Population and Development

IV. The Economic Determinants of Fertility

Rural Transformation & Development

- Successful development has invariably involved the transformation of a predominantly agrarian economy into a more diversified but predominantly industrial/service economy

- That transformation brings with it a variety of inter-related changes (higher average productivity, urban lifestyles, intensive rather than extensive use of natural resources and (?) fundamental changes in household attitudes and sources of livelihoods).

- BUT (a) most of the world's poorest countries have FAILED to make that transition – see data from Tomich et al.and (b) we can readily calculate that the residual period needed to make it could be very long – see stylised

- SO – key differences in the parameters that determine growth including "n" are also at risk of persisting longer term

- HOWEVER – this does not mean that we cannot enact policies/interventions that may accelerate the processes involved.

Features of Un-Transformed Agriculture

- Very Low Productivity
- Ever-Present Risks to Harvests
- Few Savings or Other Reserves
- Systemic Environmental Damage/Dangers –Pressure on land gets even Worse (no real prospects of REDUCING Inputs)
- Much in Remote and Poorly Serviced Areas
- Slow growth of good Off-Farm Jobs to reduce pressure on Land
- Low Literacy and Poor Health Indicators
- Heavy Input of Time but with very poor Pay-Off
- PARTICULAR ISSUES REGARDING THE USE OF WOMEN'S TIME

(see Hard Copy Diagram Box 6.2 from WDR)

Parameters that Affect Speed of Transition

• Initial share of Agriculture in Total Labour Force and

Growth Rates of:

 –Total Labour Force (population)
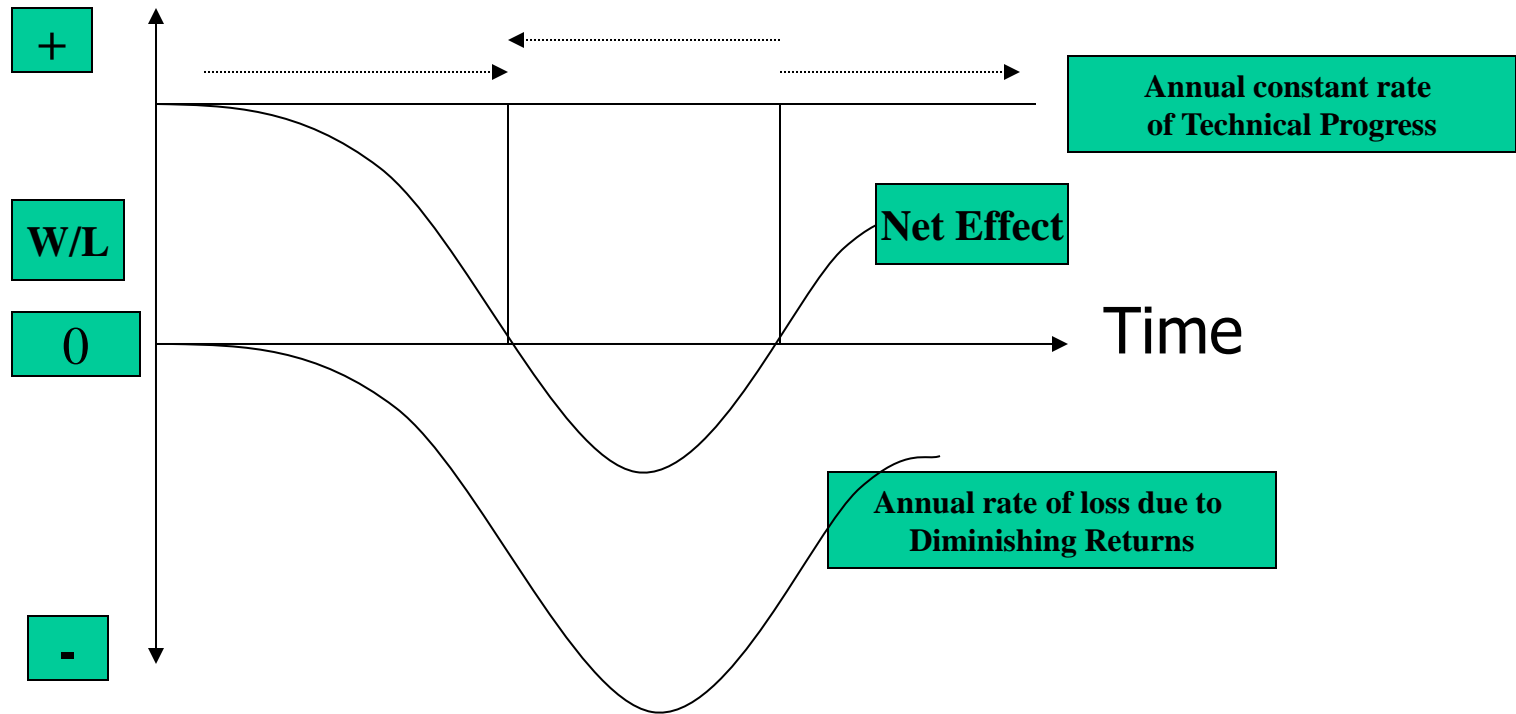
 –Non-Agricultural Employment

