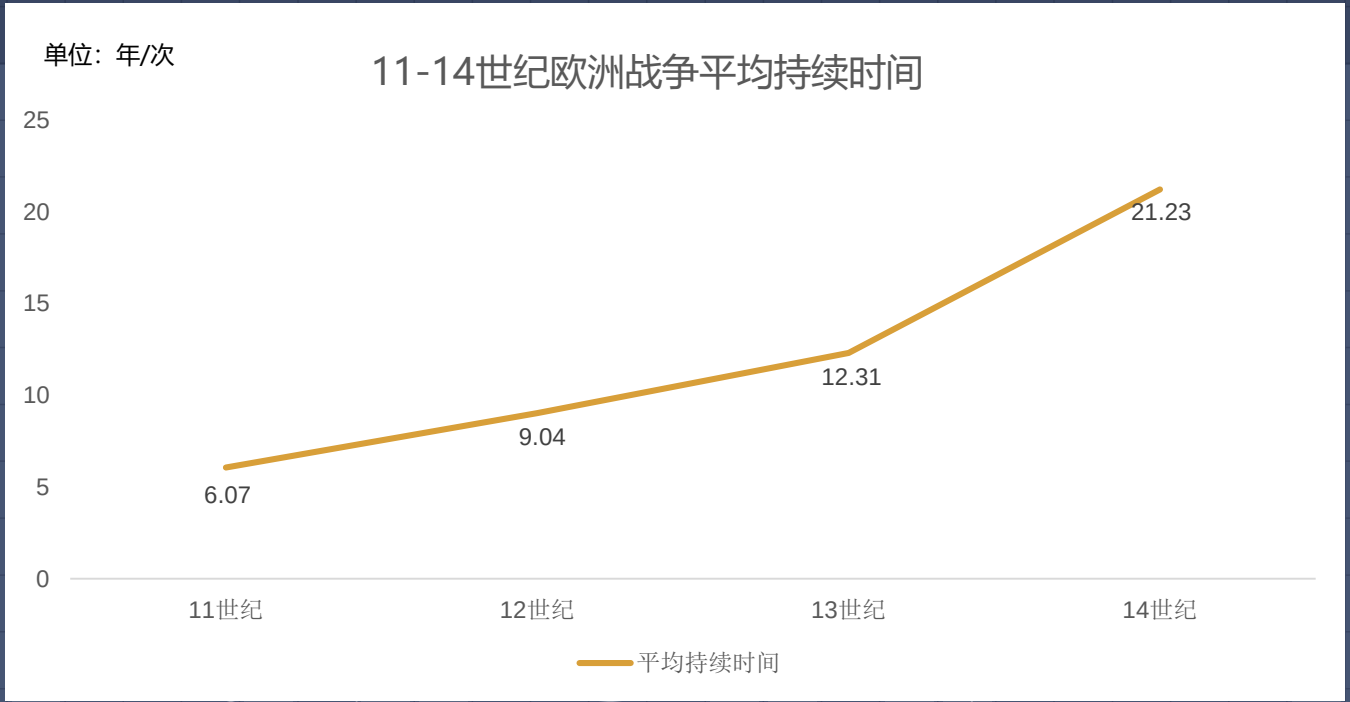
黑死病的传播线路


Trondheim
Bergen
Hamar
Oslo
Stockholm
Visby
Göteborg
Halmstad
Lund
Ribe
København
Kaliningrad
Gdansk
Elbląg
Stralsund
Kiel
Lübeck
Hamburg
Bremen
Torun
Warsaw
Frankfurt
Wrocław
Kraków
Prague
Mainz
Erfurt
Nürnberg
Cologne
Gent
Calais
Rouen
Paris
Caen
Drogheda
Dublin
Kilkenny
York
Hull
Lincoln
Grimsby
Newark
Lynn
Colchester
Harwich
Bristol
London
Weymouth
Strasbourg
Besançon
Basel
Munich
Innsbruck
Mürztal
Vienna
Budapest
Oradea
Chalon
Lyon
Trento
Milan
Venice
Genoa
Florence
Pisa
Perugia
Rome
Naples
Messina
Split
Dubrovnik
Belgrade
Bucharest
Bordeaux
Toulouse
Avignon
Aix
Marseille
Narbonne
Perpignan
Lérida
Barcelona
Tarragona
Teruel
Valencia
Zaragoza
Soria
Madrid
Toledo
Coimbra
Lisbon
La Coruña
Santiago de Compostela
Oviedo
Leon
Seville
Almeria
Oran
Algiers
Tunis
Fez
Tripoli
Al Marj
Alexandria
Cairo
Asyut
Gaza
Jerusalem
Damascus
Homs
Aleppo
Baghdad
Istanbul
Trabzon
Feodosia
Azov
Astrakhan
Old Sarai
New Sarai
Kazan
Belozersk
Velikiy Novgorod
Nizhny Novgorod
Pskov
Tver
Moscow
Suzdal
Ryazan
Smolensk
Hloukhiv
Chernihiv
Kiev
No data
1346
1347
1348
1349
1350
1351
1352
1353
Approximate border between the Principality of Kiev and the Golden Horde - passage prohibited for Christians.
Land trade routes
Maritime trade routes



