

Figure 1: A Hierarchical flow graph with successively less direct flow between more distant points

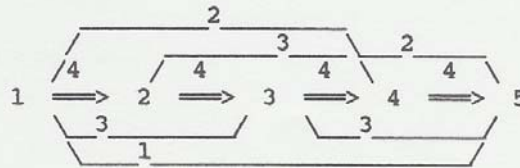
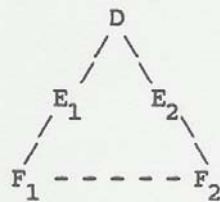


Figure 2: Karen Cook's Exchange Network



Power:  $E > D = F$

Figure 3: High Betweenness Centrality for Imports

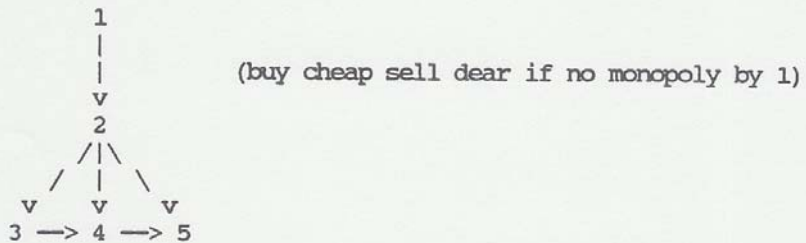


