Macro II/Aussenwirtschaft
Lecture Slides No 5

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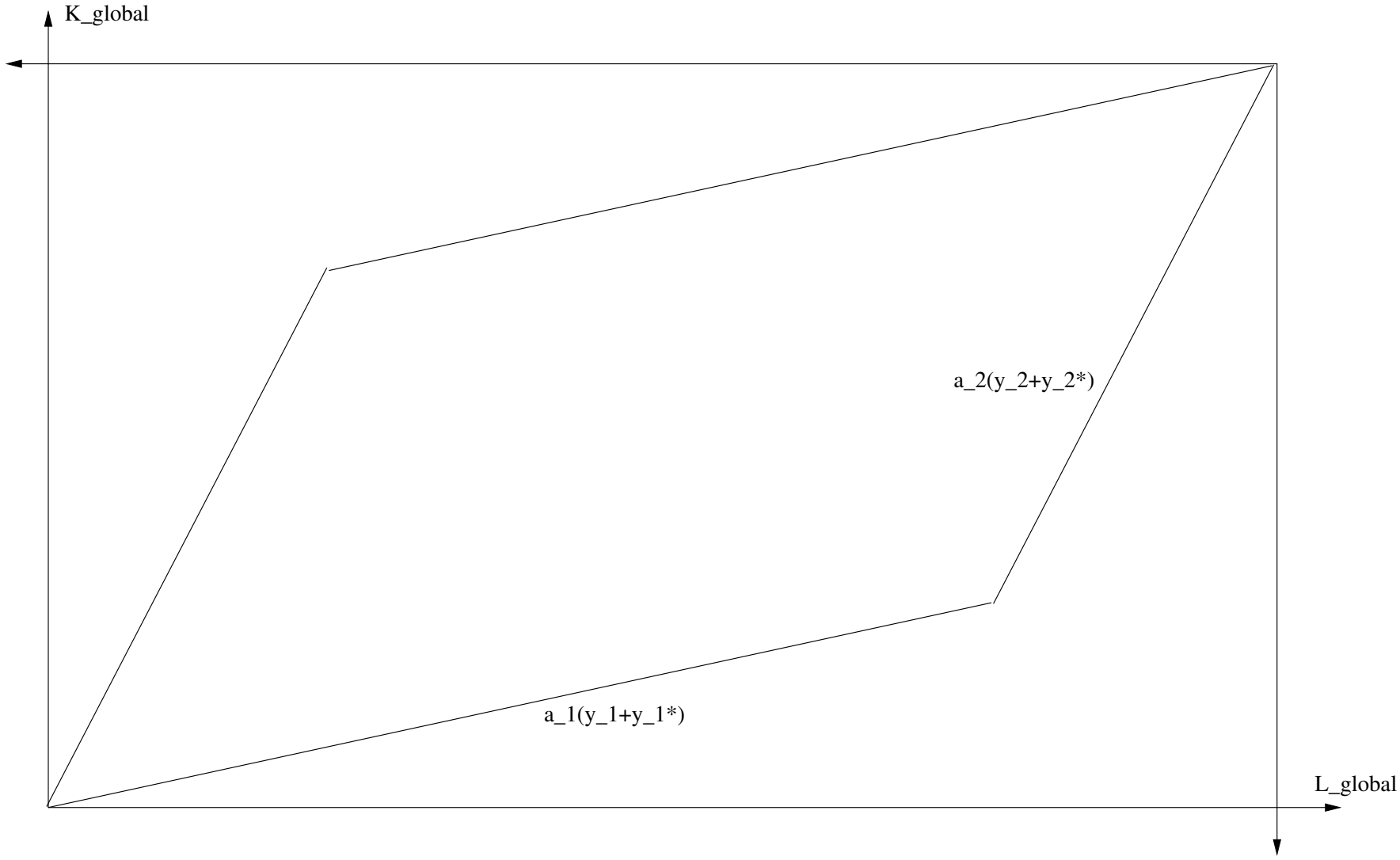