数据来源：契波拉《欧洲经济史：中古篇》

数据来源：乔治·C·科恩《世界战争大全》



数据来源：乔治·C·科恩《世界战争大全》

欧洲城市化进程

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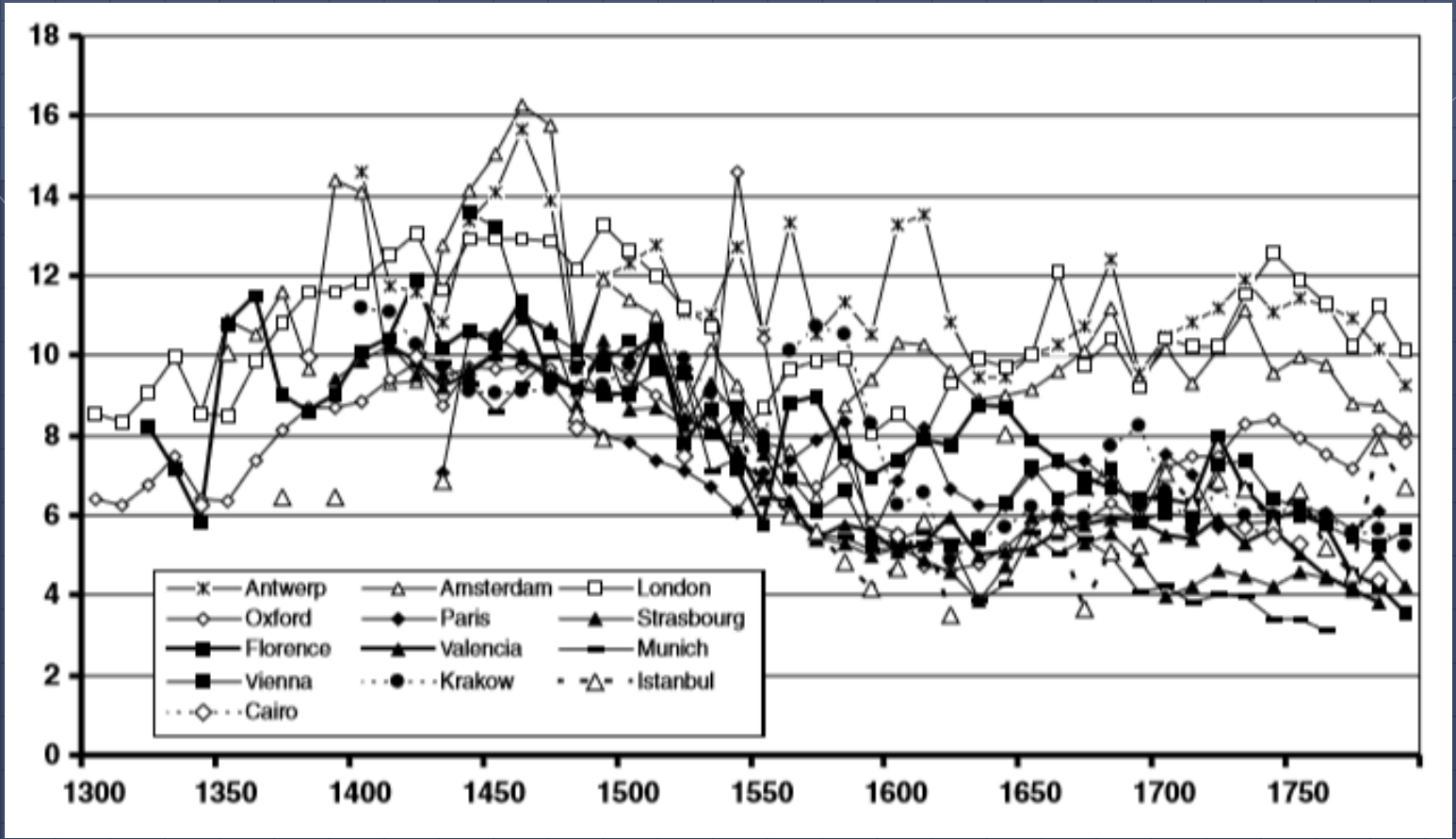
Table 1. *Population of selected European countries, 1300–1800 (in thousands)*

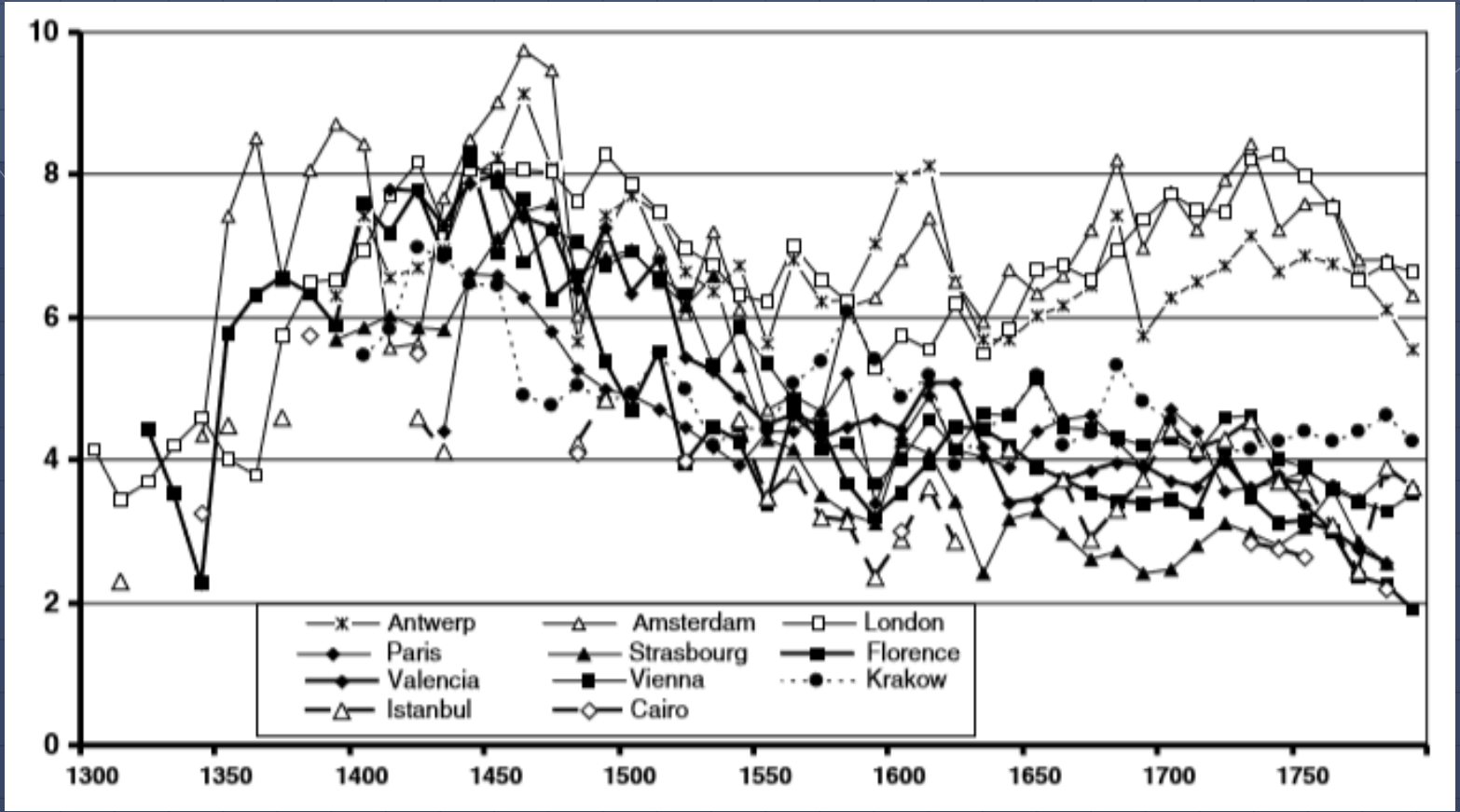
	1300	1400	1500	1600	1700	1800
England and Wales	5,750	3,000	3,500	4,450	5,450	9,250
Netherlands	800	600	950	1,500	1,950	2,100
Belgium	1,250	1,000	1,400	1,600	2,000	2,900
Italy	12,500	8,000	9,000	13,300	13,500	18,100
Spain	5,500	4,500	5,000	6,800	7,400	11,000
Total Europe	94,200	67,950	82,950	107,350	114,950	192,230