Figure 4: High Betweenness Centrality for Exports

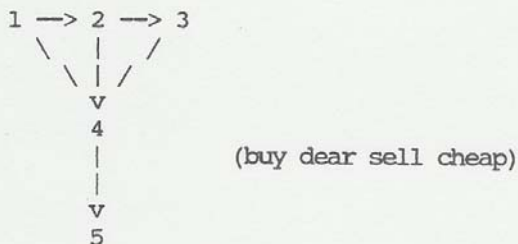


Figure 5: High Closeness Centrality relative to Imports

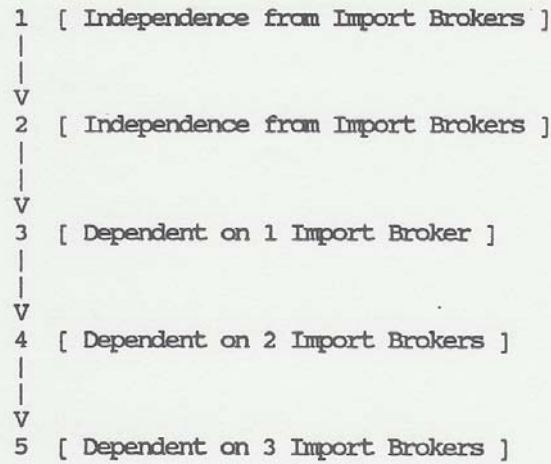


Figure 6: High Closeness Centrality relative to Exports

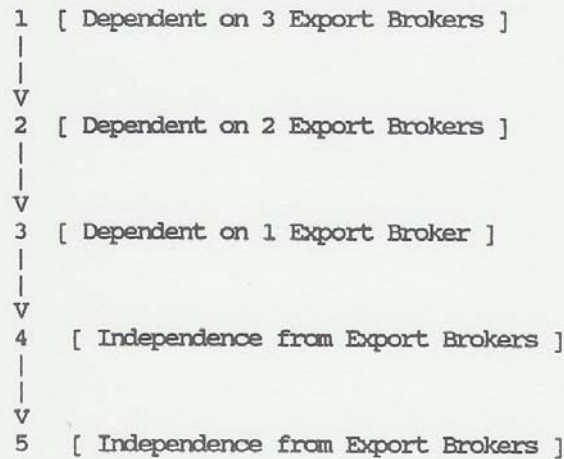


Figure 6a: Association among Measures for the World Trade Dataset