  Note that the Growth of the Agricultural labour Force is the Residual (for this purpose it includes other low productivity rural tasks

How Long for Agricultural transformation?

Initial La/Lt	gLn(%)	gLt(%)	gLn-gLt(%)	La/Lt at turning point(%)	Years to turning point
80	4	2	2	50	47
80	4	3	1	25	142
80	5	3	2	40	58
80	6	3	3	50	32
60	5	3	2	40	20

Development Economics
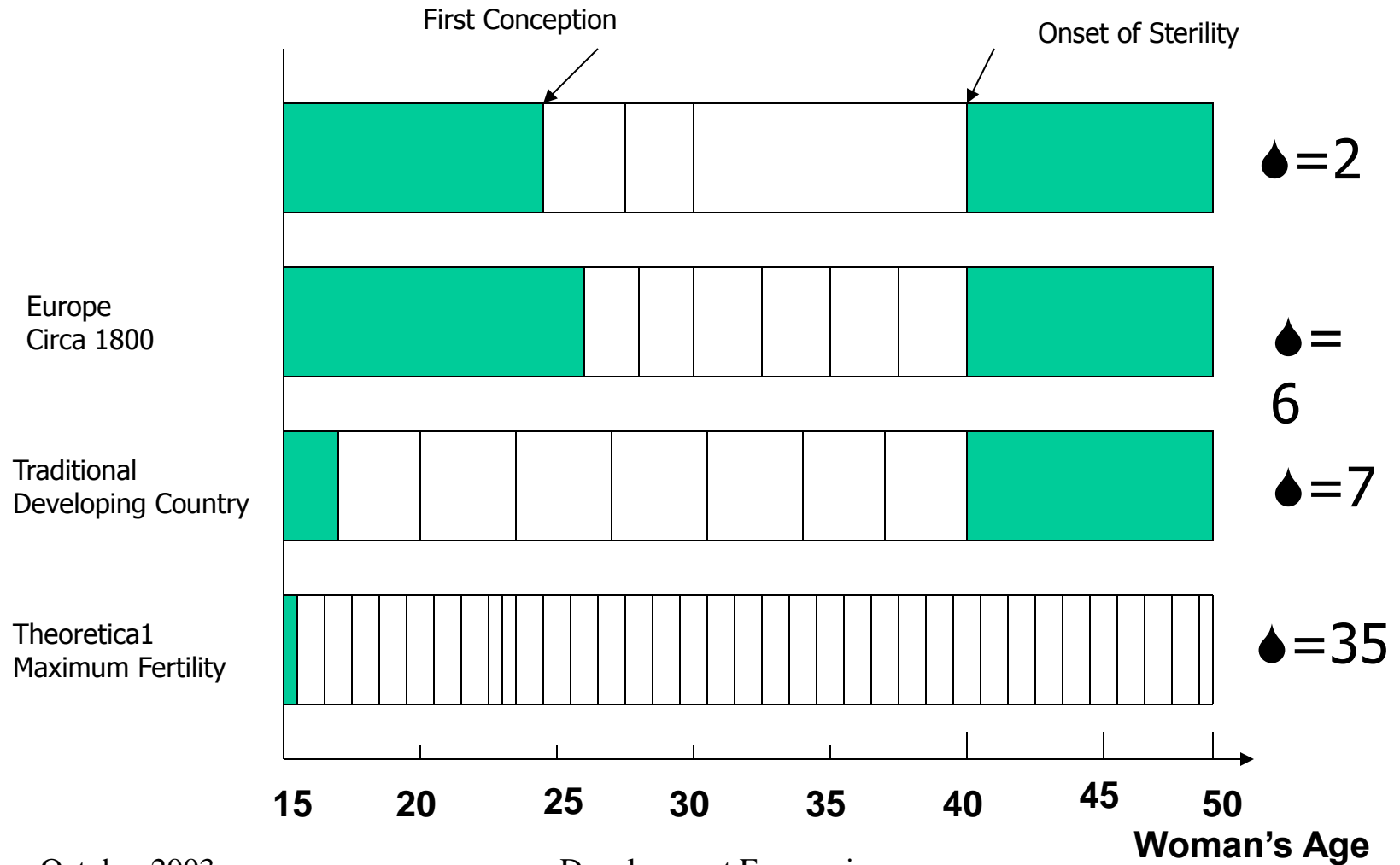Handout No. 2 (ARR)