Source: Paolo Malanima (unpublished manuscript).



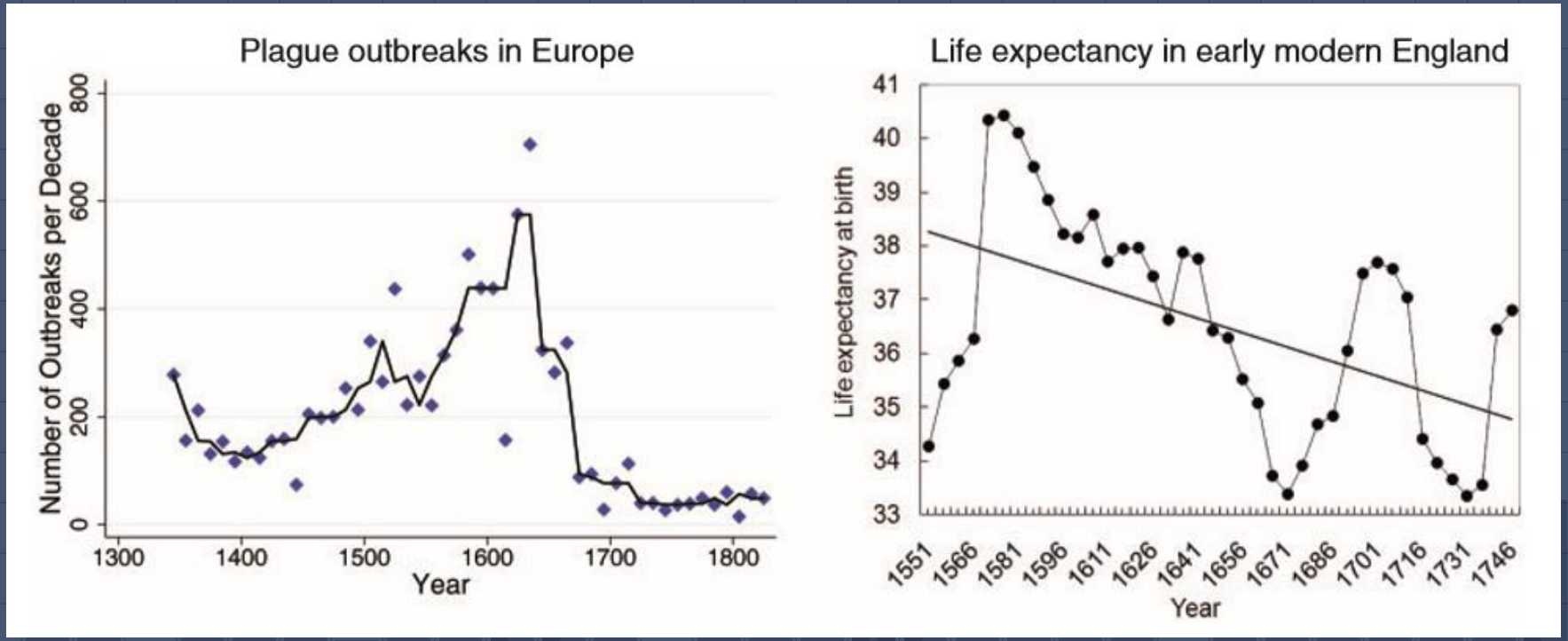
Real wages of skilled workers, 1300–1800

Sources: The Black Death and the origins of the 'Great Divergence' across Europe, 1300–1600