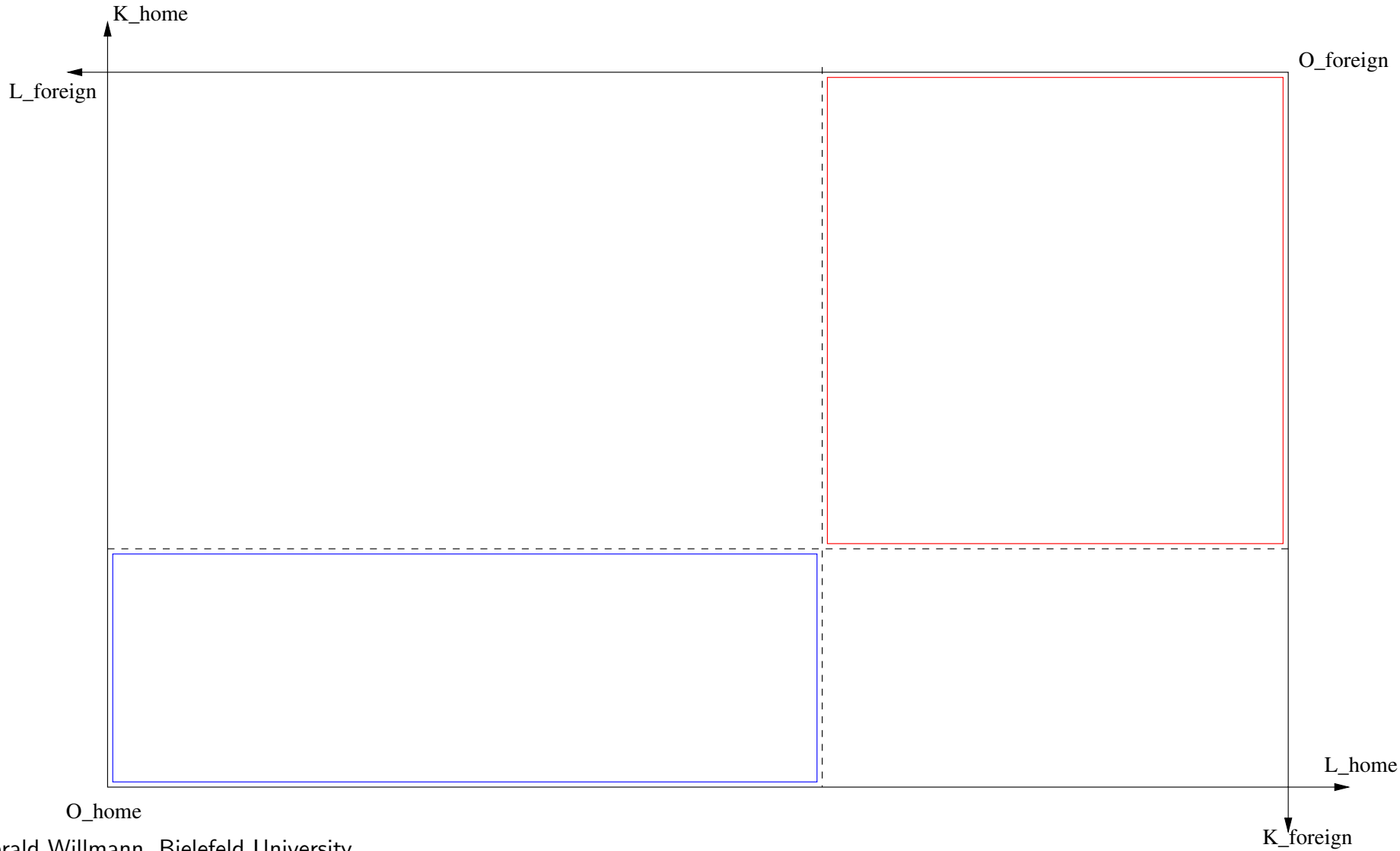
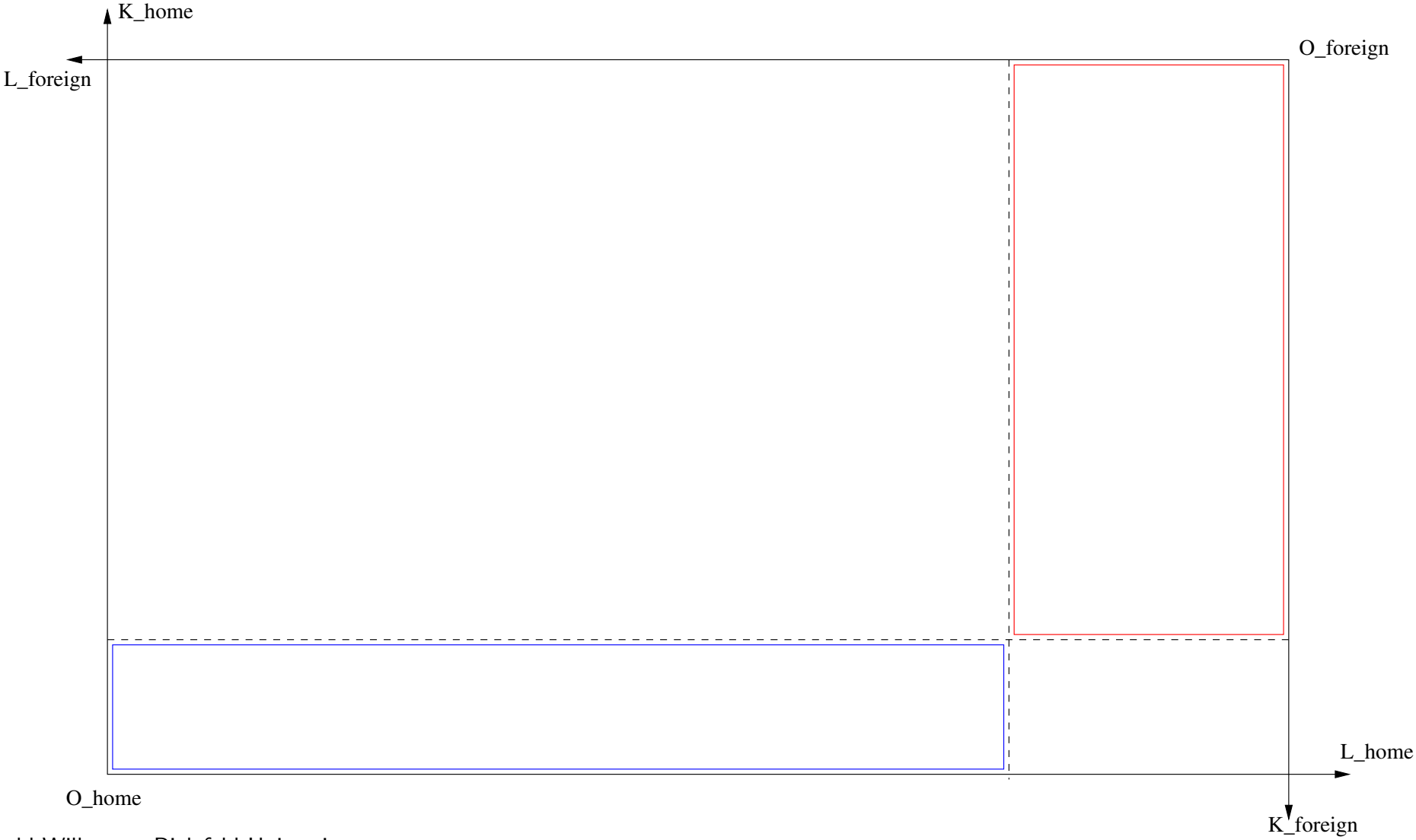
