

Working Paper

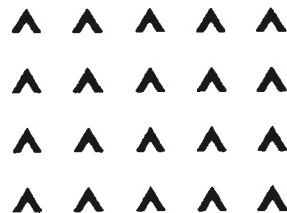
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**SOVIET FORESTS AT THE CROSSROADS:
Emerging Trends at a Time of Economic
and Political Reform**

1990

Charles A. Backman and Thomas R. Waggener

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CINTRAFOR
College of Forest Resources
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PREFACE

The Soviet Union has always represented a puzzle for foresters and those involved with the forest products industry in the Western economies. This is no more so than in the area of international trade in forest products. While it is well known that the Soviet Union encompasses one of the most significant forest areas, which contains the world's largest single conifer inventory, the utilization of that forest and the development of the future potential has remained an enigma. While a significant producer of forest products, the Soviet Union generally demonstrates levels of per capita consumption well below that of other major forested countries. Further, the role of forest products in the international trade arena has been well below potential.

At the same time, there are signs that the harsh climate and other environmental conditions will limit the productivity of much of the Soviet forest. Lack of infrastructure and capital investment has likewise restricted access to and utilization of the forests. Nevertheless, there is a widespread perception that the Soviet Union could and may choose to become a much more dominant participant in global forestry affairs - largely through political and central planning policies rather than in response to traditional market economic incentives.

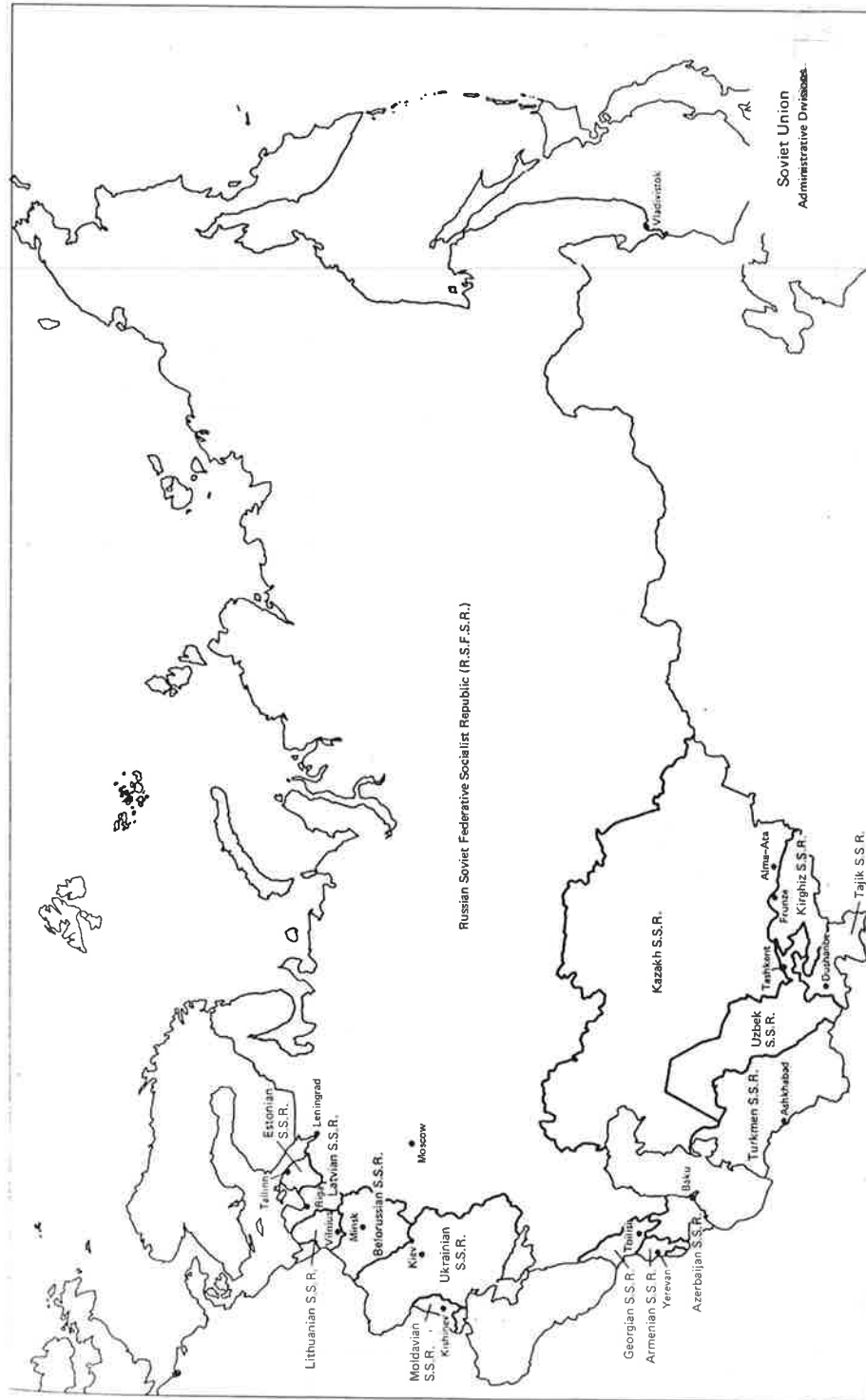
Political and economic change is in the wind throughout the Socialist Planned economies of the world - the Soviet Union is in the midst of internal reform while at the same time the alliances with the Eastern European countries are being redrawn faster than could have been envisioned as recently as twelve months ago.