Real wages of unskilled workers, 1300–1800

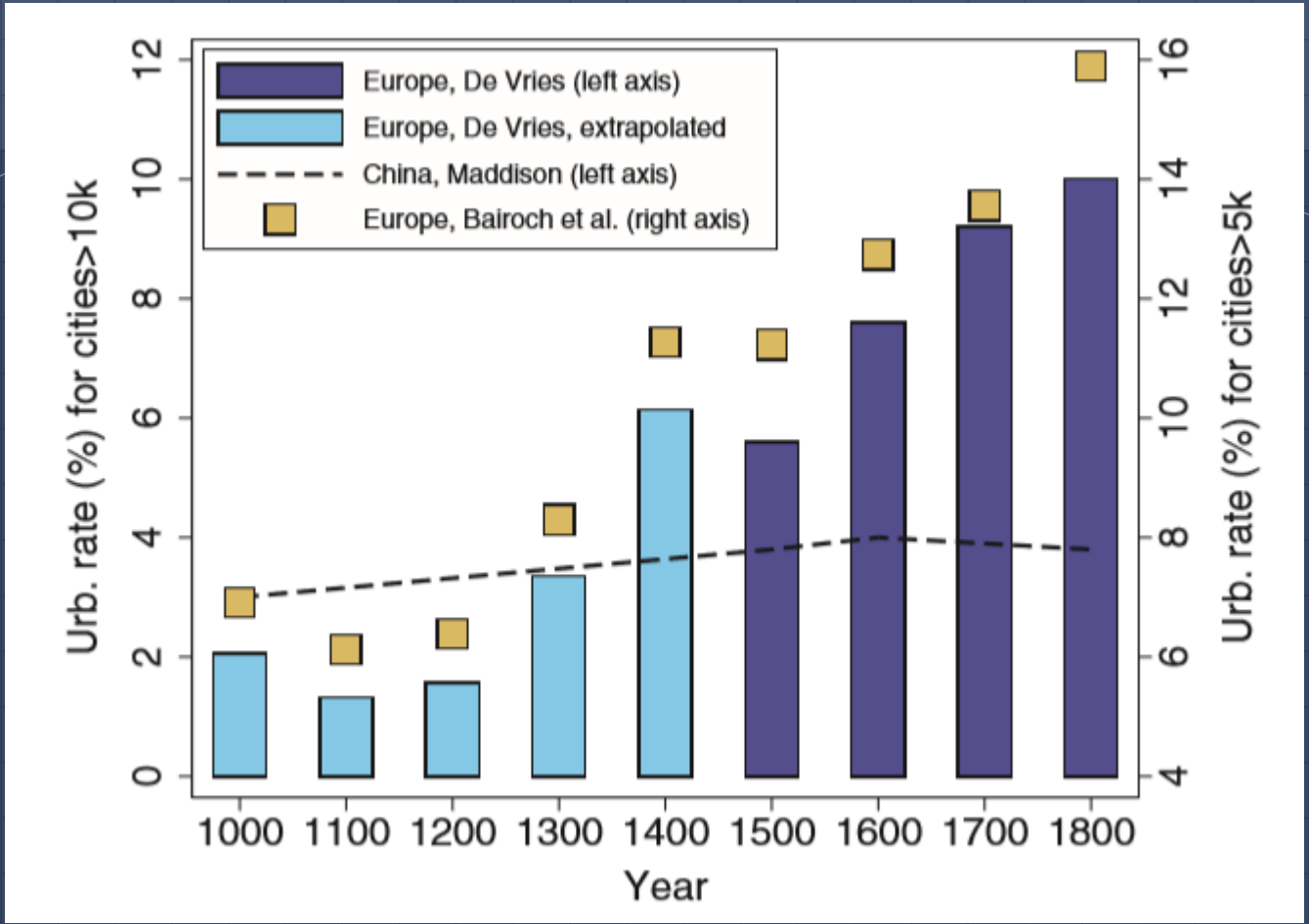
Sources: The Black Death and the origins of the 'Great Divergence' across Europe, 1300–1600



Plague outbreaks in Europe and life expectancy in early modern England.

Sources: Left panel: Biraben (1975). Data points represent the number of outbreaks over 10-year periods. The solid line is the median of each data point and the two adjacent ones. Right panel: Wrigley and Schofield (1981); 20-year moving average.

Graph from: The Three Horsemen of Riches: Plague, War, and Urbanization in Early Modern Europe. P6(779)



Urbanization rates in Europe and China, 1000–1800.

Sources: De Vries (1984) for European urbanization rates 1500–1800, corresponding to cities with more than 10,000 inhabitants. Bairoch et al. (1988) for population in cities larger than 5000 inhabitants between 1000 and 1800, divided by country-level population from McEvedy and Jones (1978) to obtain urbanization rates; see Appendix A.1 for details. A regression-based technique in the spirit of Chow and Lin (1971) is used to extrapolate De Vries' figures based on Bairoch et al.'s numbers. China: Maddison (2001, tables 1-8c and B-14); the line interpolates in 1100–1400 and 1700

A Simple Two-Sector Malthusian Model

Consumption

$$w_A = w_M = w$$
$$C_A + p_M C_M \leq w$$

Stone–Geary utility function:

$$u(C_A, C_M) = \begin{cases} (C_A - C)^a C_M^{1-a}, if\ C_A > \bar{C} \\ \phi(C_A - C), \qquad if\ C_A \leq \bar{C} \end{cases}$$

While $w > \bar{C}$:

$$\frac{C_A}{w} = \alpha + (1-\alpha)\left(\frac{\bar{C}}{w}\right)$$

$$\frac{p_M C_M}{w} = (1-\alpha) - (1-\alpha)\left(\frac{\bar{C}}{w}\right)$$

The relationship between income and urbanization is governed by the parameter α. Higher α implies more food expenditures and thus less urbanization at any given income level.

C_A: spent on agricultural goods (numeraire)

C_m: spent on manufactured goods

$\bar{C}$: minimum quantity of food (subsistence level)

φ>0, constant value

Production

Both agricultural and manufactured goods are homogenous and are produced under perfect competition.

Agricultural production function: $\mathrm{Y}_A = A_\mathrm{A} N_A^{\beta} \bar{L}^{1-\beta}$

[*β : labour income share in agriculture; N_A: labour used in agriculture; L: land*]

Agricultural wages: $w_A = A_A \left(\frac{\bar{\mathrm{L}}}{N_\mathrm{A}}\right)^{1-\beta} = A_A \left(\frac{\mathrm{l}}{n_\mathrm{A}}\right)^{1-\beta}$

[*l = L/N: land-labour ratio; n_A = N_A/N: labour share in agriculture*]