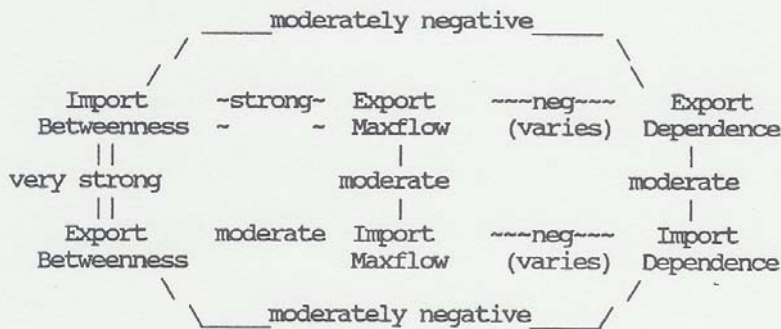


FIGURE 7: Industrial Machinery 1965

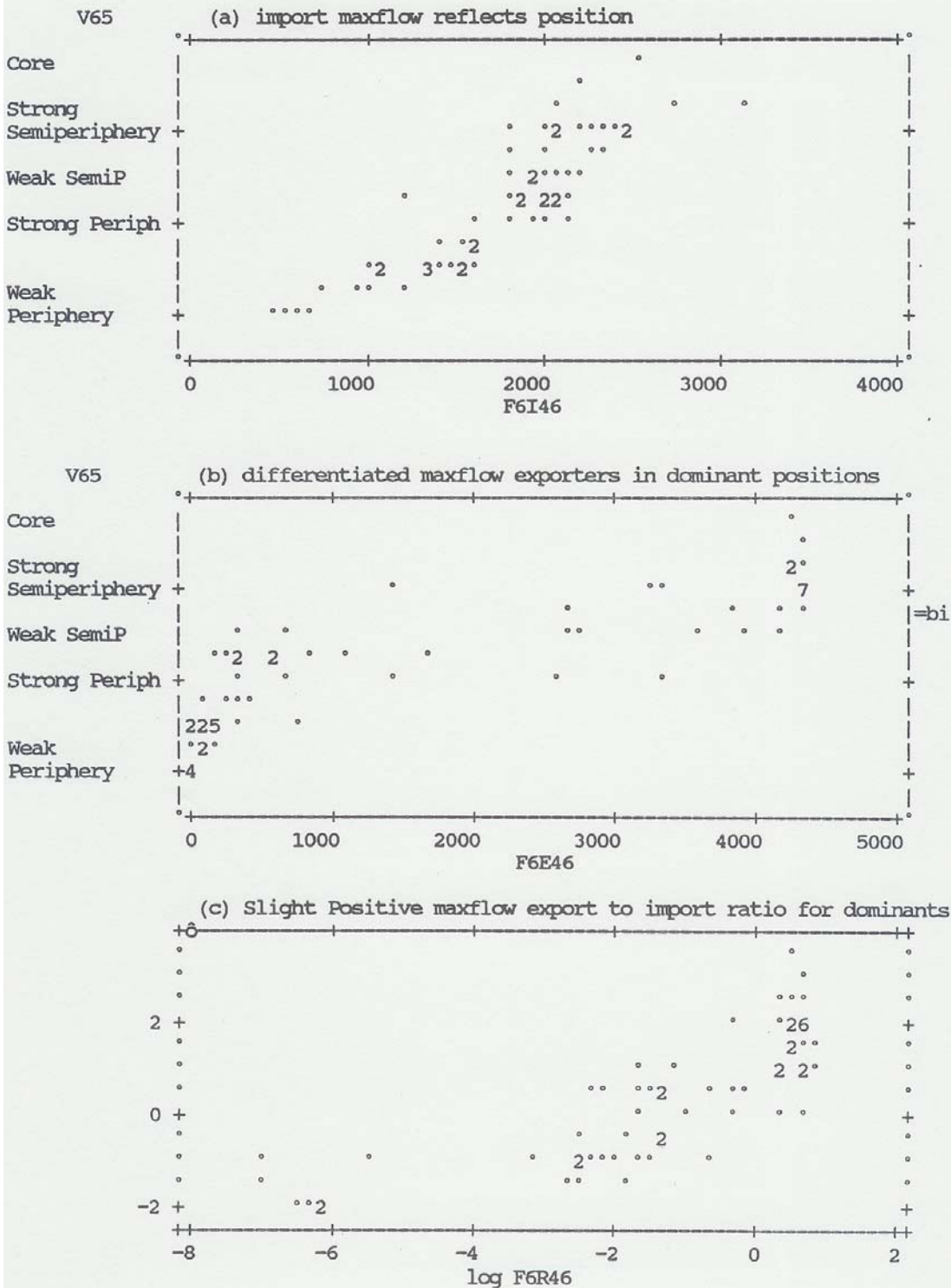


FIGURE 8: Industrial Machinery 1970

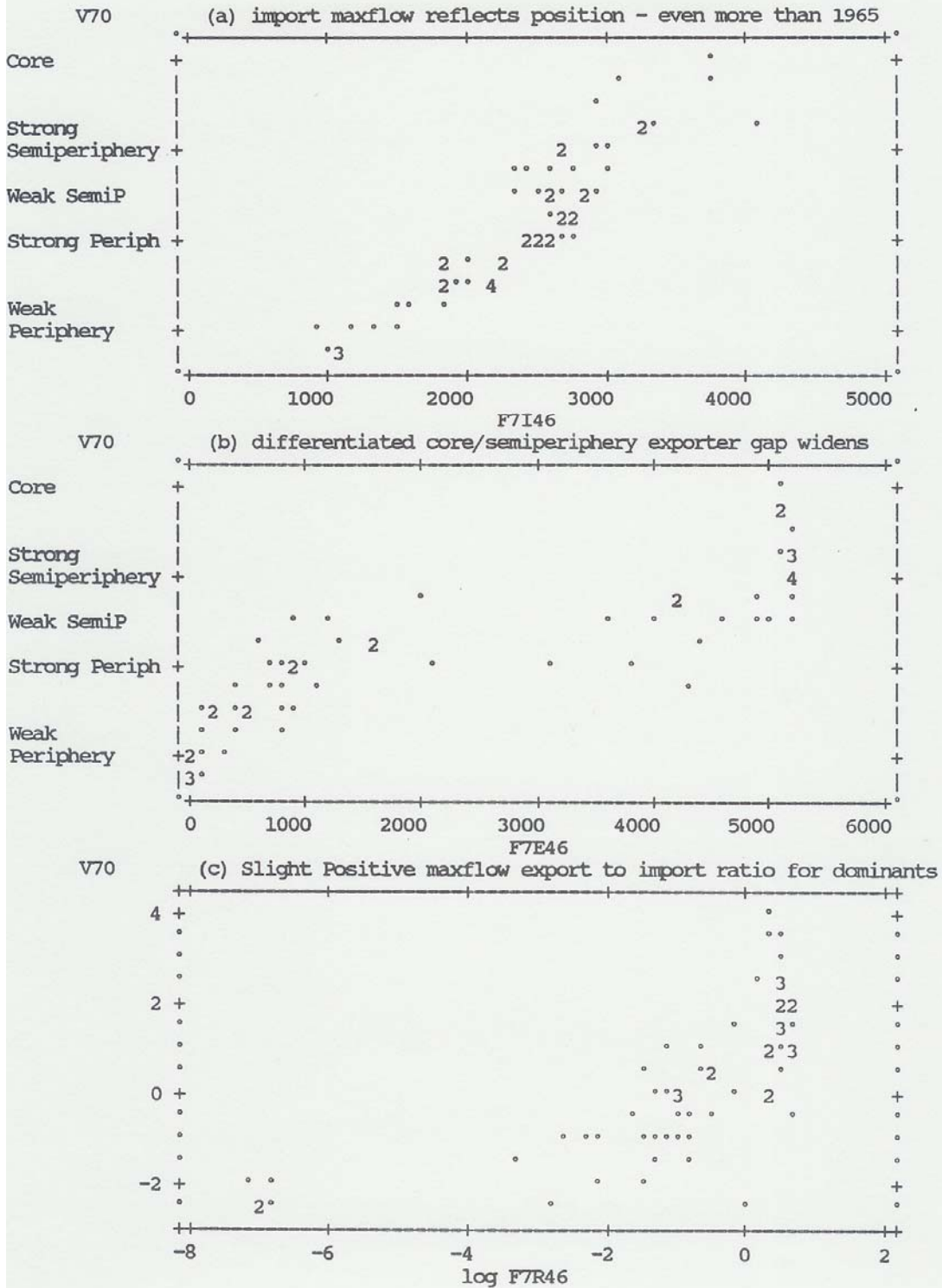


FIGURE 9: Clothing and Apparel 1965

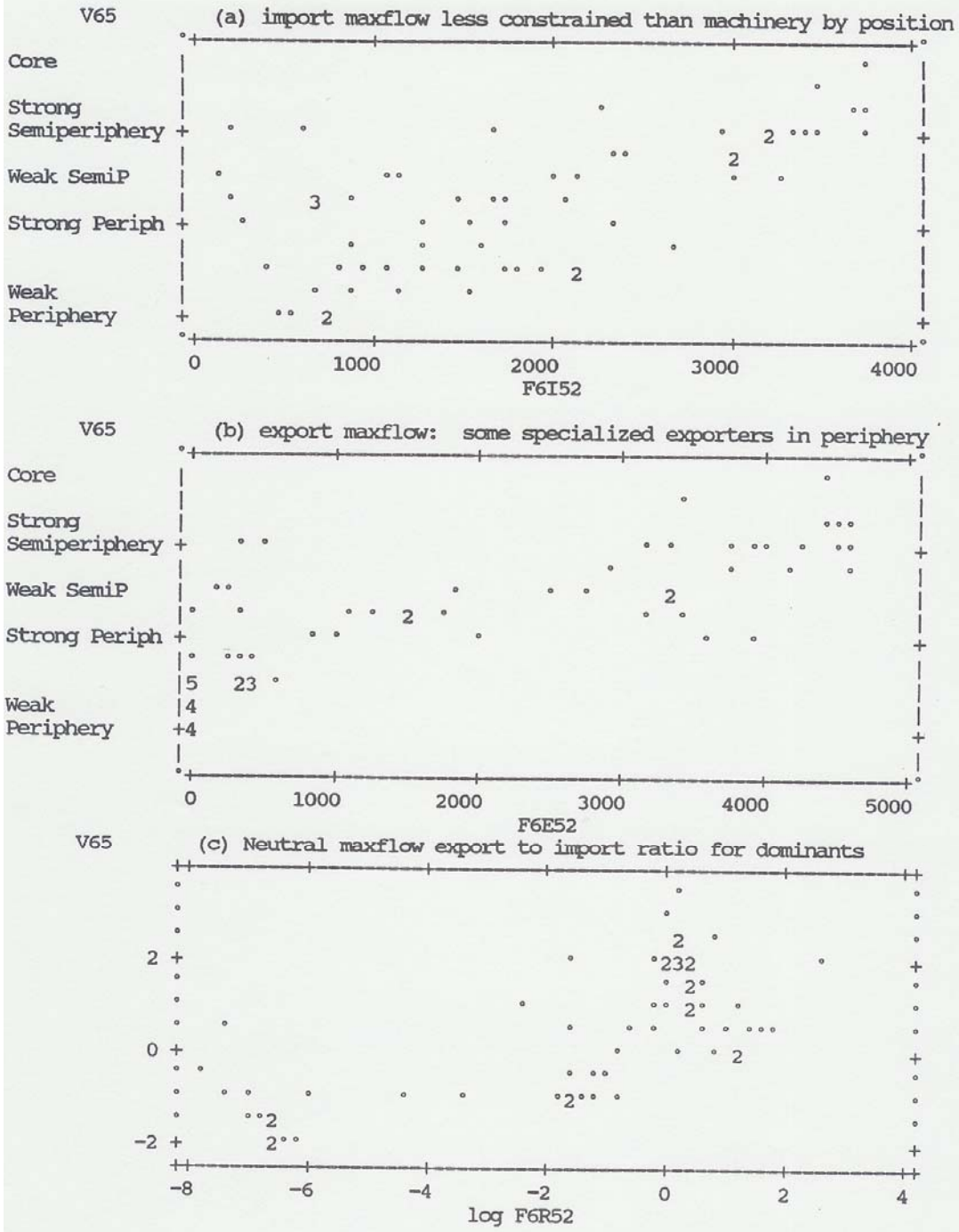






FIGURE 12: Industrial Machinery 1970