The Payoffs to achieving the transition

Population endogeneity with respect to per capita income is complicated by considering
the declining returns to land against the gains from technical progress

+

W/L

0

-

Time

Annual constant rate
of Technical Progress

Net Effect

Annual rate of loss due to
Diminishing Returns

Population Choices in the Household

• In almost all modern cultures, FERTILITY rather than MORTALITY is the critical choice variable

• Variations BETWEEN low income agrarian societies (over both time and space) do indicate that Choices ARE Exercised

• Any ECONOMIC Model of this requires that:

– Children confer BENEFITS to Parents
– Children involve COST to Parents

• BUT the nature of the Benefits and Costs can vary between countries/societies (see Hard Copy Diagrams).
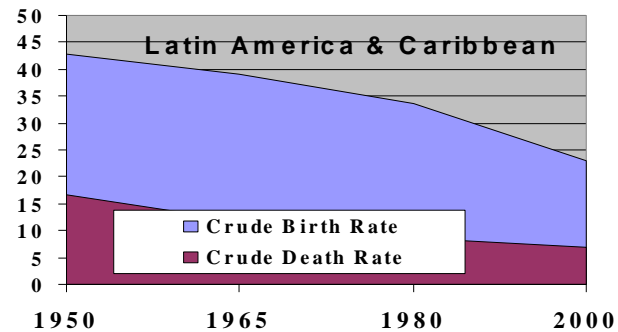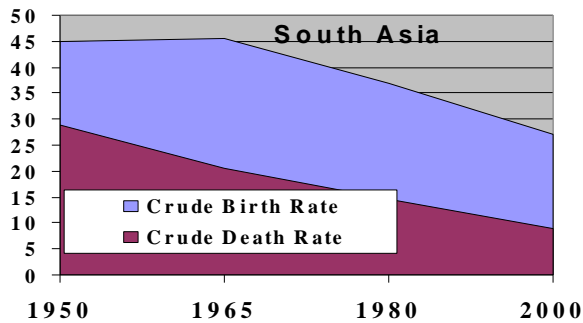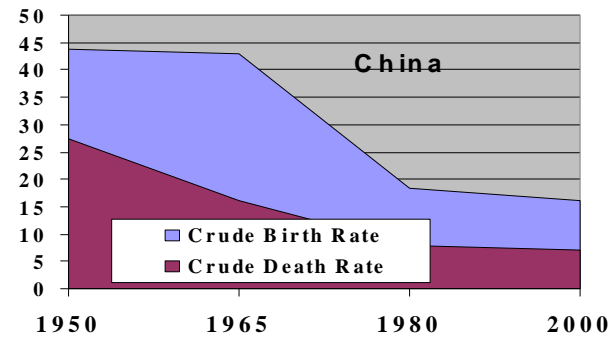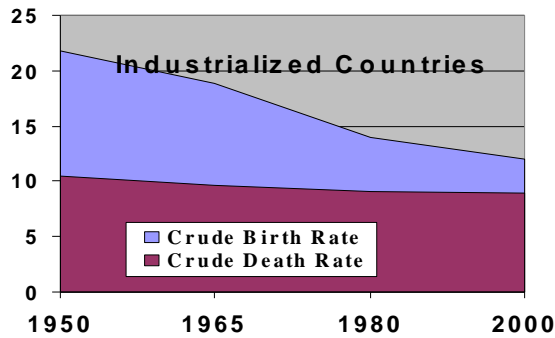
Choices in Fertility