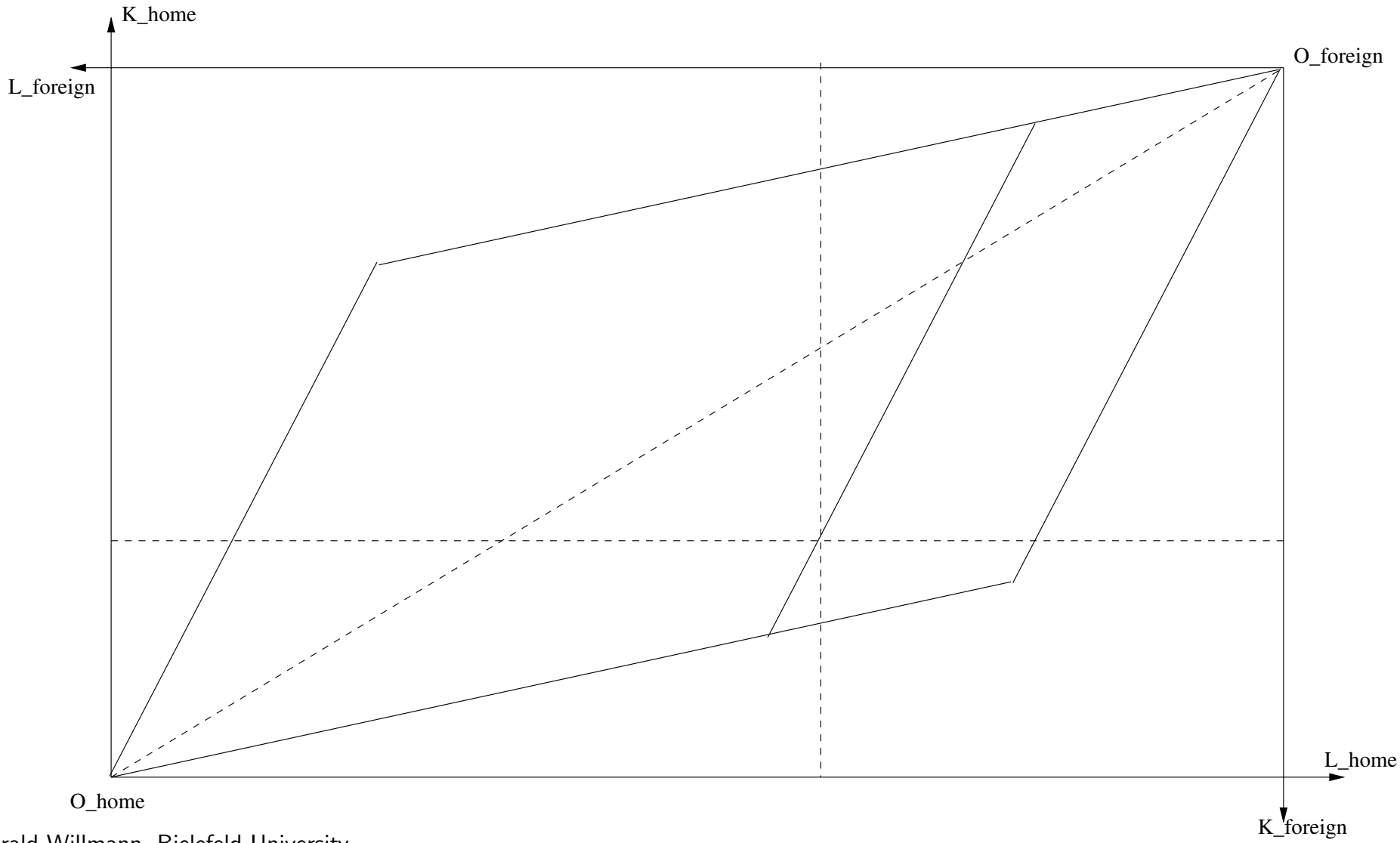
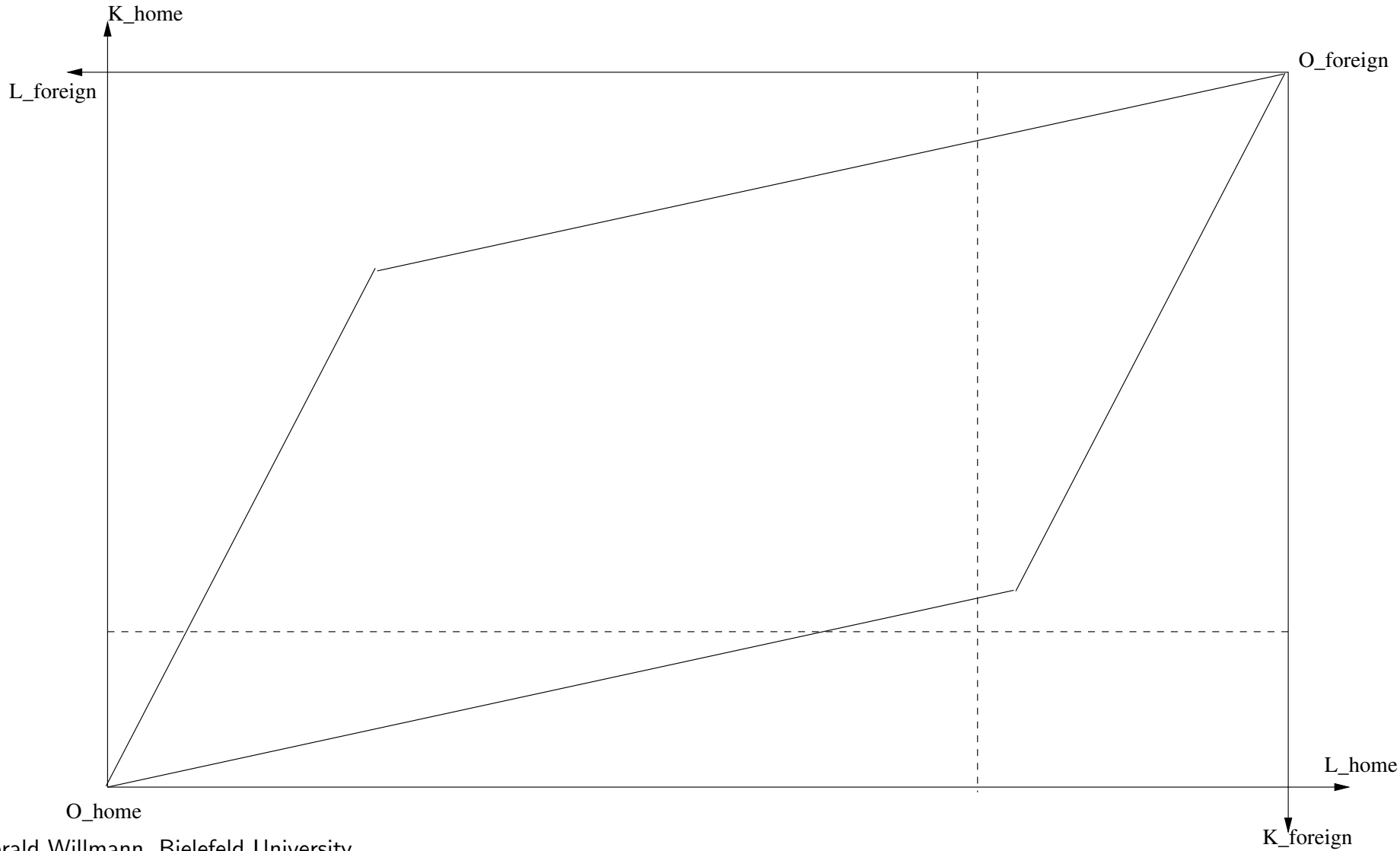