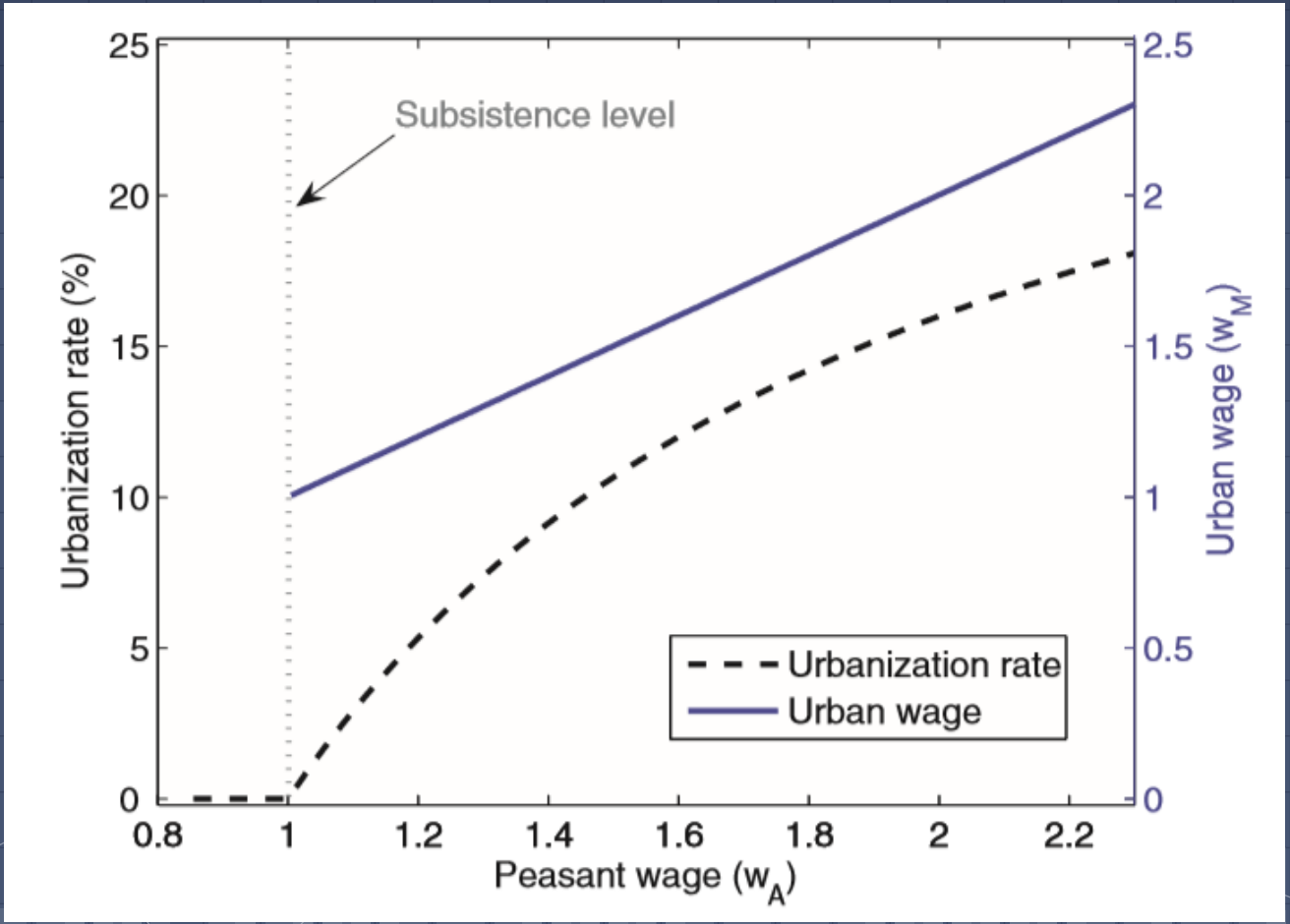
Manufactural production function: $\mathrm{Y}_M = A_\mathrm{M} N_M$

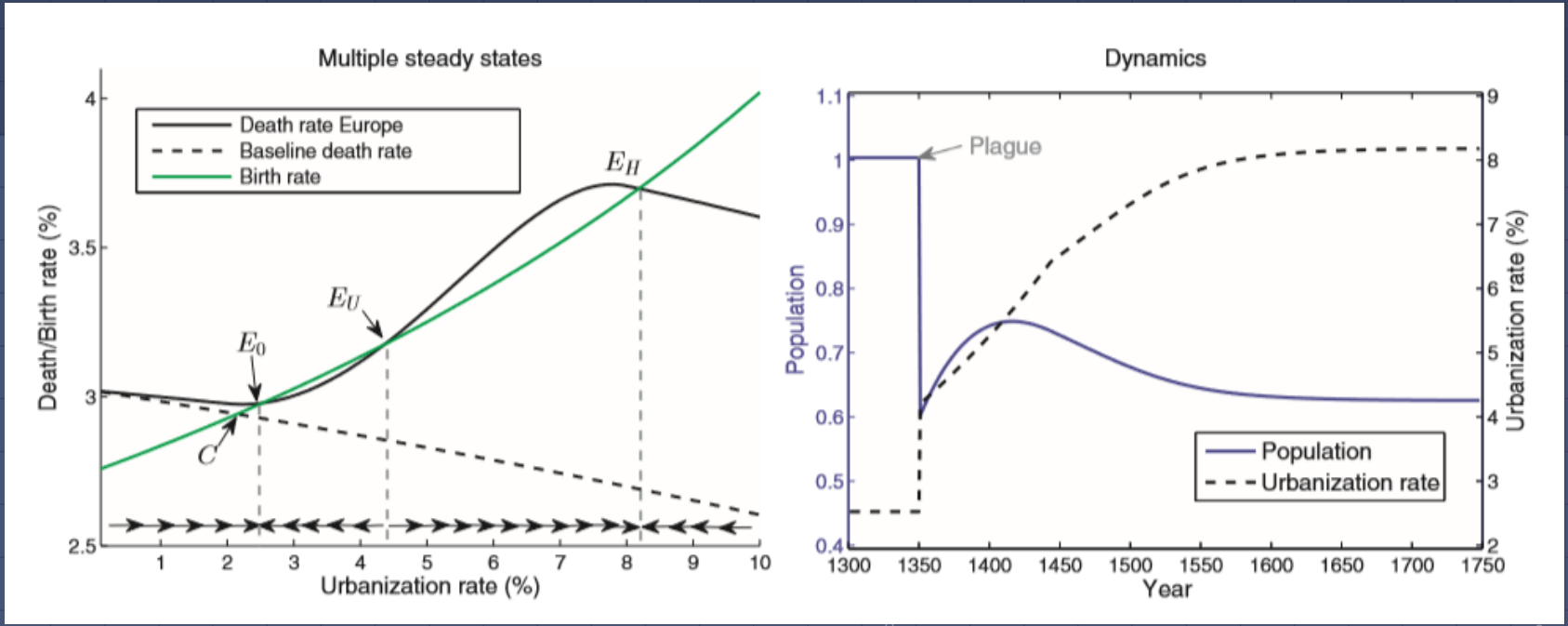
[*N_M: : labour used in manufacture*]

Manufacturing max profits: $w_M = p_M(1-t)A_M$

[*t: tax*]

