II. MACRO- AND STRUCTURAL CHANGES IN THE EUROPEAN ECONOMY, 1290 - 1520

A. The Dynamics of Population Changes in Western Europe, ca. 1000 CE – ca. 1500 CE

Dynamics of Medieval Population, to 1500: Part B

1. Ricardo and Malthus on Population
2. Mortality (Diseases), Fertility, and the European Marriage Pattern

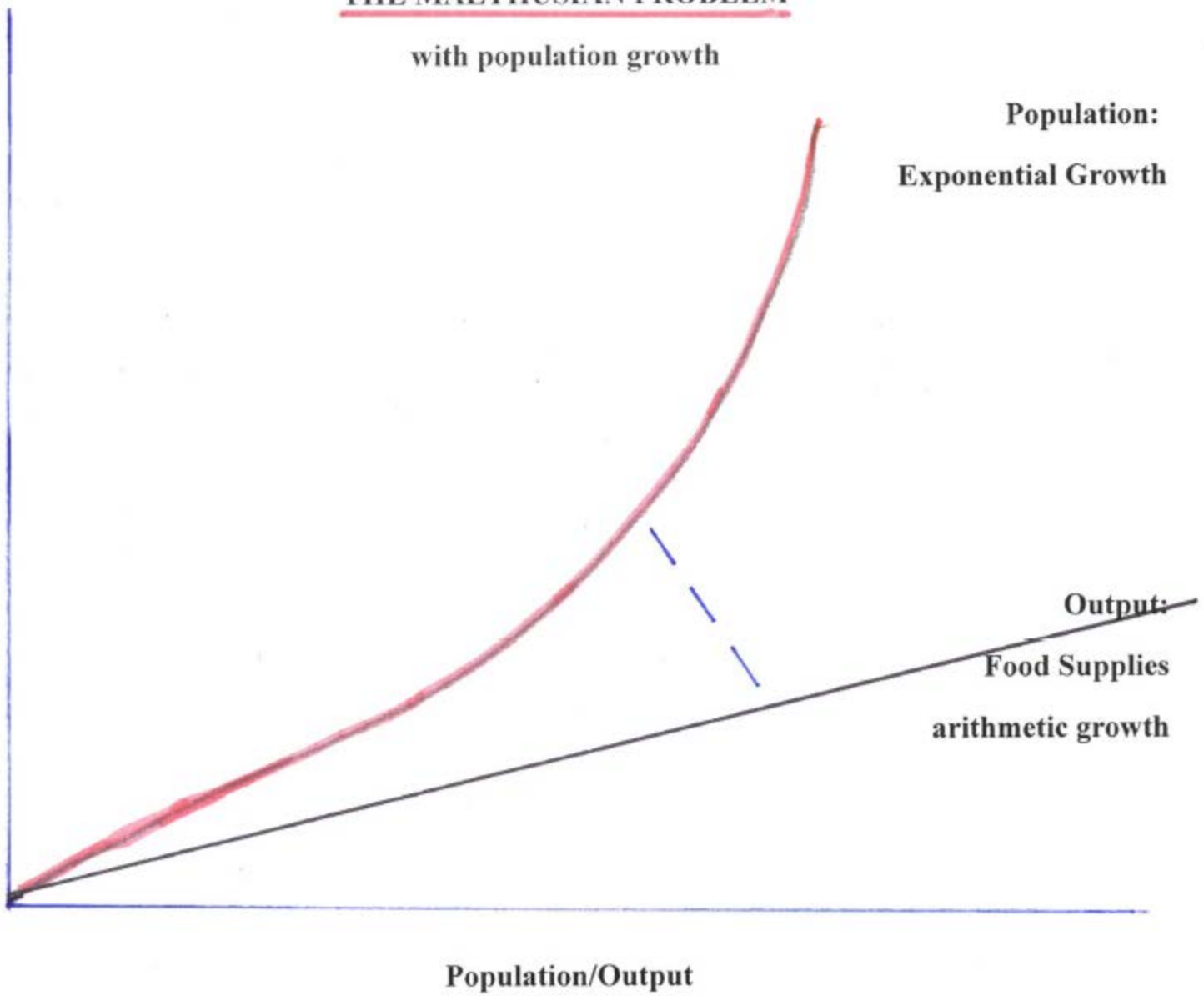
2. **18 September 2013** **Epstein**, ch. 6, 8 **Brady**, ch. 1 (De Vries) **Cipolla**, chs.1-3; 5; **Davis,** ch. 6; **Musgrave**, ch. 2 **ET 1**	**2**	**MACRO-ECONOMIC CHANGES: POPULATION:** **Demography, the Classical Economists, and the Economy:** (1)Malthus: Population Growth and Subsistence Crises (2) Ricardo: the Concept of Economic Rent **Demographic Determinants**: (1) Death Rates and the Late-Medieval Black Death (2) Birth Rates and the rise of the 'European Marriage Pattern' (3) Other factors affecting fertility

The Classical Economists: Population and the Economy

- 1) **Two 19th-century Classical Economists** have influenced to this day our interpretation of how demographic changes influenced the economy:
- (i) **Thomas Robert Malthus (1766-1834)**
- (ii) **David Ricardo (1722 – 1823)**
- 2) **Note that the Law of Diminishing Returns** is crucial to both their models: but that concept was unknown till the late 19th century
- 3) **Malthus's Subsistence Crisis model** was done last day – now we turn to Ricardo

THE MALTHUSIAN PROBLEM

with population growth



Evolution of the Ricardo Model 1

- 1) **Ricardo's own, original theoretical model:** on differences in productivity between two pieces of land, using same capital and technology
- 2) **Johann von Thünen (1783-1850)**: German economist who added the importance of differences in distance to markets and thus of transportation costs

Evolution of the Ricardo Model 2

- 3) **'Marginalist' School of Economics,** culminating with **Alfred Marshall** (1842-1924): importance of the margin:
- - marginal utility, marginal productivity, marginal cost, marginal revenue ➔ leading to
- 4) **Law of Diminishing Returns** (last day): especially to explain the Malthusian model of subsistence crises

David Ricardo on Economic Rent

- **Economic rent on land** is the **value of the difference in productivity** between
- a given piece of land and the poorest piece of land (or the land most distant from the market)
- producing the **same** goods (bushels of wheat) under the same conditions (of labour, capital, technology, climate)
- **Essence of argument**: wide differences in production and marketing costs between the best and worst lands called into production to feed a given population

Productivity in Ricardian rent

- **Productivity of agricultural land defined by**:

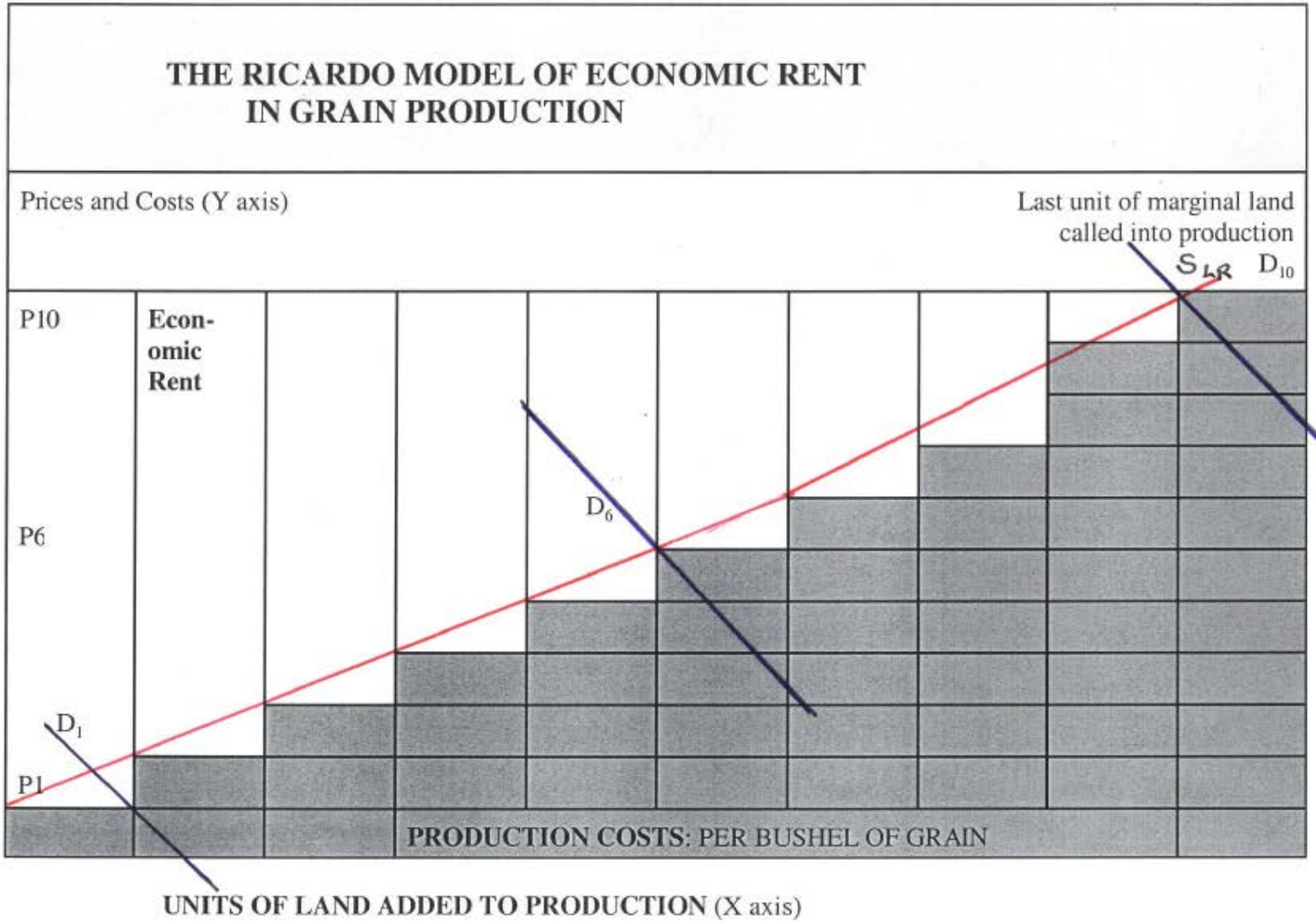
  - (1) **the natural fertility of the soil:** as utilized by given technology and stock of capital
- (2) **the distance from the market** in which the grains (or other agricultural goods) are sold
- (3) so: the productivity differences involve the costs of both **producing and marketing** the grains in a given market.

Population Growth & Ricardian Rent

- **Population growth forces into production new lands** that are (almost by definition) higher cost marginal lands (marginal = extra)
- **Such marginal lands are higher cost for reasons already seen:**
  - (1) inferior soil fertility
  - (2) and/or greater distance from the market, and thus requiring higher transportation and marketing costs (Von Thünen's contribution)

Population growth & rising rents

- **The price of grain is determined by the marginal cost** of producing the last (marginal) bushel of grain on the last (marginal) unit of land brought into production, from distant markets
- **Only one price for grain can prevail in any market**: determined by the marginal cost of producing grain and supplying it to the market (cf von Thünen model)
- **Economic rent is thus the surplus value created by the difference between the production costs on each unit of land**: from the best (highest, closest) to the worst unit and/or most distant land
- which has no economic rent)



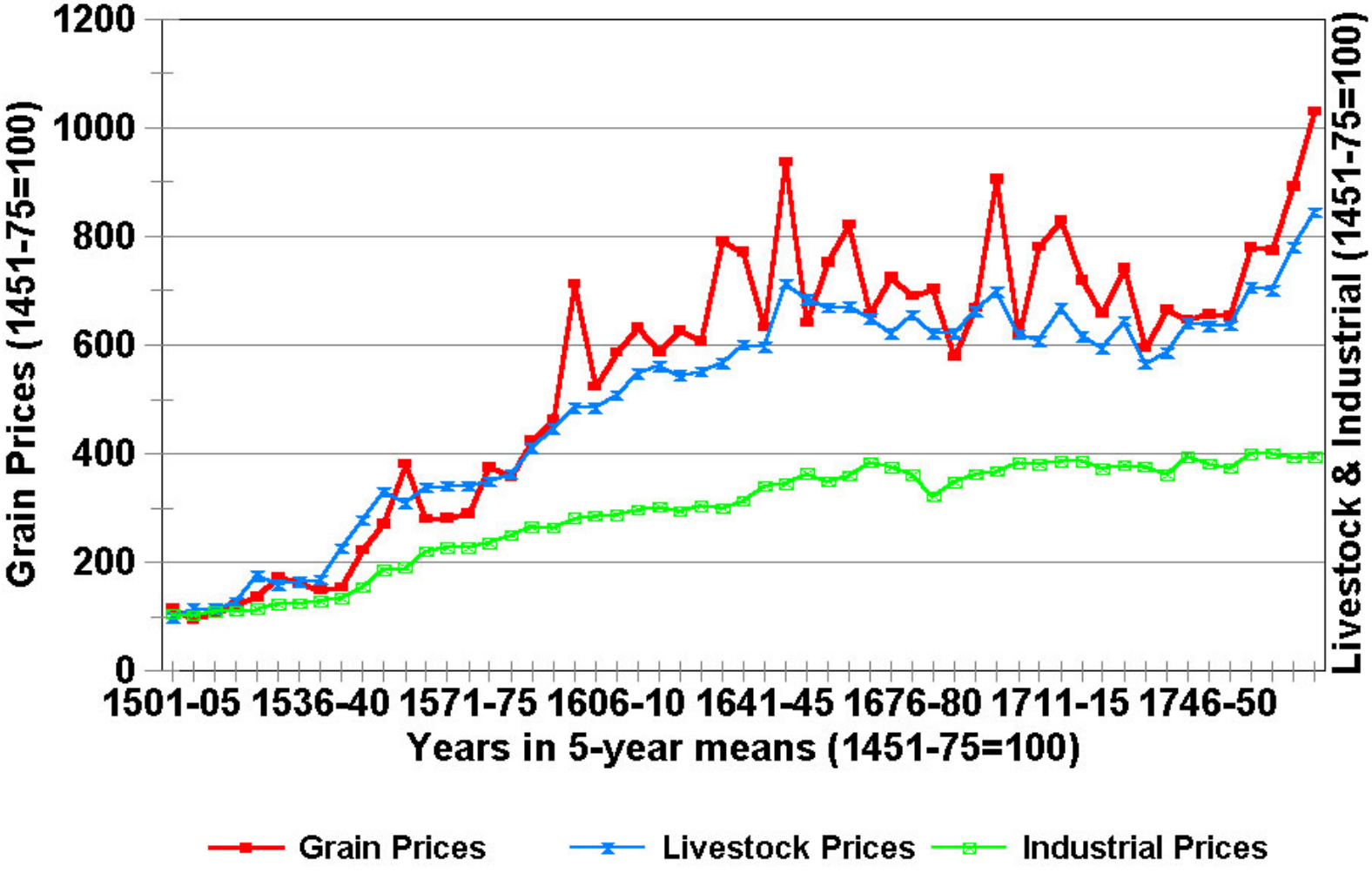
- production costs per bushel of grain: shaded area
- economic rent per bushel of grain: blank area