Heckscher–Ohlin–Vanek

- many countries: $i = 1...C$
- many sectors: $j = 1...N$
- many factors: $l = 1...M$
- matrix of unit input coefficients: A, format $(M \times N)$
- e.g. $\begin{pmatrix} a_{1L} & a_{2L} \\ a_{1K} & a_{2K} \end{pmatrix}$, or larger
- note, same for all countries, no country superscript

$$
\begin{aligned}
T^i &= Y^i - D^i \\
F^i &= \begin{pmatrix} F_l^i \\ F_k^i \end{pmatrix} = AT^i \\
&= A(Y^i - D^i) \\
&= V^i - s^i A D^w \\
&= V^i - s^i A Y^w = V^i - s^i V^w
\end{aligned}
$$

County exports abundant factors (contained in export of products)
and imports where it has below average endowment

Empirical Test by Leontief

- known for his input-output matrices
- looked at K/L ratio of US imports/exports
- assumed that US is capital abundant
- hence should export capital intensive and import labor intensive
- used US input-output matrix, also for imports
- and obtained a so-called paradox
- US exports labor intensive, imports capital intensive

Table 2.1: Leontief's (1953) Test

	Exports	**Imports**
Capital ($ million)	$2.5	$3.1
Labor (person-years)	182	170
Capital/Labor ($/person)	$13,700	$18,200

Note: Each column shows the amount of capital or labor needed per $1 million worth of exports or imports into the United States, for 1947.