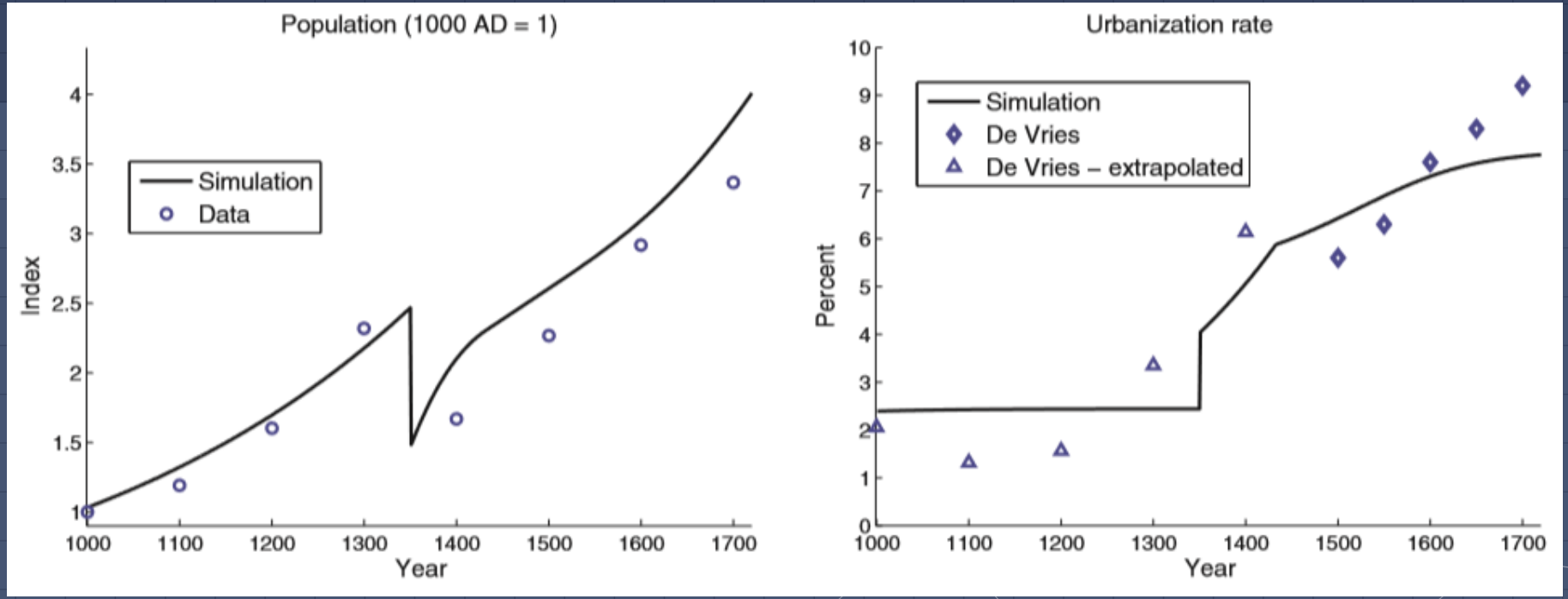
Wages and urbanization





The “Horsemen effect”

Nico Voigtländer, Hans-Joachim Voth; The Three Horsemen of Riches: Plague, War, and Urbanization in Early Modern Europe, The Review of Economic Studies, Volume 80, Issue 2, 1 April 2013, Pages 774–811, https://doi.org/10.1093/restud/rds034



Europe: simulation results vs. data.

Sources: population for Europe (exclusive of the Balkans and Russia) from McEvedy and Jones (1978). Urbanization rates: For 1500–1700 from de Vries (1984); 1000–1400: De Vries (1984), extrapolated using data from Bairoch et al. (1988). See the notes below Figure 4 andAppendixA.1 for details