Long-Term Elasticities of Supply

- (1) **Supply elasticities** (more than demand elasticities) help to explain:
- - (a) trends in long-term prices
- - (b) differences in economic rents accruing on lands for crops, pasture, industrial production
- (2) **Changes in supply curves with population growth:** see the Ricardo graph
- (a) **grains** (arable): steeply sloping supply curves
- (b) **livestock products**: less steeply sloping
- (c) **industrial products**: flat, or gently sloping

English Prices 1501-1770 (1451-75=100)

Grain, Livestock, Industrial Prices



Related definition of economic rent: OPPORTUNITY COST

- **The excess or surplus of total payments** given to any one factor of production (land, labour, capital) over and above its 'transfer earnings'
- **Transfer earnings**: the payment required to keep that factor of production in one use and to prevent its transfer to another use
- **Opportunity cost**: **the cost of doing A is the benefit forgone,** earnings not received, by doing B: i.e., transferring that factor from A use to B use

Opportunity cost & Economic Rent

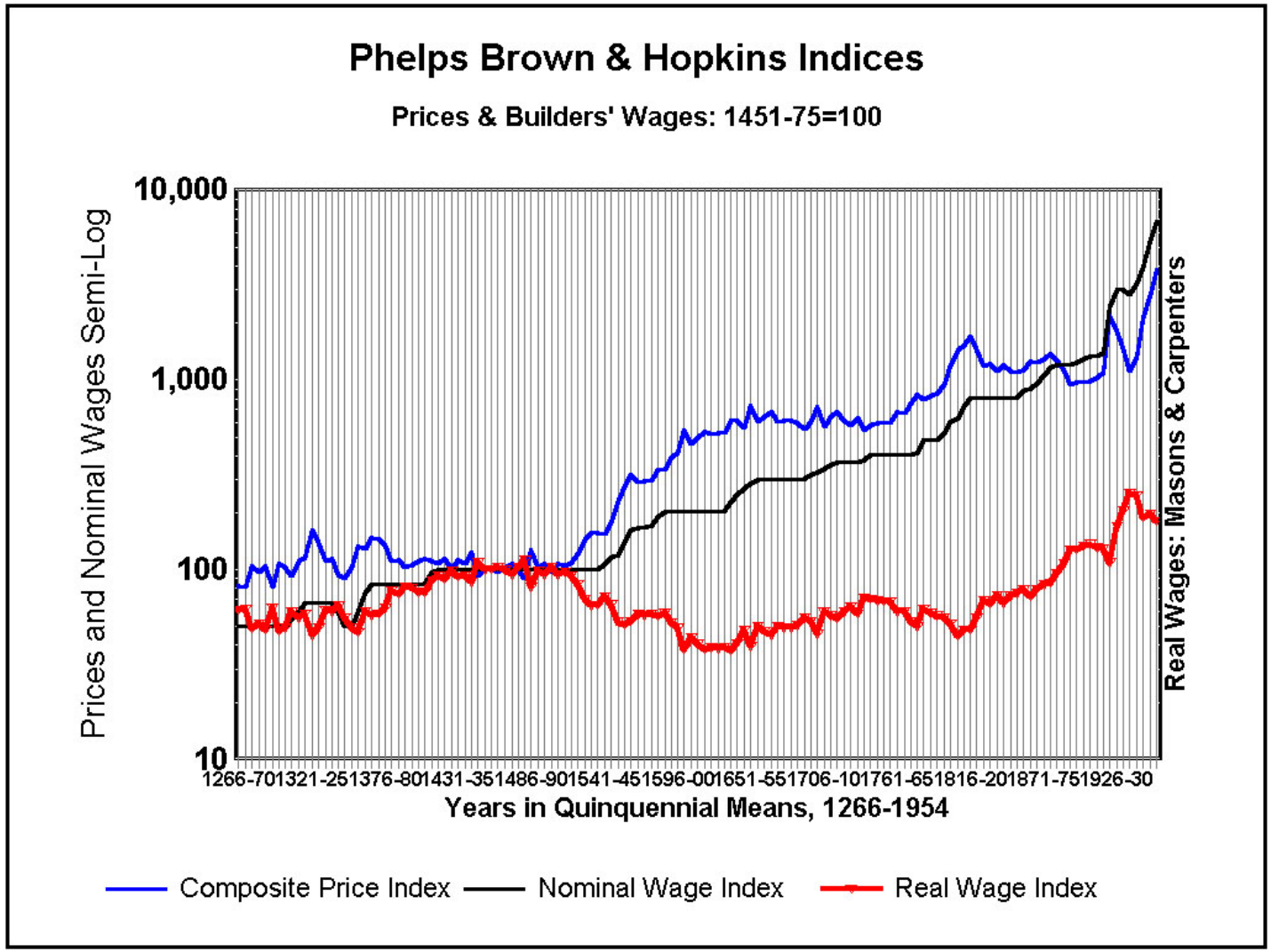
- **Thus economic rent is the extra amount of payment** that a factor production receives **over and above its transfer earnings**:
- **For Ricardo's agrarian model**: that land had only one use --- growing grains → so: no 'transfer earnings' were possible
- **Thus: all rent is surplus** to what was necessary to keep that land in its present use growing grain
- **The difference between the market price for grain and the costs of producing it was therefore pure economic rent**, which was expropriated by the landlord
- **The tenant would stay on the land so long as his own 'transfer earnings' were met**: so long as he earned enough not to seek alternative employment.