First Conception

Onset of Sterility

♦=2

Europe
Circa 1800

♦=

6

Traditional
Developing Country

♦=7

Theoretica1
Maximum Fertility

♦=35

15　20　25　30　35　40　45　50

Woman's Age

Fertility Change variations 1950-2000

Basic Fertility Model

Other Goods Used
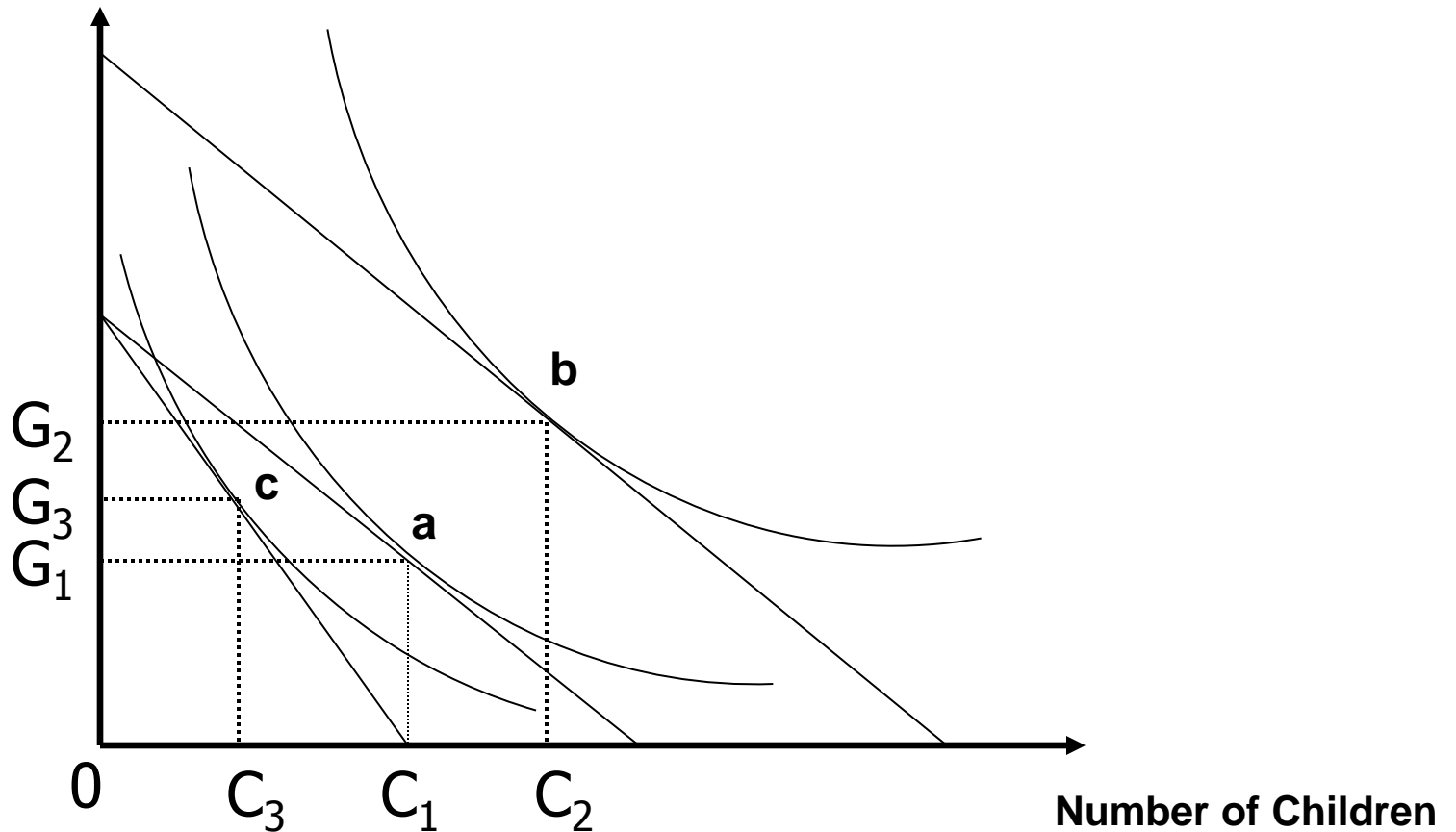
Number of Children

Model Recognising Female Income

Define: N = number of children

Q= human capital per child

C= volume of child services

S=other goods and services ("parental sevices")