It is timely, therefore, that a careful summary of the major trends and developments taking place in the Soviet Union at large and the forestry sector specifically be undertaken, utilizing the most current Russian and English sources. This Working Paper represents the first phase of such an evaluation and is presented with the modest expectation that it will contribute to a better understanding of the Soviet Union and its role in forestry and forest products. Ongoing research being conducted by the authors through the Center for International Trade in Forest Products (CINTRAFOR) at the University of Washington will continue to explore the significance of political and economic reform for both competitive and complimentary relationships within the increasingly global timber economy.

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ADMINISTRATIVE DIVISIONS OF THE SOVIET UNION



Source: Gregory, Paul R. & Stuart, Robert C., Soviet Economic Structure and Performance p. 5

Table of Contents

	<u>Page</u>
Preface	i
MAP - Administrative Divisions of the Soviet Union	ii
Table of Contents	iii
List of Tables	vi
List of Figures	viii
SUMMARY	Sl
INTRODUCTION	1
Perestroika II	2
Geo-Economic Background	4
The Soviet Economy	8
Trade	12
Economic Reforms	13
FOREST RESOURCES OF THE USSR	17
World Forest Resources	17
The USSR	20
Vegetation Zones	20
Tundra	23
The Coniferous Forest (Taiga)	27
The Mixed Forest	27
The Broadleaf Hardwood Forest	28
Forest Steppe and Steppe	29
Semi-Desert and Desert	29
Mountain Forests	30
The Forest Resource	31
Inventory	31
Inventory Classification	31
Ownership	34
Land Classifications	35
Management Intensity	38
Site Quality and Stocking Density	46
Age Class and Specie Groupings	49
Mountain Forests	52
Species Distribution	52
Accessibility	56
Allowable Annual Cut	56
Geographic Distribution	64
THE SOVIET FOREST INDUSTRY	70
Geographic Distribution	70
European-Uralean Divide	70
Soviet Union-Republic Distribution	70

	<u>Page</u>
Regional Self Sufficiency	73
Harvesting	77
Sawnwood Production	115
Plywood Production	124
Particleboard Production	128
Fiberboard Production	133
Pulp Production	137
Paper Production	156
Paperboard Production	166
 FOREIGN TRADE	 172
Importance to the Economy	172
Distribution of Foreign Trade	175
General	175
Country Groupings	175
Composition of Trade	187
Hard Currency Trade	187
Significance of Forest Products Trade	190
Exports	203
Imports	203
Forest Products Trade Turnover	206
Hard Currency Forest Products Trade	206
Forest Products Trade	211
Product Categories	211
Exports	211
Imports	211
Geographic Distribution by Value	214
Exports	214
Imports	214
Turnover	219
Product Export by Volume	219
Roundwood	219
Sawlogs	219
Pulp Logs	230
Chips, Particles and Wood Residues	237
Lumber	242
Plywood	250
Particleboard	257
Fiberboard	264
Sulfite Pulp	271
Sulfate Pulp	276
Market Share of Pulp	283
Paper	288
Paperboard	295
Product Imports by Volume	300
Logs	300
Lumber	310
Plywood	315
Planed Veneer	324