Consequences of Population Growth in the Ricardian model

- **(1) GRAIN PRICES WILL RISE**
- **(2) LAND RENTS WILL ALSO RISE** - BECAUSE OF THE INCREASES IN ECONOMIC RENT
- **(3) REAL WAGES WILL FALL:**
- - **because of the rise in the cost of living**
- - **because of changes in the land: labour ratio,** leading to a fall in the marginal productivity of labour

Real Wages in the Ricardian Model

- **Real wages are determined** by the **marginal revenue product of labour,**
- which depends on changes in values of products produced and sold on the market
- -in theory, population growth reduces the MP of labour (see: DIMINISHING RETURNS)
- **RW = MRP (L)** – or:
- **RW = NWI/CPI**


Phelps Brown & Hopkins Indices
Prices & Builders' Wages: 1451-75=100
Prices and Nominal Wages Semi-Log
Real Wages: Masons & Carpenters
10,000
1,000
100
10
1266-701321-251376-801431-351486-901541-451596-001651-551706-101761-651816-201871-751926-30
Years in Quinquennial Means, 1266-1954
Composite Price Index
Nominal Wage Index
Real Wage Index

Consequences of Population Decline in the Ricardian Model: I

- (1) **GRAIN PRICES WILL FALL** –
- as higher-cost marginal lands fall out of production and grain is produced on better quality, lower cost lands, with less labour
- and on lands closer to the market
- (2) **LAND RENTS WILL ALSO FALL**:
- as declining prices reduce the difference between the market price and production costs

Consequences of Population Decline in the Ricardian Model: II

- (3) **REAL WAGES WILL RISE:**
- - **as the cost of living falls**: with lower priced grains supplied to the market
- as the **marginal productivity of labour rises**
- i.e., since fewer persons (units of labour) are needed to produce a given quantity of grain for the market:
- See **LAW OF DIMINISHING RETURNS**

Who captured the economic rents?

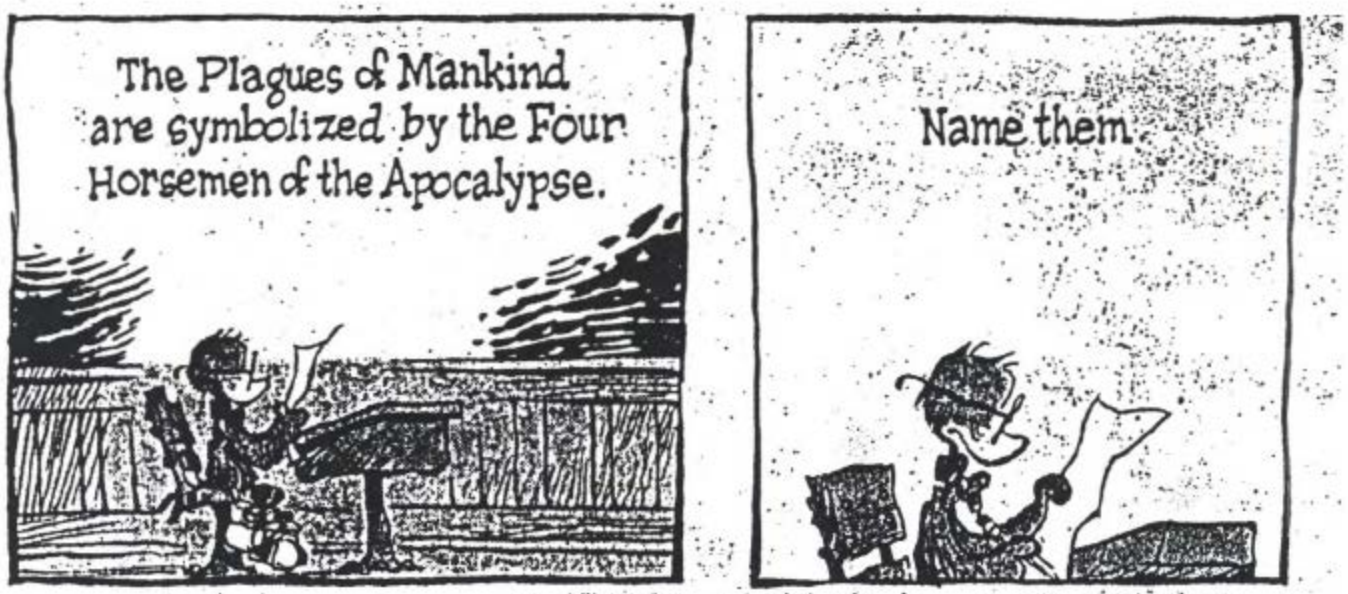
- **According to both David Ricardo and Karl Marx, the landlord,** as the unchallenged owner of the lands, captured all the economic rent
- **He could supposedly evict all tenants who refused to pay** and replace them with others
- **In historical fact, however, that never happened**: an examination of medieval feudalism and manorial farming: demonstrates that those rents were shared between landlords and tenants

Who captured the economic rents?

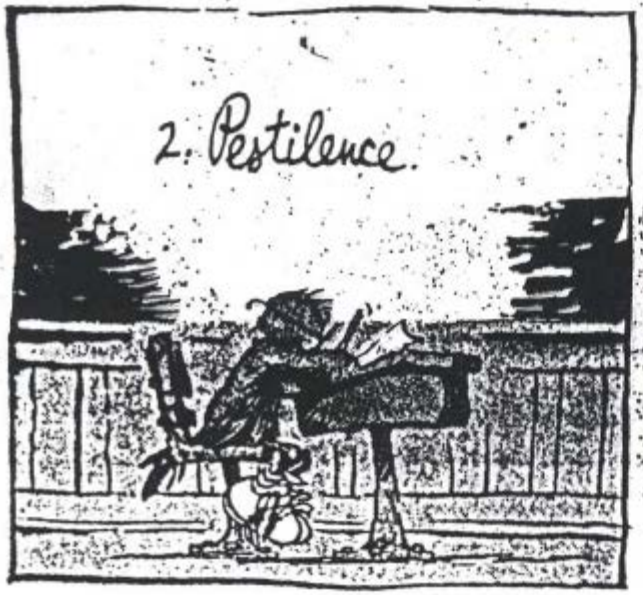
- **FEUDALISM, MANORIALISM, SERFDOM:** are topics in which these issues will be more fully explored (under Agriculture).
- **Surprising anomaly**:
- **manorial courts fixed 'customary rents'** in nominal money terms (next topic) in perpetuity (inheritance)
- **so that population growth and thus rising grain prices** meant that such 'customary' tenants captured all the economic rents – at expense of landlords
- **The landlord reaction**: to alter manorial structures (landlord-tenants relationships) in order to convert customary peasant tenures into short-term leaseholds

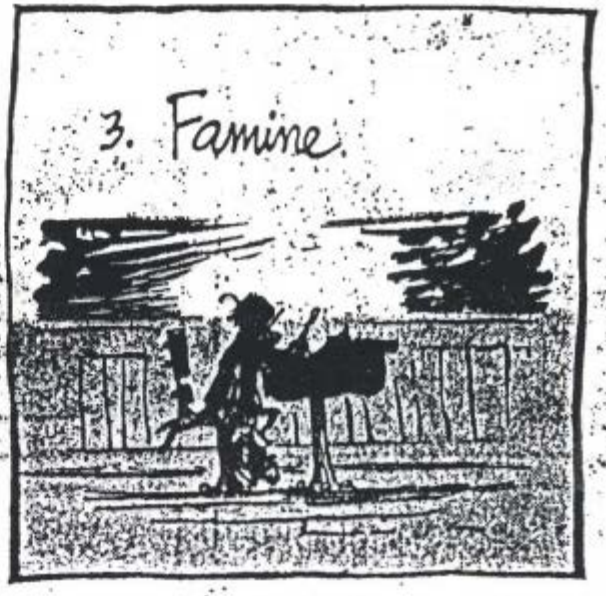
POPULATION CHECKS: I

- **MALTHUS TYPE I: PROVIDENTIAL OR POSITIVE CHECKS**
- **Four Horsemen of the Apocalypse**: war, famine, plague (pestilence) and ??
- **endogenous:** results of Malthusian overpopulation?
- **or exogenous shocks** to the economy?
- **Malthus:** not the most important type of demographic checks in European history


The Plagues of Mankind are symbolized by the Four Horsemen of the Apocalypse.
Name them.