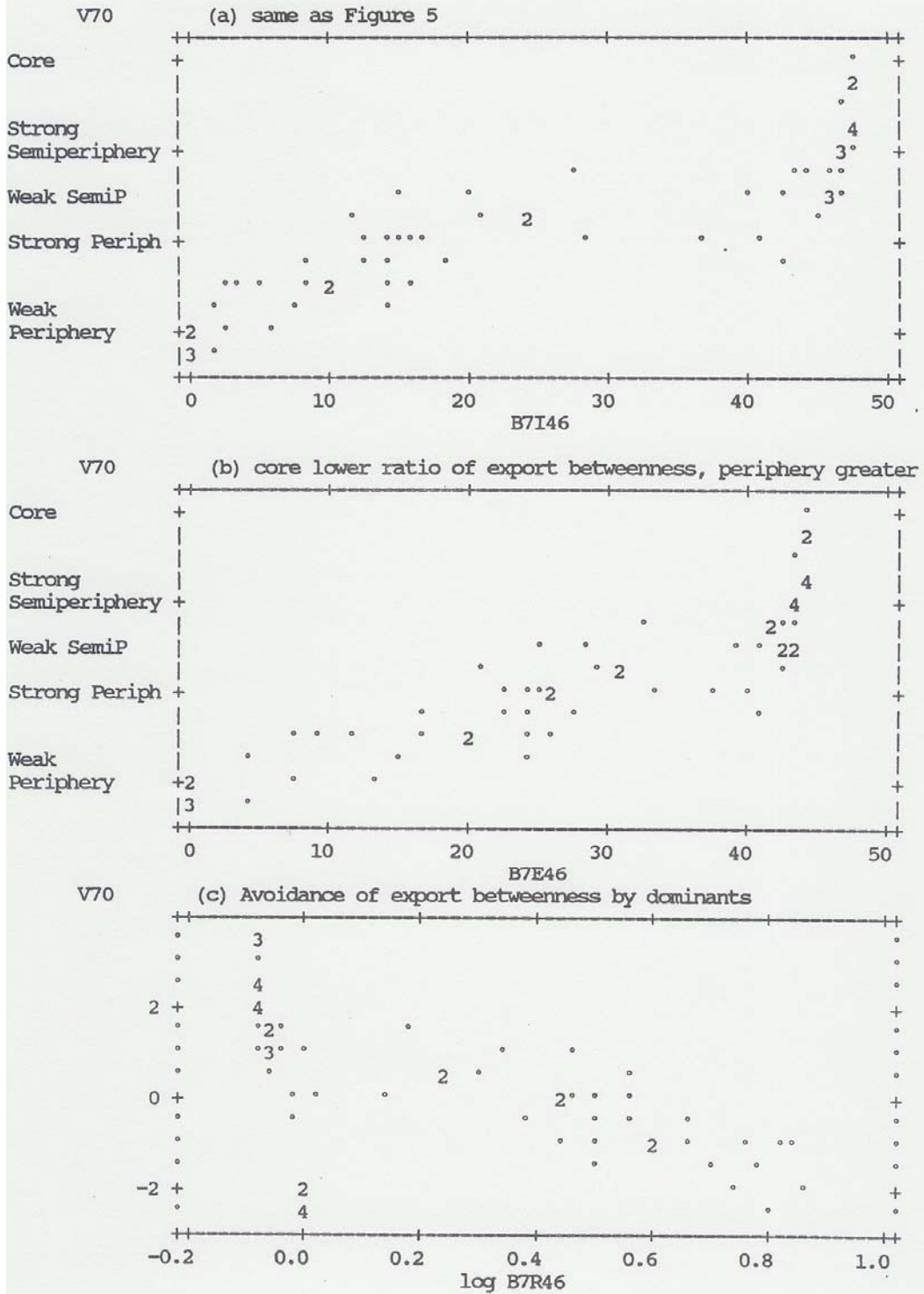


FIGURE 13: Clothing and Apparel 1965

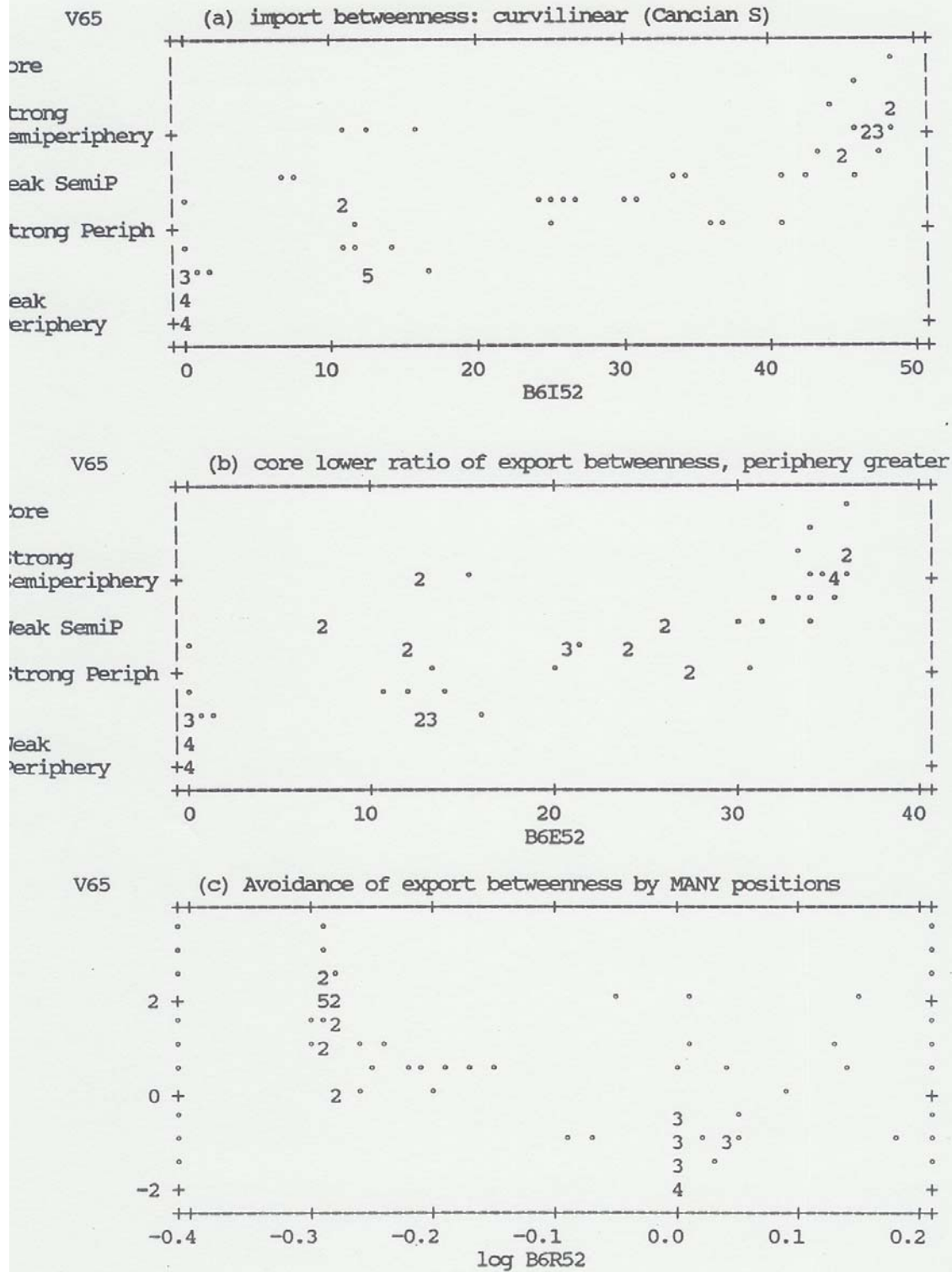
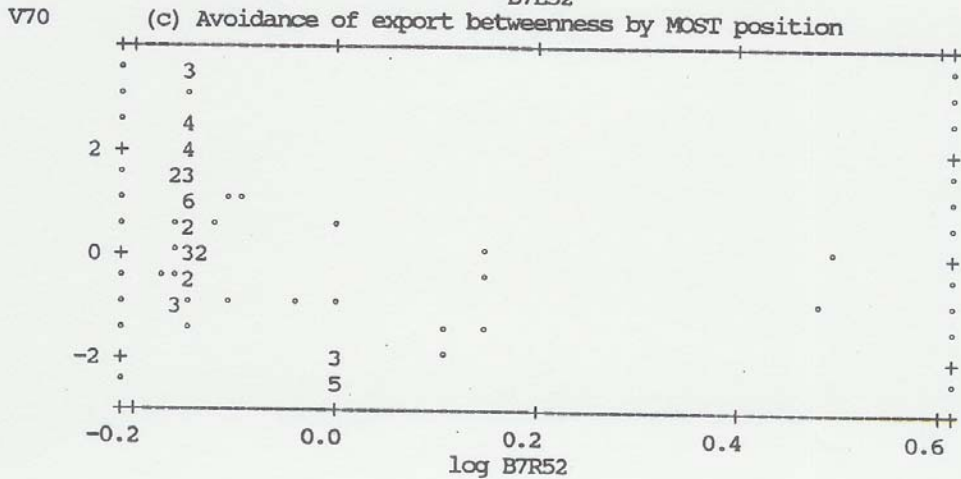
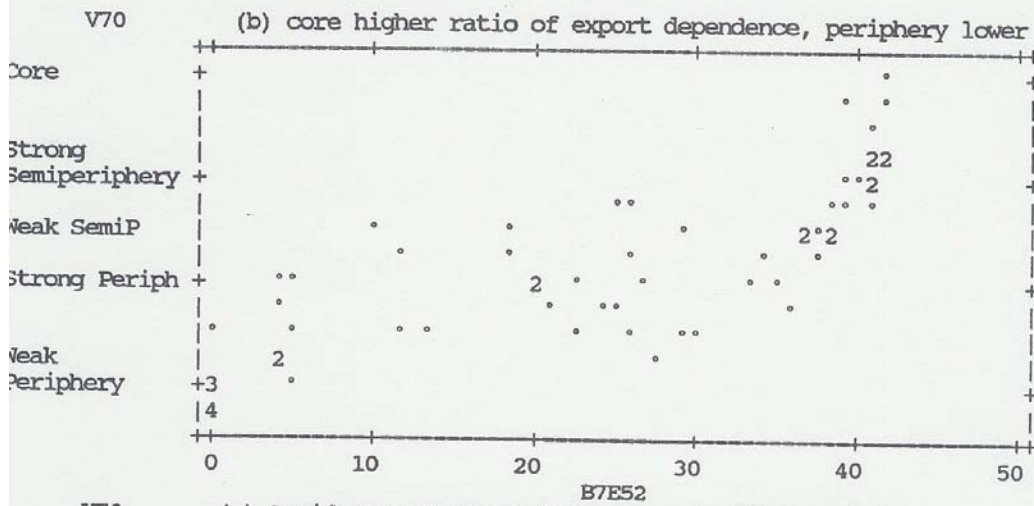
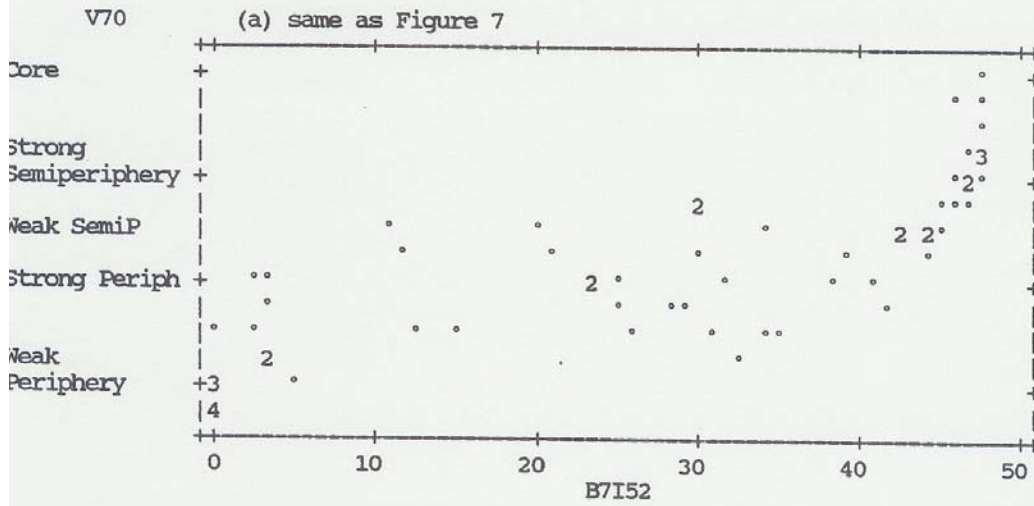
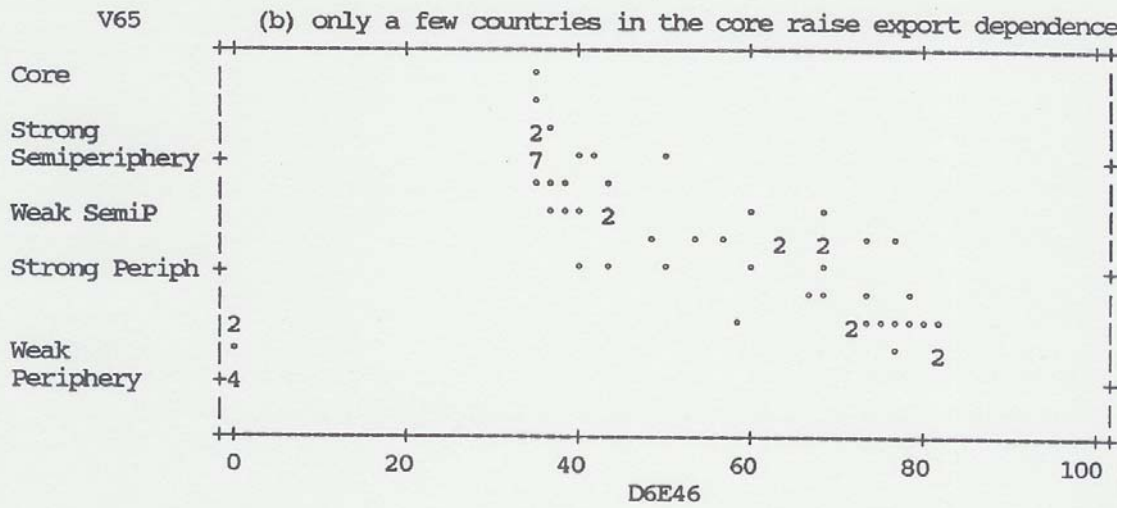
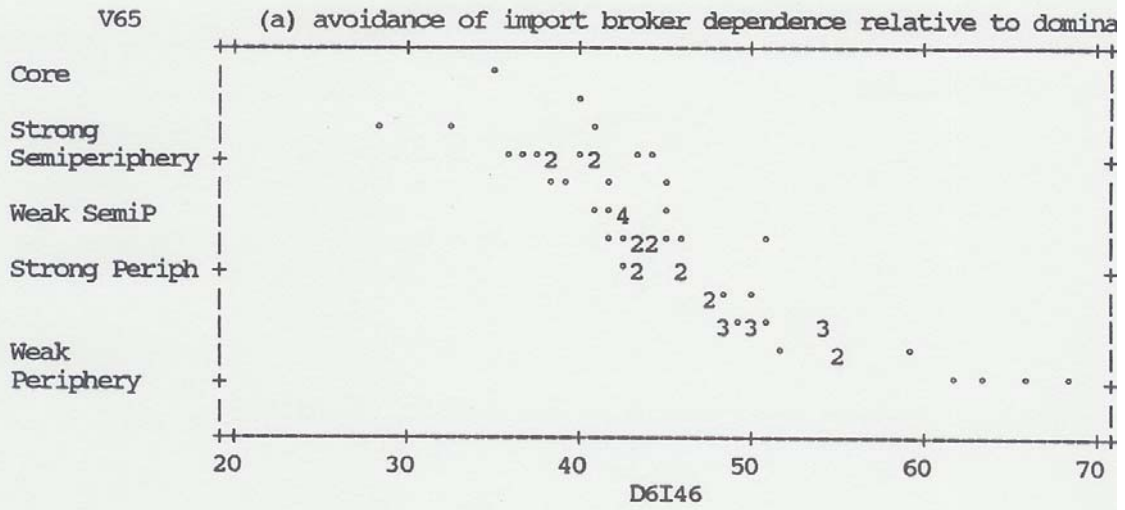