	<u>Page</u>
Bleached Sulfite Pulp	329
Paper	336
Paperboard	348
Industrial Paper	348
INVESTMENT OPPORTUNITIES	357
Size of Demand Increase in the USSR	357
Expected Sources for Meeting Increased Demand	362
Extensive Development	364
Intensive Development	364
Fewer Exports	366
Higher Imports	367
Obstacles	367
Information	367
Unclear Bureaucratic Responsibilities	368
Unclear Export Regulations	370
Managerial Culture	372
Near Term Outlook	372
BIBLIOGRAPHY	377

List of Tables

<u>Table</u>	<u>Page</u>
1.1 Soviet Union - Area and Population by Republic	7
1.2 Key Economic Indicators: USSR	10
1.3 Soviet Growth Indicators and Key Production Targets	11
2.1 Forests of the World	21
2.2 Wood Resources of the World	22
2.3 Estimated Proportion of Land Area by Vegetation Zone	25
2.4 The Changing Nature of Stocked Forest Land and Volume of Wood 1961-83	32
2.5 Forest Resources of the USSR: 1984 Inventory	36
2.6 Distribution of Government Forest Land In the USSR	39
2.7 Distribution of the Forest Land of the USSR Under the Management of the Government	40
2.8 Proportion of Forest Land of the USSR Under the Management of the Government	41
2.9 Distribution of Non-Forest Land of the USSR Under the Management of the Government	42
2.10 Proportion of Non-Forest Land of the USSR Under the Management of the Government	43
2.11 Distribution of Government Forest Land by Management Intensity Class	45
2.12 Distribution of Forest Stands by Site Quality and Stocking Density	48
2.13 Distribution of Stocked Forest Land under Forest Sector Management by Age Class and Specie Type	51
2.14 Mountain Forests as a Proportion of Total Government Forest by Republic	53
2.15 Distribution of Mountain Forest Area by Geographic Region	54
2.16 Distribution of Government Forests by Major Forest Tree Species (Area and Volume)	55
2.17 Species Composition of Forested Areas	57
2.18 Volume of Mature Timber in Accessible and Potentially Accessible Forests	58
2.19 Allowable Annual Cut and Percent Utilized in 1982	61
2.20 Calculated Allowable Cut in Accessible and Potentially Accessible Forests Under Central State Forest Management	62
2.21 Calculated Annual Allowable Cut in Reserve and Inaccessible Forests	63

<u>Table</u>	<u>Page</u>
2.22 Distribution of Forested Area: Characteristics of Industrial Stands Under Central State Forest Management	66
4.1 Distribution of Foreign Trade Turnover of the USSR in Percent for 1987	186
4.2 USSR: Hard Currency Table, by Commodity 1970-87	191
4.3 USSR: Total Imports, by Product Grouping 1960-87	192
4.4 USSR: Total Exports, by Product Grouping 1960-87	193
4.5 Exports of Round Logs by Grade Assortment 1977-87	224
5.1 Forest Products Production, Export, Import and Apparent Consumption: World and Selected Countries 1986	358
5.2 Per Capita Consumption of Forest Products by Product and Selected Country 1986	360
5.3 Population, GNP, and Per Capita GNP for Selected Countries, 1987	361
5.4 Forest Products Production, Export, Import and Apparent Consumption by Product: World and Selected Country 1987	363

List of Figures

<u>Figure</u>	<u>Page</u>
1.1 Topography of the Soviet Union	5
2.1 The Forests of the World	18
2.2 Natural Zones of the USSR	24
2.3 USSR Major Forest Regions	26
2.4 Land Classification for Forest Regulation in the USSR	33
2.5 USSR Major Forest Regions	59
2.6 Ratio of Stocked Forest Land to General Lands	65
2.7 Major Administrative Regions - Post 1982	67
3.1 USSR: European (Western) Regional Share of Population, Forest, and Forest Products Output	71
3.2 USSR: RSFSR Share of Population, Forest, and Forest Products Output	74
3.3 USSR: Percent of Commercial Roundwood Deliveries to Republic which Originate in that Republic 1987	75
3.4 USSR: Percent of Lumber Deliveries to Republic which Originate in that Republic 1987	76
3.5 USSR Contribution to World Total Roundwood Production 1977-87	78
3.6 Total Roundwood Harvest - USSR and World (Conifer and Hardwood) 1977-87	79
3.7 Total Conifer Harvest: USSR and World 1977-87	80
3.8 Total Hardwood Harvest: USSR and World 1977-87	81
3.9 USSR Contribution to World Industrial Round- wood Production 1977-87	82
3.10 Total Industrial Wood Harvest: USSR and World 1977-87	84
3.11 Total Conifer Industrial Wood Harvest: USSR and World 1977-87	85
3.12 Total Industrial Hardwood Harvest: USSR and World 1977-1987	86
3.13 Fuelwood and Total Roundwood Harvest: USSR and World 1977-87	87
3.14 USSR Total Roundwood Harvest: Conifer and Hardwood 1977-87	88
3.15 Estimated USSR Total Roundwood Harvest: Conifer and Hardwood 1960-87	89
3.16 USSR Total Roundwood Harvest: Conifer and Hardwood 1977-87	90
3.17 Allowable Annual Cut, Actual Cut and Proportion of Conifer and Hardwood AAC Actually Harvested 1982	92
3.18 USSR Roundwood Harvest by Log Grade 1977-87	93