OKAY... DON'T PANIC...
LET'S BE LOGICAL HERE...
1. War.


2. Pestilence.


3. Famine.


4/6


4. Broccoli.
MACNELLY
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FOUR HORSEMEN OF THE APOCALYPSE PAINTED IN 1887 BY VIKTOR VASNETSOV

POPULATION CHECKS: II

- **MALTHUS TYPE II: PRUDENTIAL OR PREVENTIVE**
- **Demographic self controls on fertility**: by marrying later, with sexual abstinence
- 'moral restraints' on sexual behaviour
- **What about contraception** – birth control?
- **NO**: Malthus was a Protestant clergymen when Protestants were as opposed to artificial birth controls as were Roman Catholics;
- **Infanticide:** was also, needless to say, not acceptable!

DEATH RATES: MORTALITY

- **DEATH RATES**: usually more important than birth rates: since birth rates were normally 25 to 35 per thousand,
- while medieval death rates could soar from 25 to 400/1000 (Black Death)
- **birth rates became more important** at outset of the modern Industrial Revolution :
- accounting for 70% of population growth from the 1760s to the 1830s
- **Why?**: the later **European Marriage Pattern**
- **Today in Canada**: BR is 11/1000; DR is 7/1000

Demographic Data for Contemporary Countries in Europe, North and South America, and Eastern Asia-Pacific in 2013

Country	Population in millions	Birth Rate per 1000	Death Rate per 1000	Infant Mortality	Life Expectancy Total	Life Expectancy Males	Life Expectancy Females
Canada	35.30	11	7	4.90	81	79	83
U. S. A.	316.20	13	8	5.90	79	76	81
Argentina	41.30	19	8	11.70	76	72	80
Cuba	11.30	12	8	4.90	78	76	80
U.K.	64.10	13	9	4.20	82	80	84
Belgium	11.20	12	9	3.30	80	78	83
Netherlands	16.80	10	8	3.70	81	79	83
France	63.90	13	9	3.30	82	79	85
Germany	80.60	8	11	3.30	80	78	83
Switzerland	8.10	10	8	3.80	83	80	85
Norway	5.10	12	8	2.40	81	79	83
Sweden	9.60	12	10	2.60	82	80	84
Italy	59.80	9	10	3.20	82	79	85
Spain	46.60	10	8	3.10	82	79	85
Russia	143.5	13	13	7.40	70	64	76
Japan	127.3	8	10	2.20	83	79	86
China	1357.4	12	7?	16.00	75	73	77
Taiwan	23.40	10	7	4.20	79	76	83
Australia	23.10	13	6	3.40	82	80	84

Medieval Diseases & Death Rates

- **Chief medieval diseases**:
- **plague** (bubonic, pneumonic, septicaemic),
- pneumonia, dysentery, typhus, leprosy, and tuberculois (and influenza??)
- **Early-modern and modern diseases:**
- syphilis, small pox, and
- then cholera (late 18th, 19th centuries)

Transmission of diseases

- **Medieval & early-modern view:**
- **Miasma theory:** diseases came from noxious vapours in atmosphere: from 12th century
- not until scientific experiments of Koch (German) and Pasteur (French) in 1870s did we know the bacterial causes of diseases
- **Modern Reality (from 1870s):**
- **water supplies and sewage**: chief vectors for transmission of bacterial diseases

The Black Death: Plagues I

- (1) **The Justinian Plague:** ca. 540 – ca. 750
- **the First Pandemic**: named after Byzantine Emperor Justinian (527-565 CE): from 6th to 8th centuries: in Asia, Africa, and Europe
- (2) **The medieval Black Death**: from late 1347 to about 1733: (revisit this next term)
- **the Second Pandemic**: disappearing from western Europe 1730s, it remained in the Russian and Ottoman Empires to the 1820s

The Black Death: Plagues II

- (3) **The Third Pandemic: 1894 - 1947**
- **modern bubonic plague**: afflicted Asia – especially **China and India**
- - still remains endemic in Asia, SW United States
- provided modern medical knowledge of bubonic plague (*Yersinia pestis*)
- - **but very different from the medieval and Justinian plagues**. WHY?

Types of Plagues: I

- (1) **Bubonic Plague:** 60% to 80% mortalities
- May have killed 40% of European population in the mid 14th century
- **Causes?**
- **Supposedly the plague bacillus** (bacteria) known as *Yersinia pestis*, absorbed by blood-sucking fleas (*Xenopylla cheopis, Nosopsyllus fasciatus*),
- fleas that were parasitic on black rats
- did not attack humans so long as there were ample rats
- ***Pulex Irritans***: the role of human fleas??? Disputed

Types Plague: II

- (2) **Pneumonic Plague**:
- with mortalities up to 99%
- killed rich and poor alike, healthy and infirm
- **Spread by sputum and human breath**: from the lungs
- Evidently a mutation of bubonic plague
- How common is matter of great dispute

Types of Plague: III

- (3) **Septicaemic Plague:**
- - mortalities up to 90%
- - **infection from bacteria in the blood stream**:
- - from open sores and wounds
- - apparently, very rare: past and present

Problems with Rat-Flea Theory: I

- **In the Third Pandemic (1894-1947)**, all Indian villagers knew when bubonic plague was coming: from the presence of thousands of dead rats on village roads and fields
- **Note: rat fleas will not attack humans** - unless there are not enough rats left alive
- **But no medieval chronicler,** nor medieval records, indicate the presence of any rats, let alone dead rats, in plague infested areas

Problems with Rat-Flea Theory II

- **Third Pandemic: 1894 – 1947**
- **plague travelled very, very slowly**, with low mortalities (under 10%)
- **Followed grain supply routes**: which fed rats
- **But medieval Black Death** spread like wild-fire across almost all of Europe, within two years; and with no relation to the grain trades
- **With high mortalities** – killing 40%-50%

Problems with Rat Flea Theory III

Transmission Problems with rats and fleas

- **Rats do not travel far**,
- and travel slowly
- **fleas also do not travel**, do not leave their hosts (rats or humans)
- **most fleas infected with plague bacteria will die with a matter of days**: esophagus severed
- fleas do not hibernate with plague bacteria

BRITAIN

Rats absolved of causing 14th-century Black Death

MAEVE KENNEDY LONDON

Rats weren't the carriers of the plague after all. An archeologist's study of the Black Death in London, in 1348 and 1349, exonerates the famous animal villains.

"The evidence just isn't there to support it," said Barney Sloane, author of *The Black Death in London*. "We ought to be finding great heaps of dead rats in all the waterfront sites, but they just aren't there. And all the evidence I've looked at suggests the plague spread too fast for the traditional explanation of transmission by rats and fleas. It has to be person to person – there just isn't time for the rats to be spreading it.

"It was certainly the Black Death, but it is by no means certain what that disease was, whether in fact it was bubonic plague," he added.

Dr. Sloane has concluded that the spread of the 1348-49 plague, the worst to hit the British capital, was far faster, with an impact far worse than previously estimated.