FIGURE 14: Clothing and Apparel 1970



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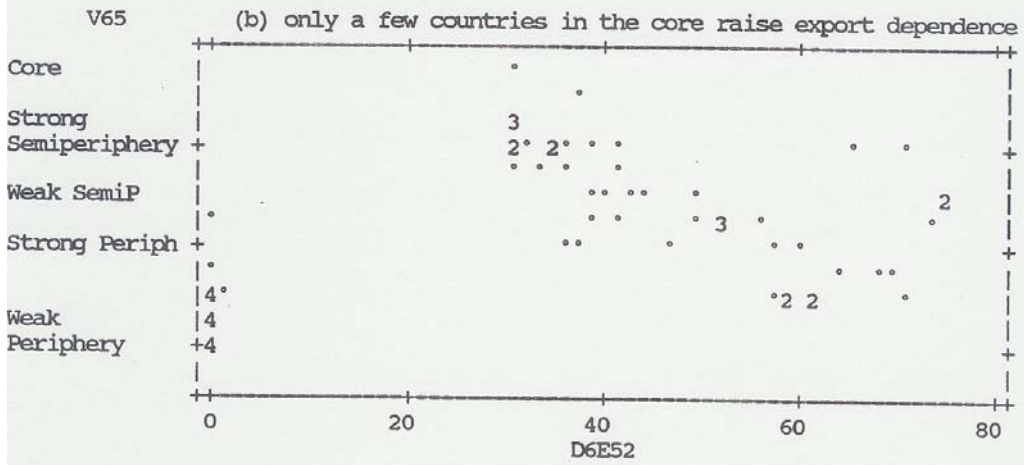
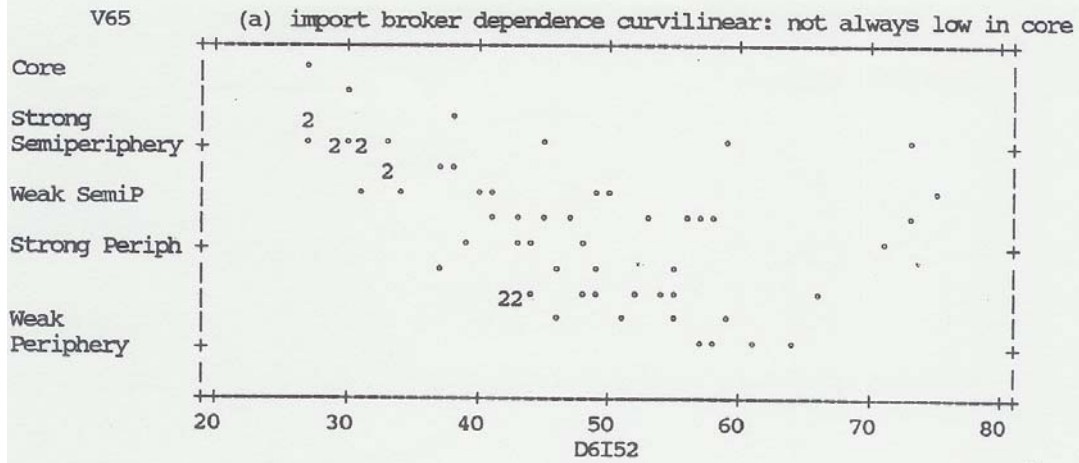
FIGURE 15: Industrial Machinery 1965