FI = full income

T= total working time for family

w=market wage rate of mother

V= husband's life term earnings

p_c and p_s are the prices per unit of child services and other services respectively

p_{xc} is the price of purchased goods needed to produce one unit of child services

P_{xs} is the price of purchased goods needed to produce one unit of other services

bc and bs are the quantities of purchased goods need to produce   one unit of child and other services respectively

Continued

$$C = NQ \qquad [1]$$

$$U = U(C, S) \qquad [2]$$

$$FI = wT + V \qquad [3] \text{ and } EX = FI$$

$$EX = p_c C + p_s S \qquad [4]$$

$$p_c = p_{xc}.b_c + wt_c \qquad [5]$$

$$p_s = p_{xs} b_s + wt_s \qquad [6]$$

$$p_c C + p_s S = wT + V \qquad [7]$$

Continued

Budget Line intercepts axes at:

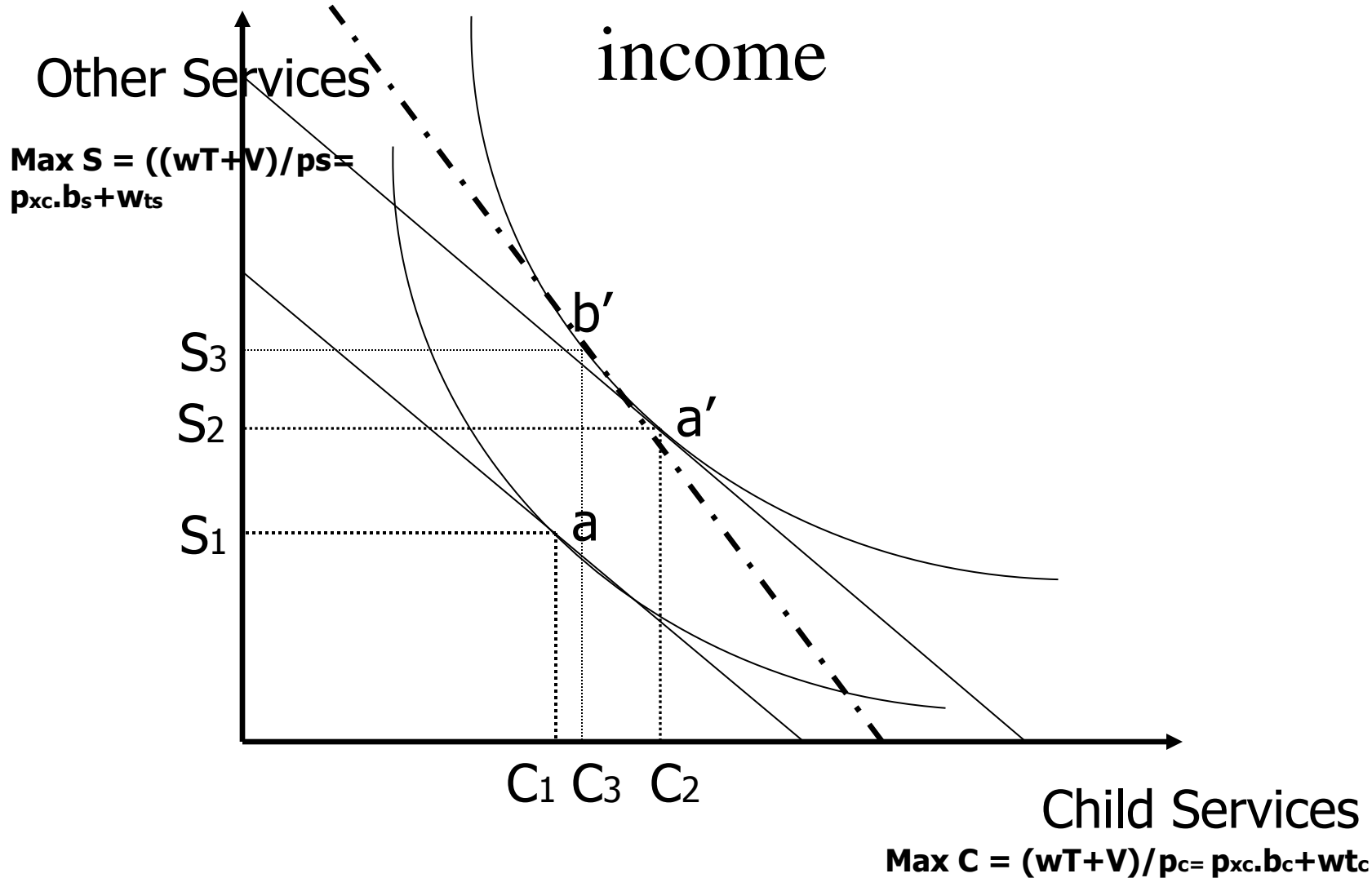Parental Services:

$$(wT + V)/p_s = wT + V/(p_{xs}.b_s + w_{ts})$$

Child Services:

$$(wT + V)/p_c = wT + V/(p_{xc}b_c + w_{tc})$$

Note – it is likely that

$$w_{tc}/p_c > w_{ts}/p_s$$

A Rise in (a) General and (b) Female income

Other Services

Max S = ((wT+V)/ps= $p_{xc}.b_s + w_{ts}$

S_3

S_2

S_1

b′

a′

a

C_1 C_3 C_2

Child Services

Max C = (wT+V)/p_c= $p_{xc}.b_c + w_{tc}$

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Effects of Income on Child Numbers

Nc = sc.Nxc+(1-sc) Nt

where

Nxc = income elasticity of demand for purchased goods and services used in child care

Nt = income elasticity of time inputed into child care

Nc = income elasticity of demand for child services

Sc = fraction of total expenditures on child services due to money (rather than time) outlays

USA budget studies indicate that Nxc≅0.46; Nt≳0; sc≳0.93

Substituting we have:

Nc=0.93(0.46)+(1-0.93)0 = 0.43

Conclusion: Child SERVICES are Normal Goods (as you might expect)

Continued

$Nc = Nn + Nq$

where

Nn = income elasticity of demand for NUMBER of children

Nq = income elasticity of demand for human capital per child

Holding pc and ps constant, studies show Nn= typically very low or negative (e.g. USA studies Nn= negative to +0.22

$Nq = Nc - Nn$

Substituting earlier numbers gives

$Nq = 0.43 - 0.22 = 0.19$

The Demand for Human Capital per Child rises with Income

In Developing Countries Nn=probably lower that 0.22 and even negative. So we would expect Nq to be positive and higher than 0.19

When Infant mortality is High

Effect 1: Expected Utility from SOME Children(Births) = Zero. So a Higher Gross Birth Rate is needed to Compensate

Effect 2: The COSTS (emotional, monetary, time) of dying children yields Zero Benefits and so is spread over the children that do Survive. Hence Cost of Surviving Children is Increased

Final Point

•Theoretical approaches in the style of Becker are only useful if we can translate the circumstances facing poor families into the language of Cost and Benefit

•Many of the specifics can be translated

Examples:

– improved earning opportunities for women will raise costs of children and would be expected to LOWER fertility

– The provision of a reliable state pension would reduce the benefit of children for risk mitigation purposes

Population and Development

V. Policies for Population

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Influences on Fertility Decisions are Multi-facetted

They include:

- Family Decisions –can they be amended?

- Socio-Economic & Cultural Environment

- Government Policies
  - Direct interventions – e.g. China's one child policy
  - Laws – Women's Status etc
  - Public Spending – e.g. Social Security and Education
  - Tax Policies e.g Child Allowances

Family Decisions

These include:

- Timing of Marriage
- Number of Children (Contraception. Abortion)
- Education of Children (trade off withy benefits of children)
- Savings and Consumption (alternative risk management strategies
- Work-Leisure Decision

Socio-Economic and Cultural Environment

- Educational Expectations and Opportunities

- Women's Status

- Financial and Labour Markets

- Family Structures/Social Norms

- Land-Holding Structures – Communal or Individual

Government Policies -Partly a Response to Market Failures

Examples:

- Information (e.g. people failing to internalise the facts of lower death rates)

- Risk Aversion and Old Age Provision (excessive numbers of Children to ensure the desired final number)

- Externalities
  - Under-priced provision of Education
  - Inadequate Pricing of Environmental Degradaation

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Government Policies

Expenditures:
- – Education –Free? Available?
- – Primary Health Care Free? Available?
- – Family Planning Services
- – Incentives for Family Planning (incl Prescriptive)
- – Old Age Security Provision –Reliable?