While some suggest that half the city's population of 60,000 died, he believes it could have been as high as two-thirds.

Dr. Sloane spent nearly 10 years researching his book, poring over records and excavation reports.

He believes there was little difference in mortality rates between rich and poor, because they lived so closely packed together. The plague, he is convinced, spread from person to person in the crowded city. Mortality rose through the bitterly cold winter, when fleas could not have survived, and there is no evidence there were enough rats.

Current Plague Historians

(1) **Samuel Cohn**:

- has convincingly raised all these problems:
- does not believe that the Black Death was pneumonic plague,
- nor that the plague flea was *Pulex irritans*

(2) **John Kelly, John Theilman, Frances Cate**:

- Black Death was bubonic plague, caused by *Yersinia pestis*, but a far more virulent form:

- but they do not explain how it spread!!

(3) **Ole Benedictow:** ignores Cohn & others

Warfare

- **Warfare:** endemic, a spreading stain, from the 1290s to the 1450s, in western Europe:
- **1290s a major turning point**: warfare across most of Europe and Mediterranean led into better known Hundred Years War (1337-1453)
- **Wars: not major killers** in terms of battle deaths,
- **but were in terms of wounds & diseases**, and in causing famines
- **Warfare: disrupted food production and trade**
- **polluted water supplies**: rotting bodies

Famines

- **Famines:** often a serious threat, but not often major killers
- **Famines resulted from adverse climate** changes : bad weather → too wet, too dry
- **Or from disruptions** to both agricultural production and trade: especially from warfare
- **Great Famine of 1315 – 1322**: fortuitous result of temporary climatic changes?
- **Chronic malnutrition:** more serious factor, reducing resistance to diseases

Mortality and Birth Rates

- **Famine, malnutrition, diseases** (especially plague) often seriously reduced fertility:
- **- amenorrhea** (disruption of menstrual cycle)
- **High infant mortalities** from malnutrition and diseases (esp. plague)
- **effectively reduced the 'live birth' rate** and thus the replacement rate to produce new generations of surviving children
- **Maternal mortalities**: dying in child birth: not as much as often imagined, but a problem

The European Marriage Pattern

- **John Hajnal:** "The marriage pattern of most of Europe [except eastern Europe], as it existed for about two centuries up to 1940 was… unique. There is no known example of a non European civilization which has had a similar pattern."
- **Prudential or Preventive** checks to population growth: for Malthus, key to demographic problem – anticipating concept of the EME

Europe in 1914

The European Marriage Pattern in the 19th century: Europe west of the line from Saint Petersburg (Russia) to Trieste (Italy)

Components of the EMP

- known as **Low Pressure Demographic System**
- (1) **Nuptiality:** a high age of first marriage for women: in late 20s or early 30s
- (2) **Celibacy**: a significant proportion of women who never married: from 15% to 30%
- (3) **Nuclear families**: father, mother, children – and relatively few children
- (4) **Wealth and Incomes**: help determine age of first marriage and family size

Servants in Husbandry & the EMP

- **post-Black Death phenomenon:** may be related to origins of the EMP
- **With growing scarcity of labour**, many rural households began hiring young people – chiefly teenage women – to assist in agricultural tasks
- **Lived as members of the (nuclear) family** while doing farming tasks
- **Received board, room, clothing, annual salary**

Servants in Husbandry & EMP II

- **Condition of Service**: that they not marry (or procreate) while living in the household as servants
- **Thus: such women might work as agricultural servants to their late 20s**: then retire with substantial cash dowries
- **major factor in delaying the age of marriage**
- - to the late 20s

The Universal Marriage Pattern

- known as: **High Pressure Demographic System**
- **Prevailed in all the ancient world,** in all of Europe before the early modern era, in eastern Europe until the 20th century, and in all of the rest of the world (Asia, Africa, Americas)
- **UMP: for both nuptiality and celibacy**
- Almost ALL women married
- Almost ALL women married by late teens