(c) ratios randomly distributed over positions



FIGURE 17: Clothing and Apparel 1965



(c) ratios randomly distributed over positions

FIGURE 18: Clothing and Apparel 1970

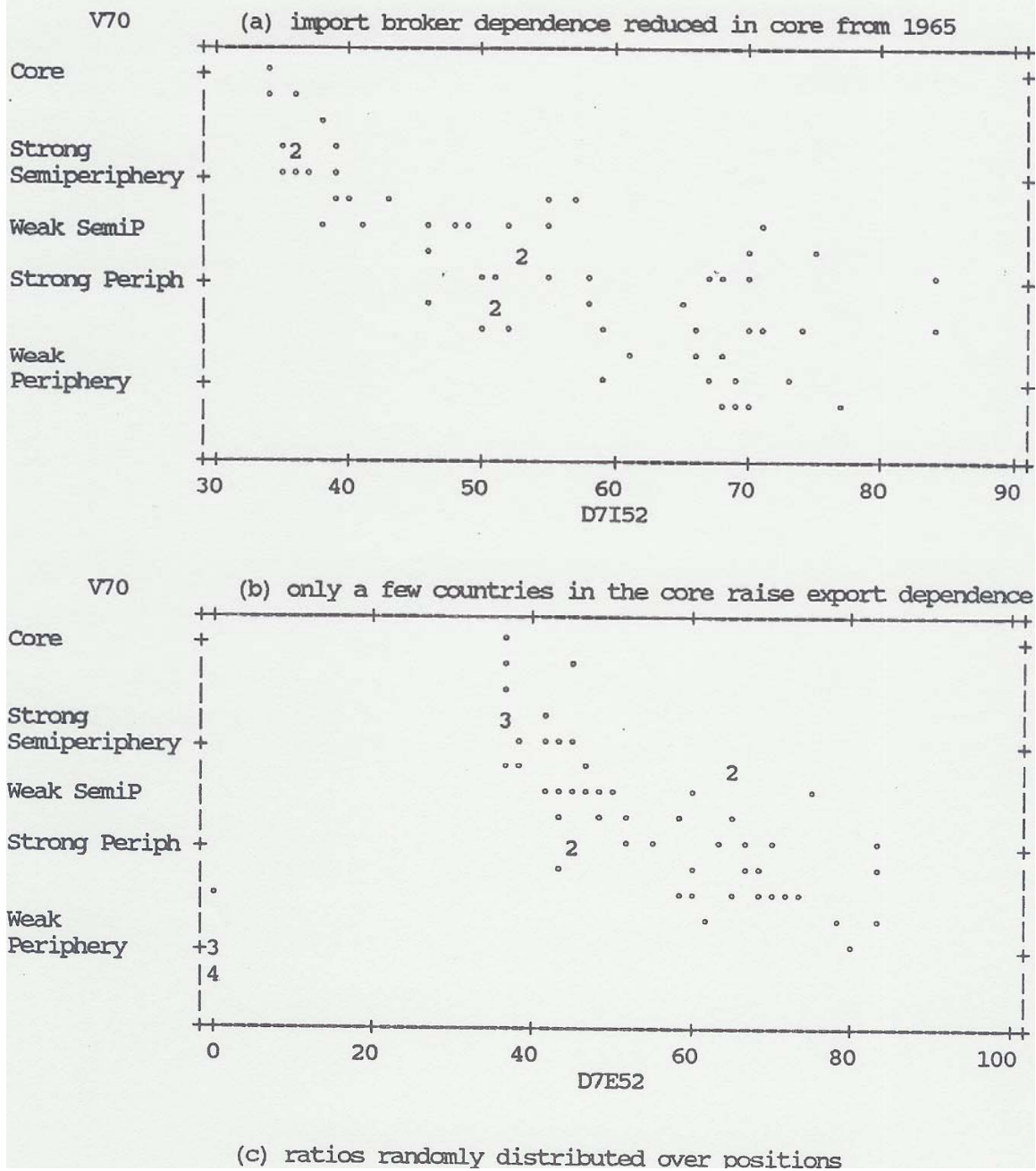


FIGURE 19: Changes in Position, 1965 - 70, from Block 2 (Strong SemiPeriphery)

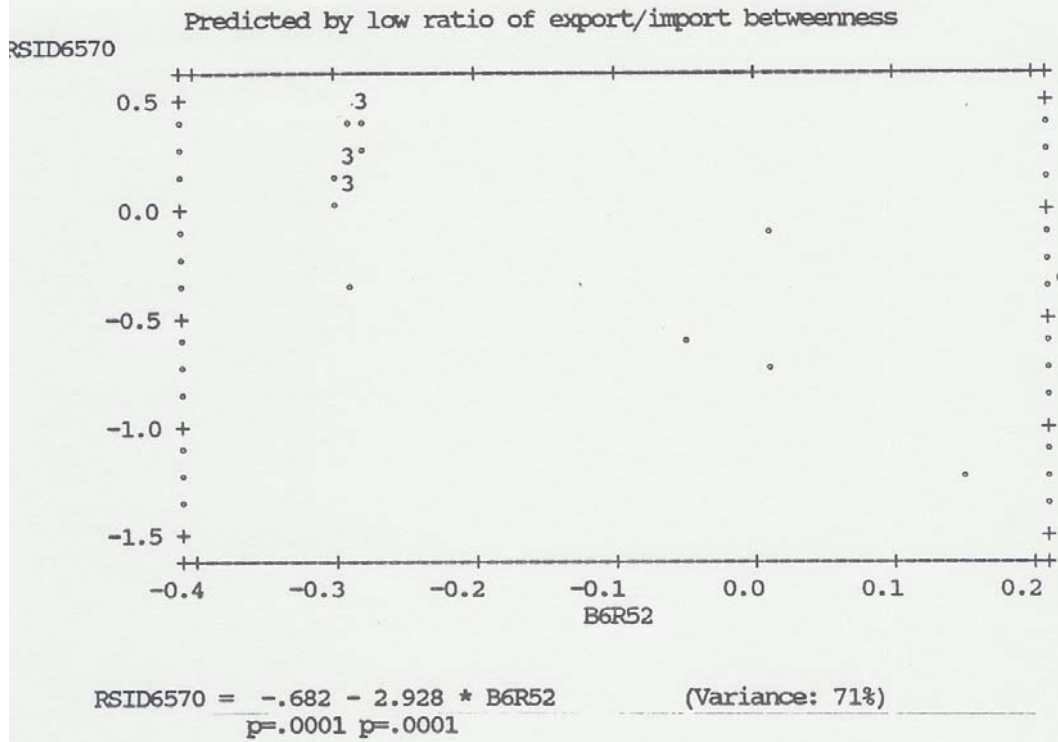


Figure 20: Changes in Position, 1970 - 80, from Block 2 (Strong Semiperiphery)