黑死病与马尔萨斯陷阱

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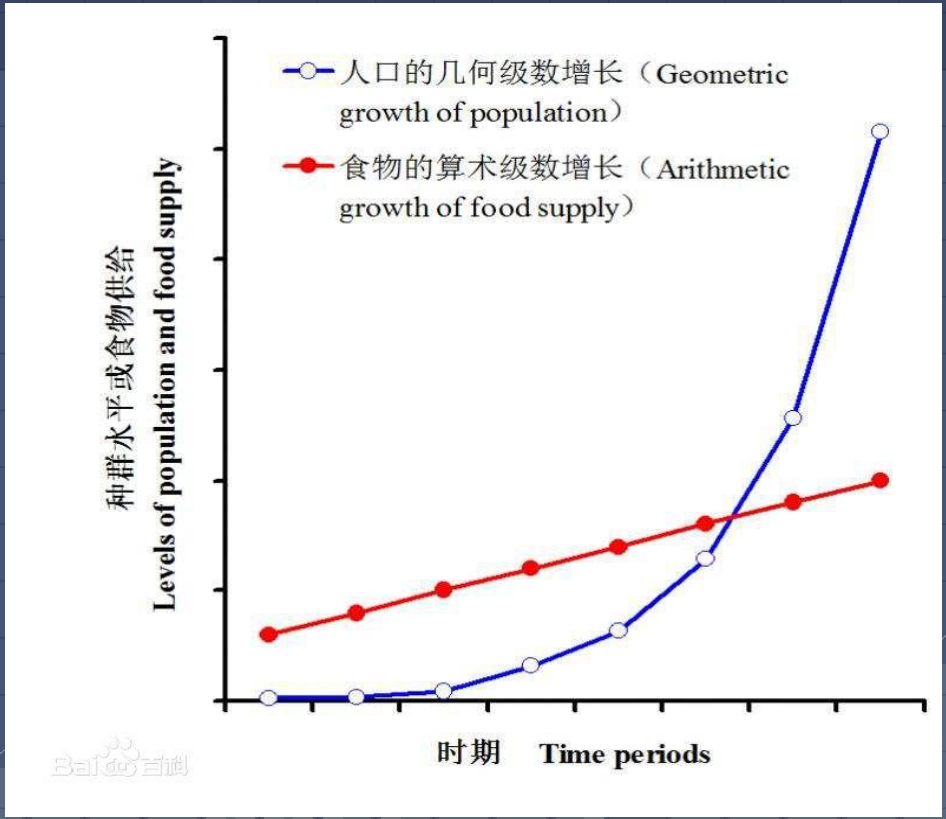
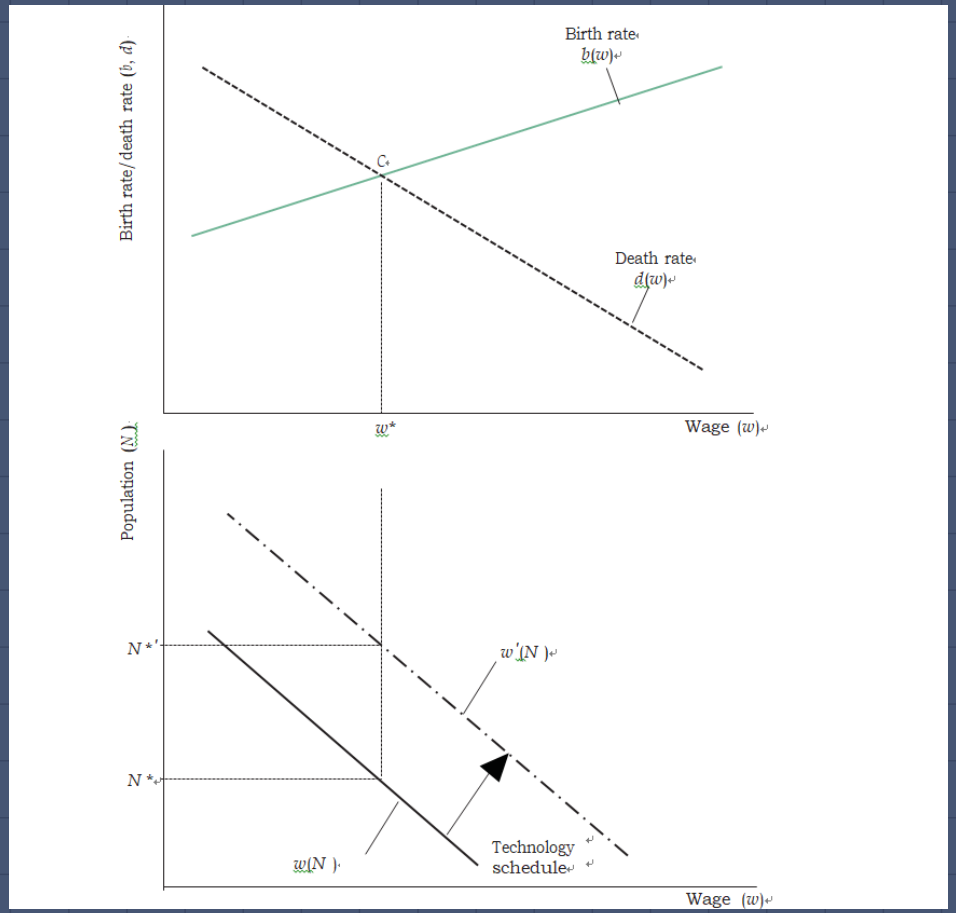
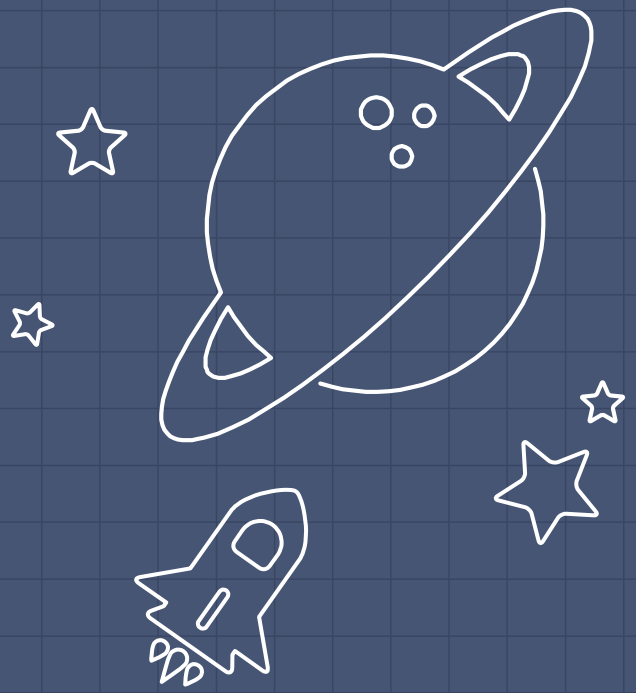
$$\begin{cases} \dfrac{dN(t)}{dt} = rN(t) \\ N(t_0) = N_0 \end{cases} \quad (1)$$

$$N(t) = N_0 e^{r(t-t_0)} \quad (2)$$







Journal of Economic Perspectives—Volume 27, Number 41

农业发展与结构调整

1831年英国爆发农民大起义

- 庄园制、农奴制→农民自主租赁土地→积极性提高、技术进步
- 实物收入→货币租金→农民收入增加
- 土地荒废→经济作物、畜牧业

中产阶级的诞生

- 农奴制和庄园制瓦解→贵族地位下降→资产阶级、新贵族兴起
- 劳动力不足、粮食价格低→第一次圈地运动
- 土地密集型→劳动力、资本密集型产业

- 农业以及城市手工业者收入增加促进技术进步
- 收入增长远大于一两代人口增长可能侵蚀的收入，资本/劳动力比率极大提高，人均资本存量的提升降低了利率，促进资本密集型产业的发展，新的生产方式减少了对土地的依赖
- 黑死病间接降低了人口增长率，人口数量难以恢复