The UMP in Medieval Tuscany: 1427

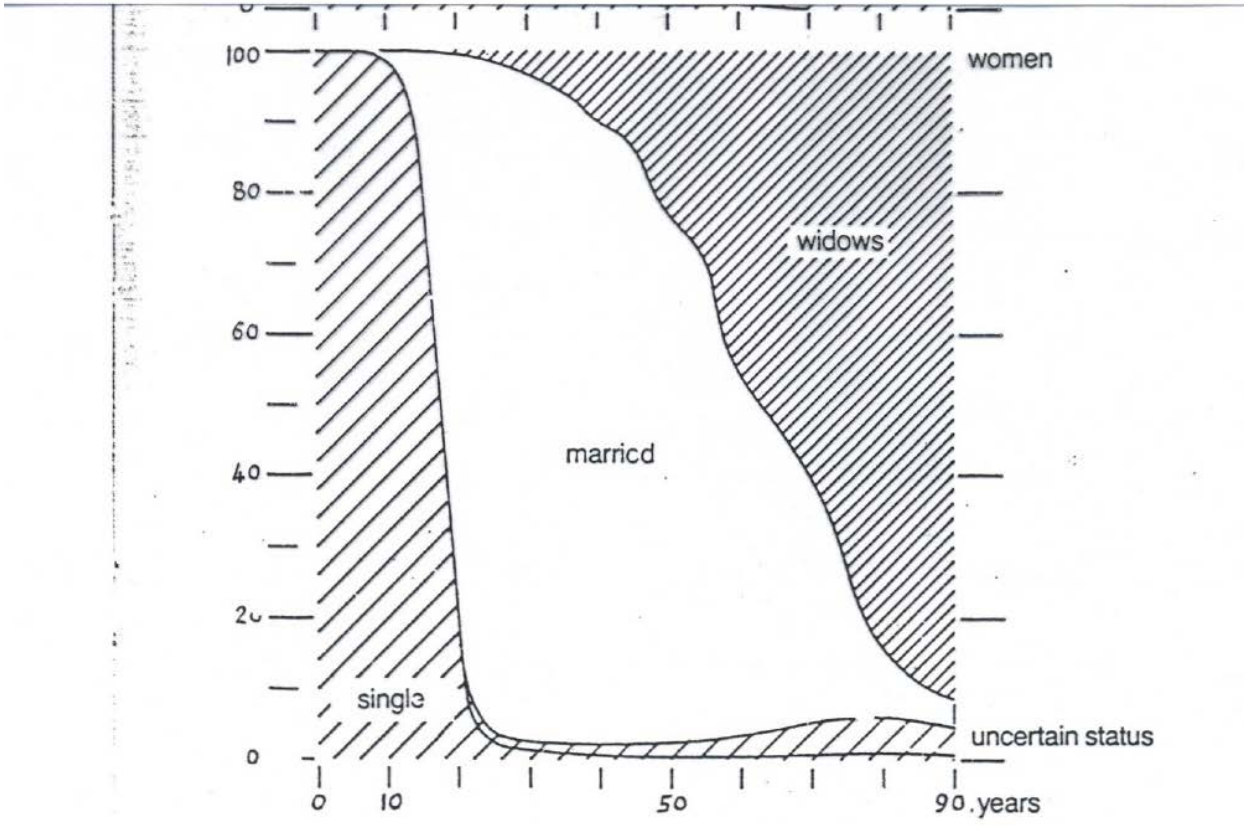
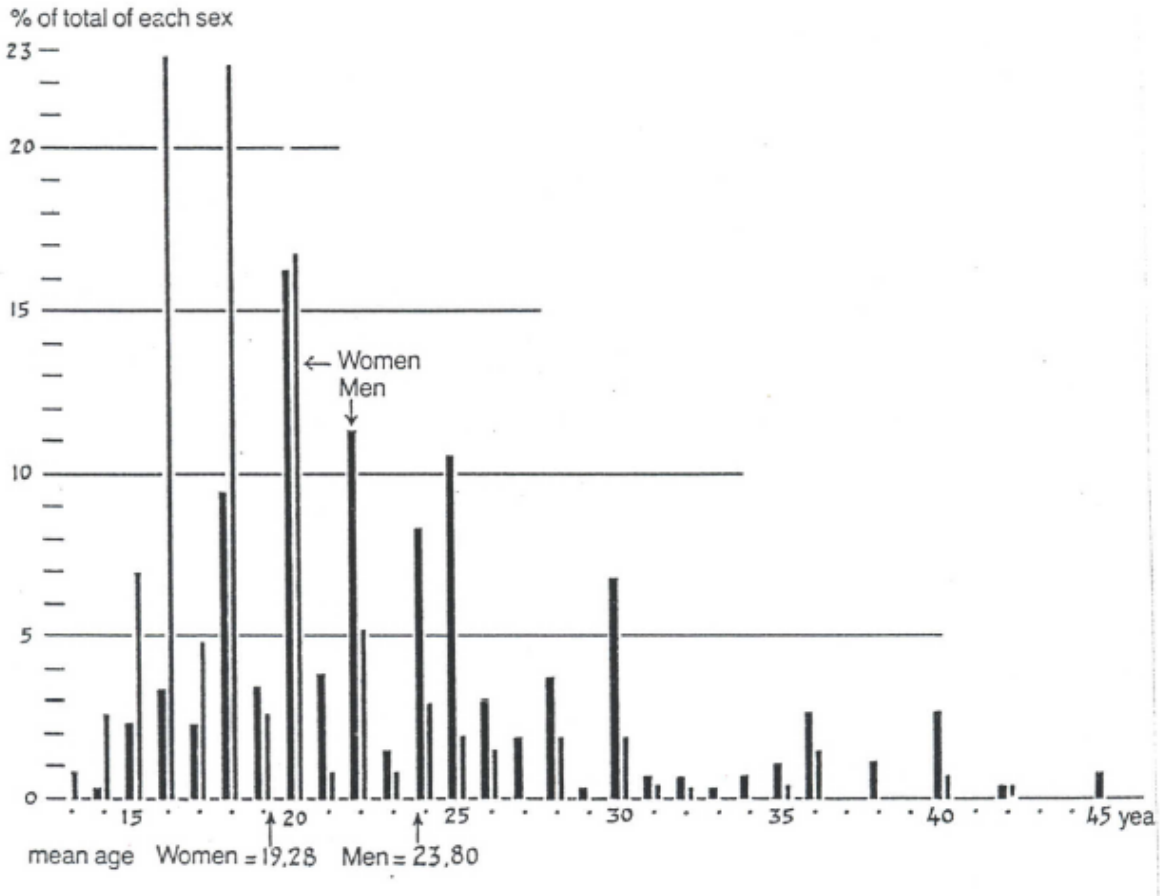
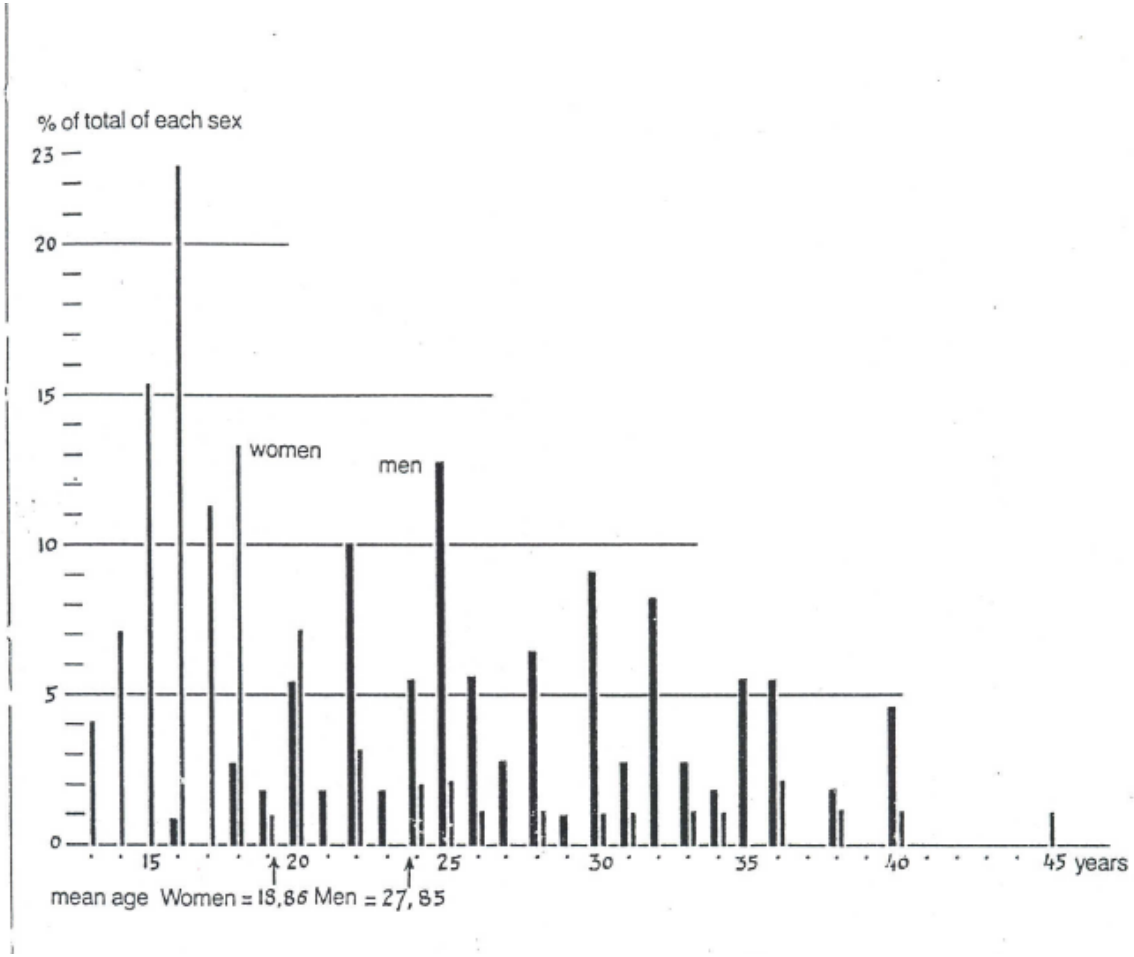


Fig. 7.3. Distributions according to Age and Marital Status (Tuscany, 1427)

Mean marriage ages in Tuscany (1427): rural



Mean marriage ages in Tuscany (1427): urban (Florence, Pisa, etc.)