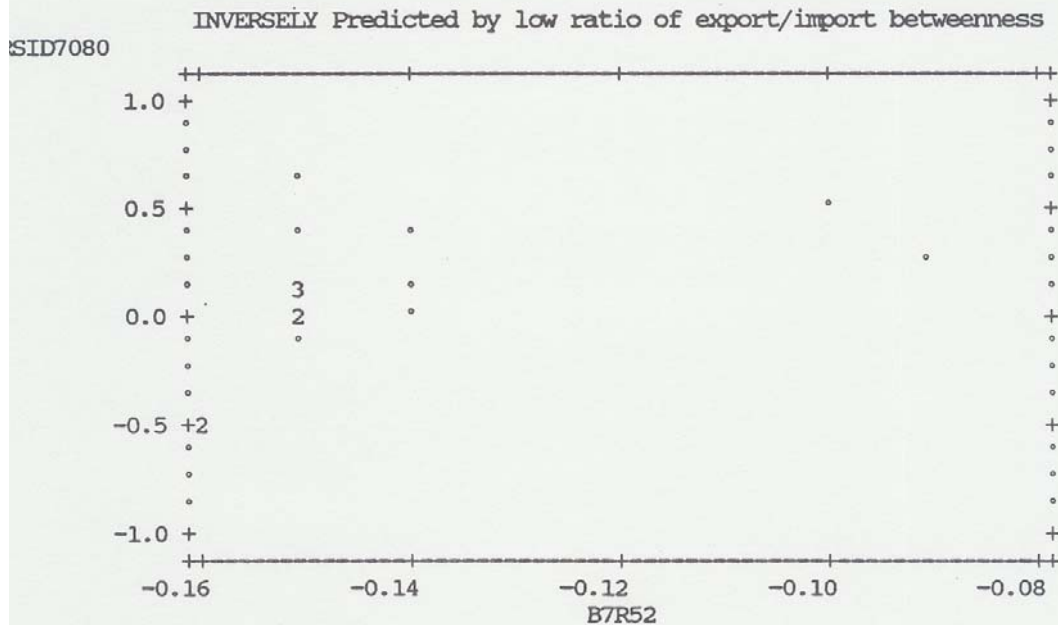


Figure 21: Changes in Position, 1970 - 80, from Block 4 (Strong Periphery)