黑死病—西欧低生育率（EMP）

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黑死病爆发

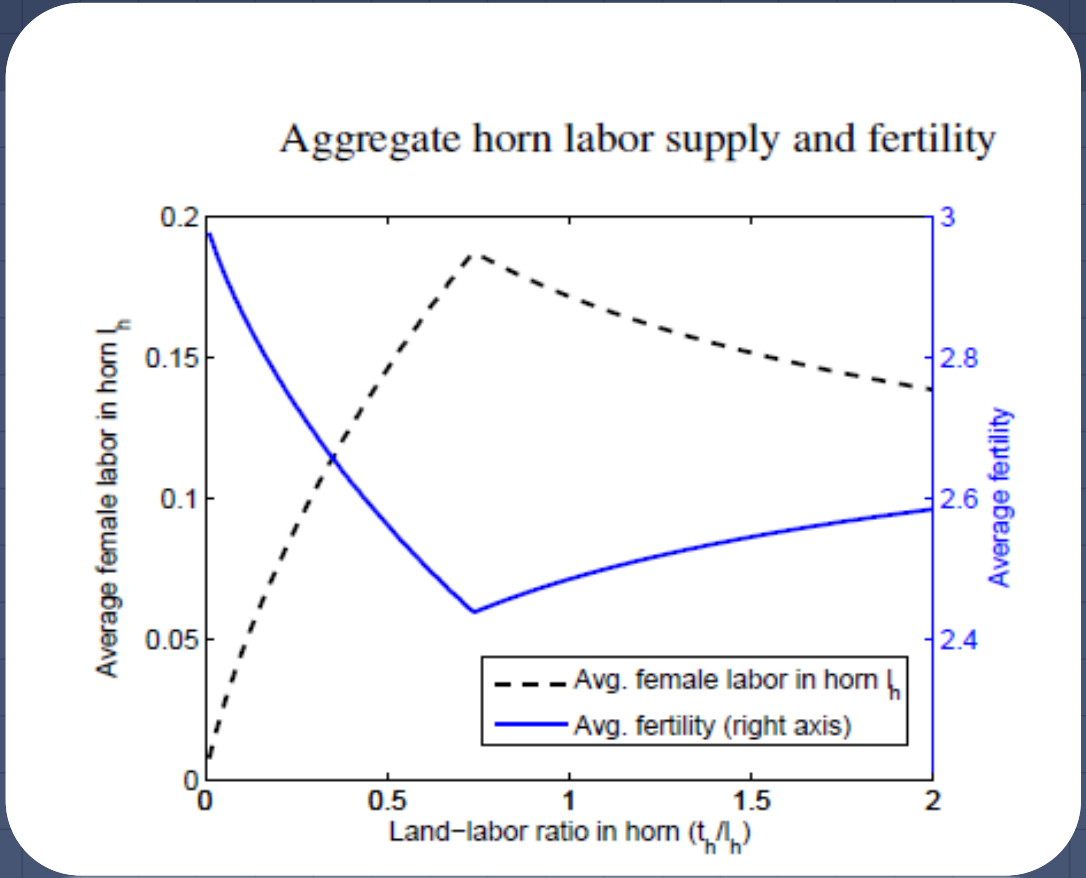
人口减少了1/3到1/2

土地 - 劳力比率升高

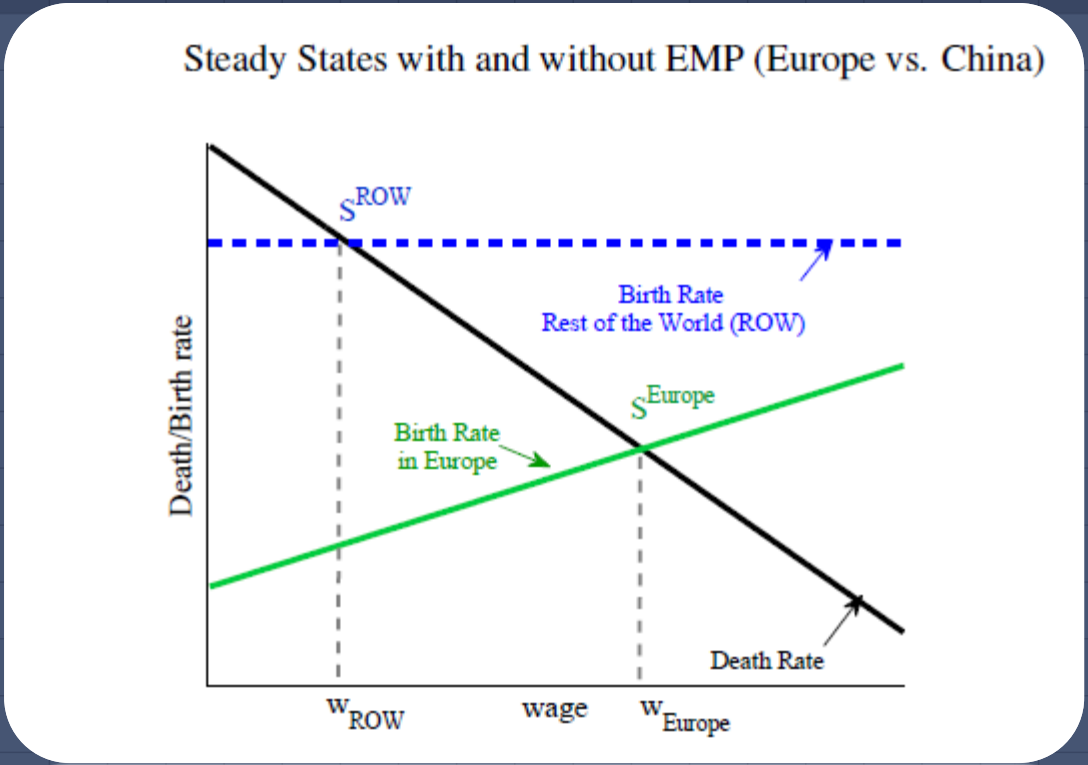
土地丰富有利于土地密集型畜牧业;妇女在农牧业的就业增加

婚姻被推迟，生育受到限制

女性就业率更高，婚姻更晚，生育率更低，人均收入更高



-Nico Voigtländer and Hans-Joachim Voth(2011).How the West 'Invented' Fertility Restriction. Working Paper.



-Nico Voigtländer and Hans-Joachim Voth(2011).How the West ‘Invented’ Fertility Restriction. Working Paper.

分歧

南欧

- 初婚年龄和不嫁的比例都低于西北部
- 人口从黑死病的影响中恢复得相对较快

- 地中海国家的农业状况不利于西北欧常见的牧区农业。
- 自行穿越人烟稀少的地区与现代欧洲早期的女性社会角色并不相称。

东欧

- 粮食生产率很高
- 劳动力不是免费的，工资也没有激增到瘟疫后西欧的程度
- 东欧的人口减少比西欧小

中国

- 中国人结婚比较早，对女性而言几乎是普遍的
- 中国的粮食生产比英格兰效率高大约4倍

THANK YOU!