Greenwich
A 8 B 10 C 12 D 14 E 16 F 18
ITALY
in the XII & XIII Centuries
Statute Miles
0 50 100
Duchy of Tuscany
Papal Territory: Patrimony
Papal States under Innocent III.
Venetian Territories in XII Cent.
Kingdom of Naples and Sicily
Lands of Counts of Savoy
Boundary of the Kingdom of Italy
Boundary of Lands of Countess Matilda
B
Towns in Lombard & Veronese League 1164-7 thus •
Towns in Lombard League 1177 are underlined red
Towns in Tuscan League 1196 are underlined black
DUCHY OF SWABIA
Chiavenna
Valtellina
Trent
MARCH OF TREVISO
MARCH OF FRIULI
Belluno
Feltre
Gorizia
Aquileia
Trieste
COUNTY OF SAVOY
Aosta
Oria
Legnano
Como
Bergamo
Cortenuova
Vicenza
Verona
Treviso
Brescia
Milan
Novara
Ivrea
Vercelli
Crema
Padua
Venice
DUCATUS VENETIANUS
Susa
Turin
PIEDMONT
MONT-FERRAT
Pavia
Lodi
Cremona
Mantua
Este
Parenzo
Chioggia
Rovigno
Asti
Annone
Piacenza
Tortona
Alessandria
Acqui
Roncaglia
Parma
Reggio
Modena
Ferrara
Comacchio
Pola
Cherso
Arbe
Saluzzo
EMILIA
ROMANIOLA
Bologna
Ravenna
Lussino
Savona
Genoa
Canossa
Luna
Faenza
Forli
Zara (1202)
Rimini
Pistoia
RAVENNA
Pesaro
Sebenico
Salona
Spalato
Lucca
Pisa
Prato
Florence
Senegaglia
Ancona
MARCH OF ANCONA
Leghorn
Volterra
Siena
Arezzo
Gubbio
Fermo
Bartzo
Lesina
Montaperto
Perugia
Assisi
Camerino
Piombino
TUSCANY
Radicofani
DUCHY OF SPOLETO
Curzola
Bastia
Grosseto
Norcia
Elba
Orvieto
Spoleto
Marrana
Soana
Amiterno
CORSICA
(to Pisa 1077, disputed by Genoa)
Viterbo
Rieti
Aquila
Chieti
ABRUZZI
Sagona
Corneto
Sutri
Tagliacozzo
Aleria
PATRIMONIUM
M. Gargano
Marsia
Ajaccio
Rome
Anagni
Molise
Loritello
M. Sant' Angelo
Ceprano
Siponto
S. Germano
Lucera
Foggia
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Aversa
Naples
Torres
Civita
GALLURA
M. Peloso
Montescaglioso
LOGUDORO
Salerno
PRINCIPATO
Taranto
Amalfi
Marsico
BASILICATA
SARDINIA
Galtellia
(to Pisa until 1284, then to Genoa)


ITALY
DURING THE RENAISSANCE
in the XV and Early XVI Centuries
REPUBLIC OF GENOA
DUCHY OF MODENA ESTE
REP. OF LUCCA
REPUBLIC OF FLORENCE
REPUBLIC OF SIENA
STATES OF THE CHURCH
UMBRIA
SABINA
PATRIMONY OF ST. PETER
CAMPAGNA
ROMAGNA
EMILIA
MARCHES
KINGDOM OF NAPLES
ABRUZZI
MOLISE
CAPITANATA
BARI
OTRANTO
BASILICATA
TERRA DI LAVORO
FRIULI
ISTRIA
DALMATIA
ADRIATIC SEA
SAVOY
DAUPHINÉ
PROVENCE
VALAIS
MARQUISATE OF SALUZZO
Rome
Naples
Venice
Elba

Modern Day Asia

- - **Universal Marriage Pattern**: is disappearing, but with widely varying patterns
- - **depends in part on marriage customs:** continuation of parentally arranged marriages vs. freely chosen marriages
- **JAPAN**: with far greater economic and personal independence, and higher education, Japanese women are marrying later – if at all – around 30
- - about a third of women remain unmarried

Asia's lonely hearts

Why Asian women are rejecting marriage and what that means

Yet marriage is changing fast in East, South-East and South Asia, even though each region has different traditions. The changes are different from those that took place in the West in the second half of the 20th century. Divorce, though rising in some countries, remains comparatively rare. What's happening in Asia is a flight from marriage (see pages 21-24).

Marriage rates are falling partly because people are postponing getting hitched. Marriage ages have risen all over the world, but the increase is particularly marked in Asia. People there now marry even later than they do in the West. The mean age of marriage in the richest places—Japan, Taiwan, South Korea and Hong Kong—has risen sharply in the past few decades, to reach 29-30 for women and 31-33 for men.

A lot of Asians are not marrying later. They are not marrying at all. Almost a third of Japanese women in their early 30s are unmarried; probably half of those will always be. Over one-fifth of Taiwanese women in their late 30s are single; most will never marry. In some places, rates of non-marriage are especially striking: in Bangkok, 20% of 40-44-year old women are not married; in Tokyo, 21%; among university graduates of that age in Singapore, 27%. So far, the trend has not affected Asia's two giants, China and India. But it is likely to, as the economic factors that have driven it elsewhere in Asia sweep through those two countries as well; and its consequences will be exacerbated by the sex-selective abortion practised for a generation there. By 2050, there will be 60m more men of marriageable age than women in China and India.

High and Low Pressure Regimes

- (1) **High pressure demographic regimes**
- **Universal Marriage Pattern**
- -**fertility at its biological maximum**: in the late teens, early twenties
- -therefore **mortality is the governing factor**
- (2) **Low pressure demographic regimes**
- - **EMP**: mortality and fertility fairly low
- **But fertility the more dynamic factor**, with changes in both nuptiality and celibacy

EMP and Fertility

- **earlier marriages**, with more time for procreation, led to larger families, especially in eras of low life expectancies
- **Fertility**: is much, much higher in late teens, low 20s; and falls very sharply in the 30s
- -these findings are also borne out by recent Canadian studies:
- **From ages 20-24 to 35-39**, the live birth rate falls by 39.4% : from 409/1000 to 248/1000

Age Specific Marital Fertility Rates per 1,000 women-years lived and Total Marital Fertility Rates in England

Ages	1680-1729	1730-1779	1780-1829
15-19	315	430	532
20-24	410	418	429
25-29	366	364	390
30-34	315	314	312
35-39	240	254	255
40-44	111	134	148
45-49	22	22	23

Other Fertility Control Factors

- (1) **sterility and amenorrhea**: as discussed
- (2) **contraception**: evidently widely practised, especially *coitus interruptus (onanism)*
- (3) **sodomy** (aka: buggery: anal intercourse)
- (4) **condoms**: from the 16th century (sheepskin)
- **Illegitimacy?** - accounted for 10% of all first births, but only 1% - 4% of total births: most pre-marital pregnancies led to marriage

EMP and Mortality

- **EMP: lower birth rates better preserved the health** of both women and children
- i.e., smaller families better ensured higher living standards – or reduced malnutrition
- **The concept of the EMP is implicit in Malthus:**
- **as the primary form of the Prudential checks** that prevented 'Malthusian Crises' of overpopulation (and thus higher mortalities)
- **But when and where did the EMP begin??**