Taxes
- – Family Allowances
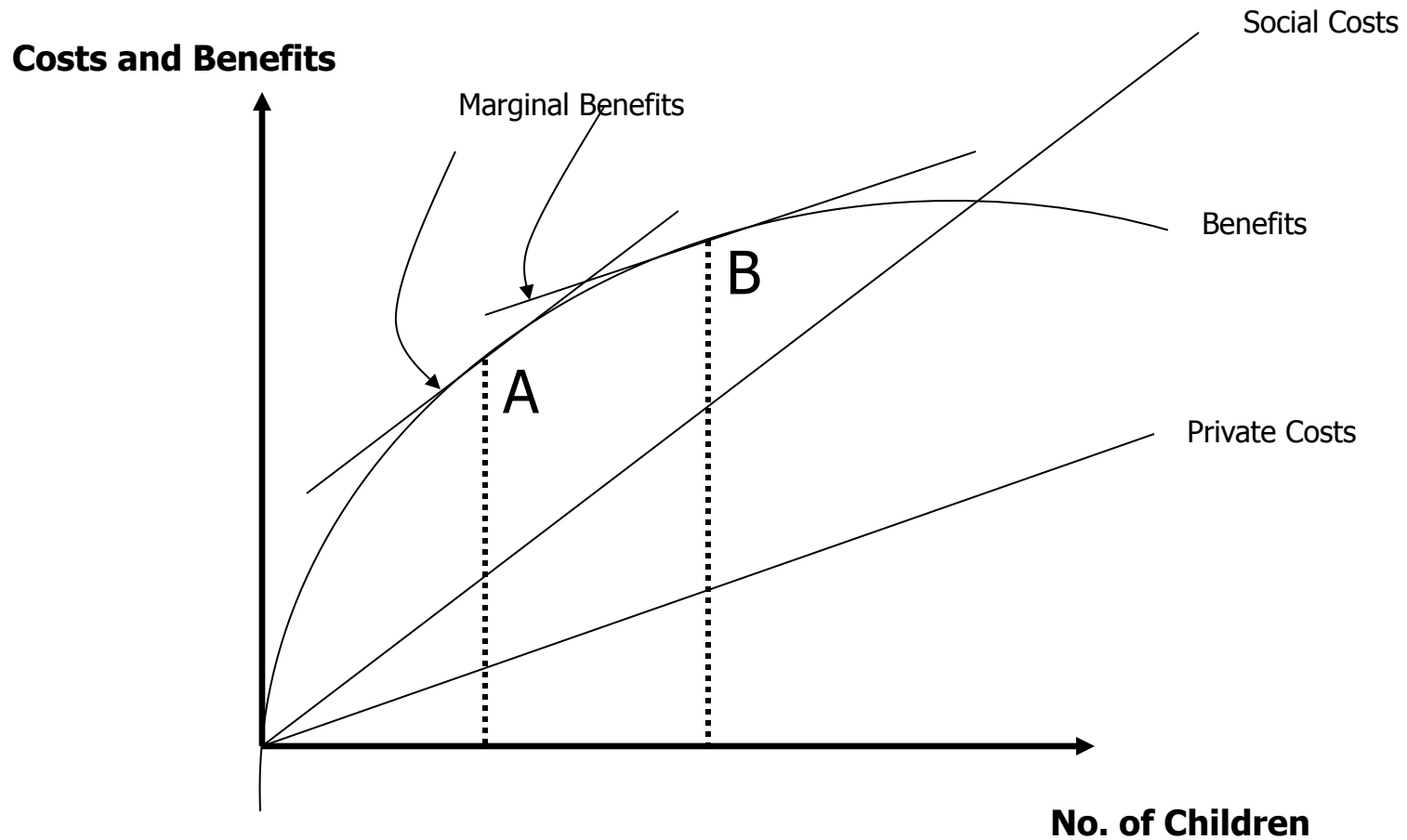- – Tax Breaks for Social Provision

Laws

Children's Work/Conditions

Women's Status

Womens' Employment Laws

Externalities and Fertility

Development Economics
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Private ∨ Social Divergencies

- extended family in close proximity (= intra-family externality and lower costs)

- children as entry tickets in the "good jobs" lottery (= a raising of the private benefits of the marginal child)

- Inadequately priced (communal) resources (= a lowering of private costs relative to social costs)