Possible explanations for paradox

- technology not the same for all countries
- missing factors, e.g. land and human capital
- distinguish unskilled and skilled labor
- situation right after war might be unusual
- not really free trade, especially no trade balance
- despite attempts to remedy, paradox persists
- or at best weakens, not reversed

Newer tests following BLS

- Bowen, Leamer, Sveikauskas (AER 1987)
- use HOV as basis for test
- sign test: $\operatorname{sign} F^i = \operatorname{sign}(V^i - s^i V^w)$
- note that flipping a coin gives 50%
- rank test: $\operatorname{sign} F^i > \operatorname{sign} F^j$ iff $\operatorname{sign}(V^i - s^i V^w) > \operatorname{sign}(V^j - s^j V^w)$
- results somewhat more encouraging

Table 2.5: Results from the HOV model

		SIGN HOV		RANK HOV		ESTIMATES	
Country	GDP per-capita	F	F^{δ}	F	F^{δ}	δ^{i}	t-stat
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bangladesh	0.04	0.33	0.78	0.75	0.78	0.03	47.71
Pakistan	0.08	0.33	0.67	0.72	0.78	0.09	32.10
Indonesia	0.11	0.22	0.67	0.67	0.67	0.10	39.51
Sri Lanka	0.12	0.22	0.56	0.42	0.67	0.09	14.85
Thailand	0.16	0.22	0.67	0.69	0.72	0.17	23.80
Colombia	0.21	0.33	0.89	0.81	0.86	0.16	18.41
Panama	0.23	0.33	0.78	0.56	0.78	0.28	3.24
Yugoslavia	0.30	0.56	0.67	0.44	0.61	0.29	11.35
Portugal	0.30	0.22	0.78	0.53	0.58	0.14	9.63
Uruguay	0.31	1.00	0.11	0.72	0.53	0.11	19.46
Greece	0.35	0.11	0.56	0.47	0.75	0.45	4.63
Ireland	0.39	0.67	0.44	0.53	0.39	0.55	2.91
Spain	0.41	0.22	0.78	0.39	0.69	0.42	9.40
Israel	0.60	0.67	0.89	0.39	0.69	0.49	2.91
Hong Kong	0.61	0.67	0.89	0.83	0.72	0.40	4.12
New Zealand	0.62	0.44	0.22	0.53	0.61	0.38	7.89
Austria	0.65	0.56	0.67	0.53	0.47	0.60	3.03
Singapore	0.66	0.56	1.00	0.61	0.61	0.48	2.11
Italy	0.66	0.67	0.33	0.78	0.67	0.60	7.16

U.K.	0.66	0.67	0.78	0.58	0.64	0.58	8.04
Japan	0.66	0.78	0.67	0.78	0.78	0.70	7.15
Belgium	0.67	0.67	0.78	0.61	0.53	0.65	2.73
Trinidad	0.69	0.67	1.00	0.50	0.53	0.47	1.25
Netherlands	0.69	0.44	0.44	0.53	0.47	0.72	2.66
Finland	0.70	0.33	0.44	0.47	0.50	0.65	2.17
Denmark	0.72	0.44	0.44	0.53	0.42	0.73	1.92
West Germany	0.73	0.56	0.67	0.81	0.78	0.78	3.80
France	0.73	0.33	0.33	0.08	0.22	0.74	4.84
Sweden	0.75	0.44	0.44	0.67	0.36	0.57	4.09
Norway	0.82	0.44	0.44	0.61	0.78	0.69	1.80
Switzerland	0.91	0.89	0.89	0.56	0.47	0.79	1.41
Canada	0.95	0.56	0.22	0.89	0.56	0.55	9.82
U.S.A.	1.00	0.89	0.56	0.92	0.72	1.00	
All Countries		0.50	0.62	0.60	0.62		

Notes: Columns (1) is per-capita GDP relative to U.S. per-capita GDP. Columns (2) and (4) report the results of the sign and rank tests, assuming that all countries have the U.S. technology. Columns (3) and (5) report the results of the sign and rank tests, allowing for uniform technological differences δ^i across countries. Column (6) reports the estimates of δ^i and column (7) their asymptotic t-statistic for the null hypothesis $\delta^i = 1$.

Source: Trefler (1995) and empirical exercise 2.1 and 2.2.