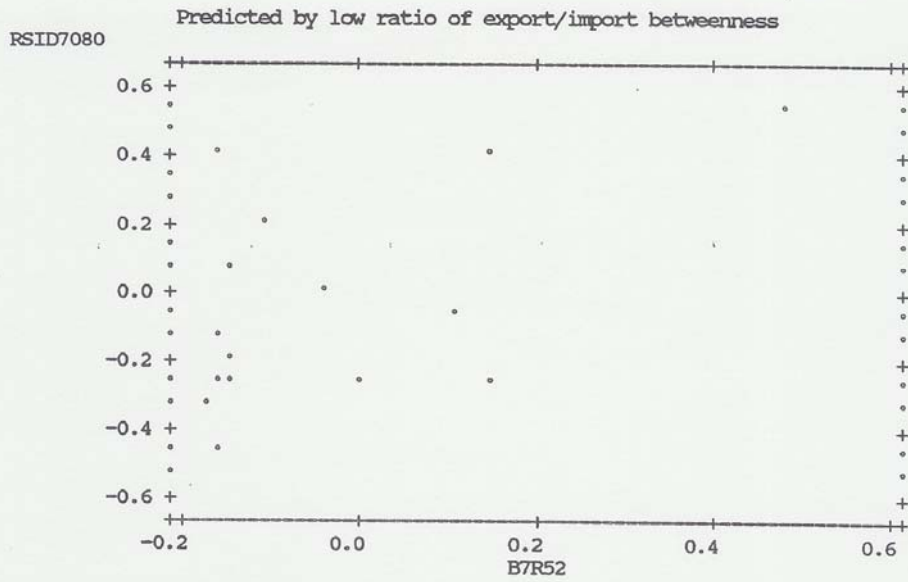


Figure 22: Changes in Position, 1965 - 70, All Countries

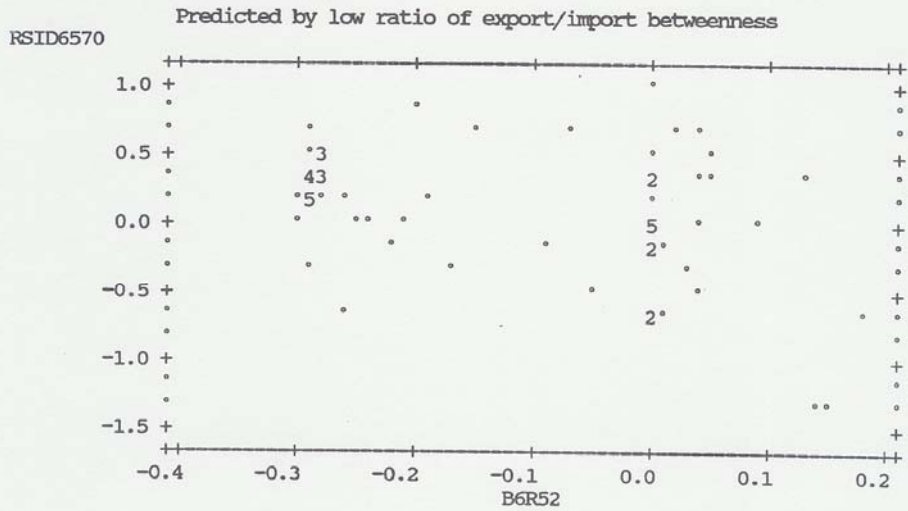


Figure 23: Changes in Position, 1970 - 80, All Countries

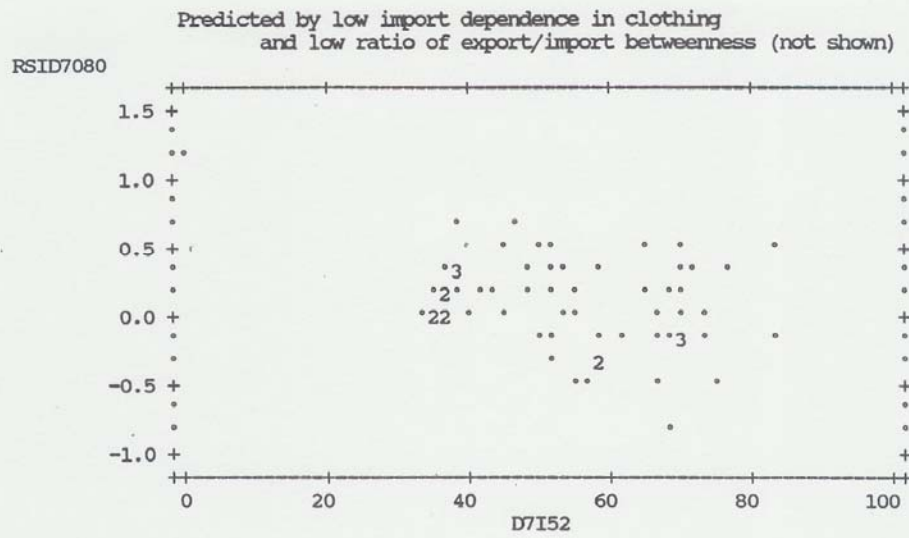


Figure 23: Changes in Position, 1970 - 80, All Countries

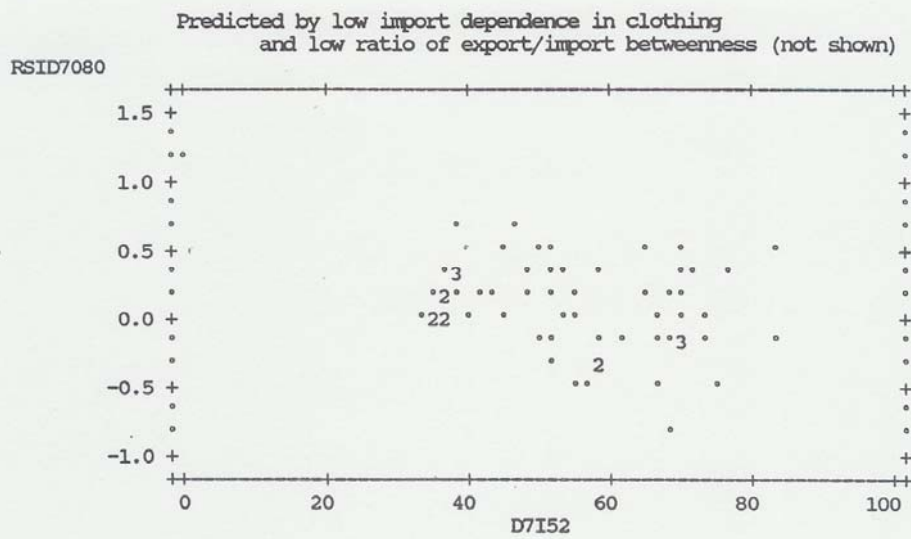


Table 1: An Illustration of Flow Centrality Measures for an Hierarchical Graph

```

Raw data: exports from column to row (h.dat)
0 0 0 0 0
4 0 0 0 0
3 4 0 0 0
2 3 4 0 0
1 2 3 4 0

MaxFlow: maximum flows from each point to each other point
5 0 0 0 0
4 5 0 0 0
7 4 5 0 0
9 7 4 5 0
10 9 7 4 5

```

```

Import BETWEENNESSES OF POINTS :
.0 17.4 19.1 10.0 .0
Export BETWEENNESSES OF POINTS :
.0 10.0 19.1 17.4 .0
Log of Ratio of Export to Import BETWEENNESSES :
.00 -.52 .00 .52 .00

```

```

Dependence on Import Brokers :
.0 .0 18.2 30.0 45.0
Dependence on Export Brokers :
45.0 30.0 18.2 .0 .0
Log of Ratio of Export to Import DEPENDENCE :
3.83 3.43 .00-3.43-3.83

```

```

MAXFLOW IMPORTS OF POINTS :
0. 4. 11. 20. 30.
MAXFLOW EXPORTS OF POINTS :
30. 20. 11. 4. 0.
Log of Ratio of Export to Import MAXFLOW :
3.43 1.44 .00-1.44-3.43

```

Table 2: Flow Centrality Computations for a Karen Cook Exchange Network

flow matrix: symmetric

```

0 3 0 0 1
3 0 3 0 0
0 3 0 3 0
0 0 3 0 3
1 0 0 3 0

```

```

Import/Export BETWEENNESSES OF POINTS :
5.6 16.6 13.3 16.6 5.5

```

```

Dependence on Import/Export Brokers :
26.6 17.8 26.6 17.8 26.6

```

```

DEGREES OF POINTS :
4. 6. 6. 6. 4.

```

Table 3: Correlations among b(etweerness), d(ependency) and f(lowmax) measures

Key: b, d, f are the measures; 6, 7, 8 are the time periods, e.g., b6, b7, b8  
46 is machinery, 52 is clothing

(a) export and import betweenness are strongly correlated  
(due to positioning effects: this is not true by definition, and is not  
purely a function of scale)

|       | b6i46 | b6i52 | b7i46 | b7i52 | b8i46 | b8i52 |
|-------|-------|-------|-------|-------|-------|-------|
| b6e46 | .959  |       | .967  | .999  | .982  | .997  |
| b6e52 |       | .994  |       |       |       |       |
| b7e46 |       |       | .967  | .999  |       |       |
| b7e52 |       |       |       | .999  |       |       |
| b8e46 |       |       |       |       | .982  |       |
| b8e52 |       |       |       |       |       | .997  |

(b) maxflow in and out are moderately correlated (scale effect)

|       | f6i46 | f6i52 | f7i46 | f7i52 | f8i46 | f8i52 |
|-------|-------|-------|-------|-------|-------|-------|
| f6e46 | .687  |       | .755  | .707  | .753  | .492  |
| f6e52 |       | .640  |       |       |       |       |
| f7e46 |       |       | .755  | .707  |       |       |
| f7e52 |       |       |       | .707  |       |       |
| f8e46 |       |       |       |       | .753  |       |
| f8e52 |       |       |       |       |       | .492  |

(c) the two dependence measures are uncorrelated if outliers allowed  
(but see 1980: 46)

|       | d6i46 | d6i52 | d7i46 | d7i52 | d8i46 | d8i52 |
|-------|-------|-------|-------|-------|-------|-------|
| d6e46 | -.128 |       | .003  | -.023 | .823  | .028  |
| d6e52 |       | -.044 |       |       |       |       |
| d7e46 |       |       | .003  | -.023 |       |       |
| d7e52 |       |       |       | -.023 |       |       |
| d8e46 |       |       |       |       | .823  |       |
| d8e52 |       |       |       |       |       | .028  |

(d) the two dependence measures are moderately correlated if outliers eliminated

|       | d6i46 | d6i52 | d7i46 | d7i52 | d8i46 | d8i52 |
|-------|-------|-------|-------|-------|-------|-------|
| d6e46 | .720  |       | .781  | .603  | .823  |       |
| d6e52 |       | .546  |       |       |       |       |
| d7e46 |       |       | .781  | .603  |       |       |
| d7e52 |       |       |       | .603  |       |       |
| d8e46 |       |       |       |       | .823  |       |
| d8e52 |       |       |       |       |       |       |

Table 4: Correlations between b(etweerness), d(ependency) and f(lowmax) measures

(a) fe - bi export flow often proportional to (advantageous) import betweenness  
but clothing in 1970 is an exception — .85

|       | b6i46 | b6e46 | b6i52 | b6e52 | b7i46 | b7e46 | b7i52 | b7e52 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| f6i46 | .744  | .823  | .738  | .711  | .802  | .852  | .809  | .810  |
| f6e46 | .987  | .915  | .929  | .919  | .985  | .917  | .851  | .864  |

(b) fi = -di import flow inverse to dependence on import brokers (esp. 65?)  
i.e. => few imports, high dependence on import brokers  
fe = -de export flow inverse to dependence on export brokers (esp. mach.)  
i.e. => few exports, high dependence on export brokers  
DEFINITION OF PERIPHERALITY

|        | d6i46 | d6e46 | d6i52 | d6e52 | d7i46 | d7e46 | d7i52 | d7e52 |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| check: |       |       |       |       | -.993 |       | -.987 |       |
| f6i46  | -.987 | -.708 | -.965 | -.459 | -.448 | -.758 | -.782 | -.624 |
| f6e46  | -.730 | -.957 | -.594 | -.768 | -.505 | -.981 | -.541 | -.990 |
|        |       |       |       |       | -.779 |       | -.694 |       |

(c) moderate negative correlation of betweenness and dependence

|        | b6i46 | b6e46 | b6i52 | b6e52 | b7i46 | b7e46 | b7i52 | b7e52 |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| check: | -.301 | -.076 |       |       | -.827 | -.881 | -.842 | -.840 |
| d6i46  | -.771 | -.852 | -.720 | -.689 | -.603 | -.542 | -.654 | -.649 |
| d6e46  | -.986 | -.994 | -.672 | -.646 | -.822 | -.812 | -.834 | -.850 |

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