Follow-up to BLS

- Davis/Weinstein allow technology difference
- uniform efficiency difference between countries
- also account for non-homothetic demand
- Treffler considers individual A matrices
- so many parameters, you perfectly fit the data
- then compare to real factor price differences

Further tests/empirics

- Deardorff 1984 proposes to test
- $(p^{i,a} - p)'T^i \leq 0$
- not as ambitious as HO
- nice test by Bernhofen/Brown
- using Japanese data around 1850
- confirm this weaker hypothesis

Further pts: # of goods vs. factors

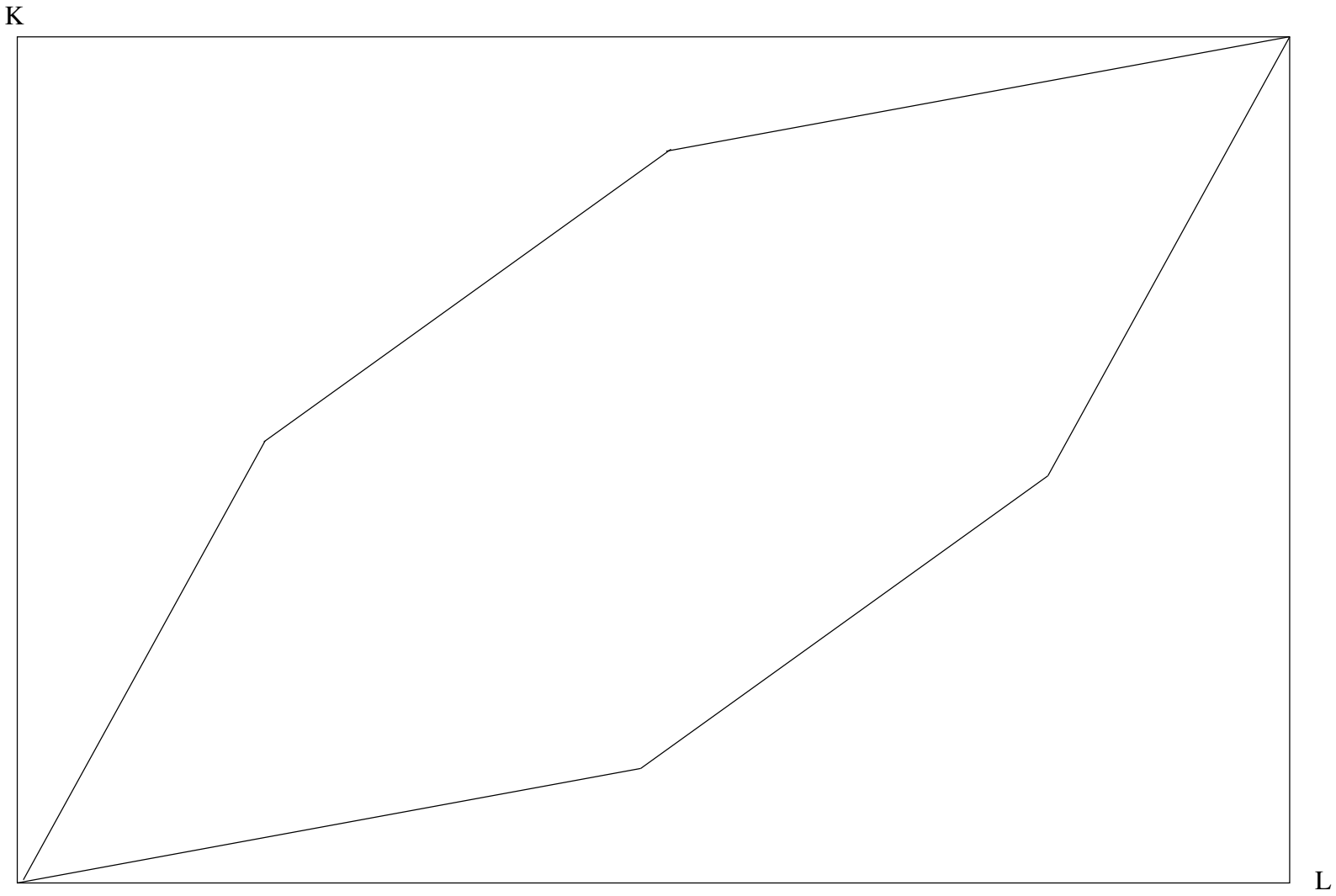
- there are three cases:

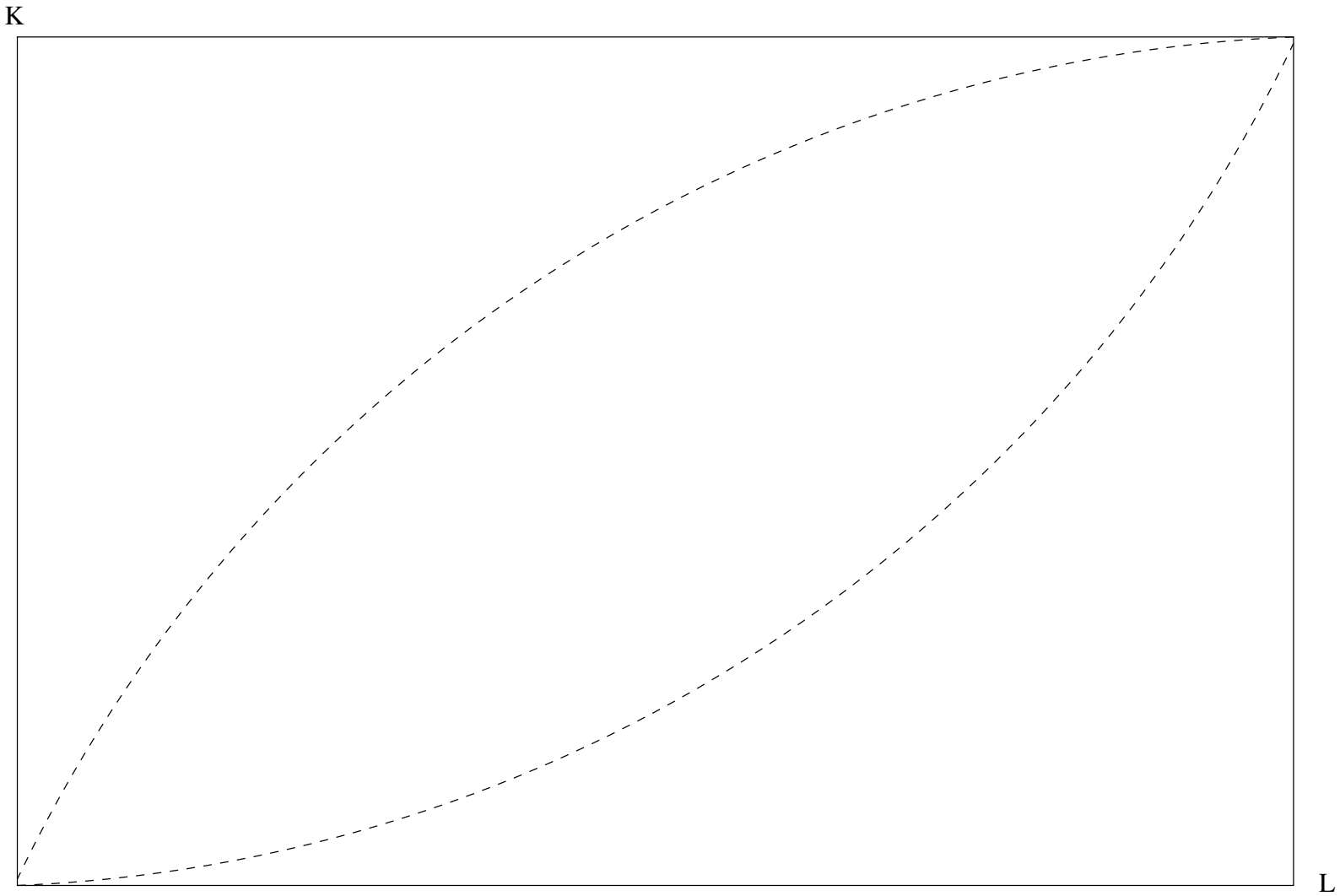
  1. # factors = # goods
  2. # factors ¡ # goods
  3. # factors ¿ # goods

- note that using zero profit conditions to determine factor prices only works in the first case

- 2nd case: Ricardo, HO with continuous goods

- 3rd case: Specific factors model





Specific factors model

- 1 specific factor per sector
- 1 mobile factors
- hence $n + 1 > n$
- short run interpretation (by contrast to HO)
- setup: $L_1 + L_2 \leq L$
- $w = p_1 f_{1L}(L_1, K_1) = p_2 f_{2L}(L_2, K_2)$