<u>Figure</u>	<u>Page</u>
3.19 USSR Total Roundwood Harvest by Log Grade 1977-87	94
3.20 USSR: Distribution of Harvest by Major Product Group	96
3.21 USSR Saw and Veneer Log Harvest (Conifer and Hardwood) 1977-87	97
3.22 USSR Pulp Log Harvest (Conifer and Hardwood) 1977-87	98
3.23 USSR Other Industrial Log Harvest (Conifer and Hardwood) 1977-87	99
3.24 USSR Fuelwood Harvest (Conifer and Hardwood) 1977-87	100
3.25 USSR Conifer Roundwood Harvest by Log Grade 1977-87	101
3.26 USSR Hardwood Roundwood Harvest by Log Grade 1977-87	102
3.27 USSR: Distribution of Total and Industrial Harvest by Major Republic of Origin 1940-87	103
3.28 USSR: Total Harvest by Region (Percent) 1987	105
3.29 USSR: Industrial Harvest by Region in 1987	107
3.30 Volume of Thinnings and Sanitary Fellings in the USSR (Volume) 1970-87	108
3.31 USSR Regional Shares of Total Harvest, Thinnings, and Industrial Harvest Circa 1980 (Percent)	110
3.32 Distribution of Annual Allowable Cut by Species Group and Specified Region 1982	112
3.33 Distribution of the Allowable Annual Cut by Region and Species Group 1982	113
3.34 Proportion of the Allowable Annual Cut Harvested by Species Group and Region (Percent) 1982	114
3.35 USSR Contribution to World Lumber Production Conifer and Hardwood (Percent) 1977-87	116
3.36 USSR and World Lumber Production - Conifer and Hardwood (Volume) 1977-87	117
3.37 USSR and World Conifer Lumber Production (Volume) 1977-87	118
3.38 USSR and World Hardwood Lumber Production (Volume) 1977-87	119
3.39 USSR and World Hardwood Lumber Production as Share of Total Lumber Production (Percent) 1977-87	120
3.40 USSR Lumber Production by Major Republic of Origin (Volume) 1940-1987	122
3.41 USSR: Lumber Production by Region (Percent) 1987	123
3.42 USSR Percent of World Plywood Production 1977-87	125

<u>Figure</u>	<u>Page</u>
3.43 USSR and World Plywood Production (Volume) 1977-87	126
3.44 USSR Plywood Production by Major Republic of Origin (Volume) 1940-87	127
3.45 USSR Plywood Production by Region (Percent) 1987	129
3.46 USSR: Percent of World Particleboard Production 1977-87	130
3.47 USSR and World Particleboard Production 1977-87	131
3.48 USSR: Production of Particleboard by Major Republic of Origin (Volume) 1950-87	132
3.49 USSR: Percent of World Fiberboard Production 1977-87	134
3.50 USSR and World Fiberboard Production 1977-87	135
3.51 USSR: Production of Fiberboard by Major Republic of Origin 1950-87	136
3.52 USSR: Percent of World Pulp Production 1977-87	138
3.53 USSR and World Pulp Production (Volume) 1977-87	139
3.54 USSR: Percent of World Mechanical Pulp Production 1977-87	140
3.55 USSR and World Mechanical Pulp Production 1977-87	141
3.56 USSR: Percent of World Production of Semi-Chemical Pulp 1977-87	142
3.57 USSR and World Semi-Chemical Pulp Production 1977-87	143
3.58 USSR: Percent of World Chemical Pulp Production 1977-87	144
3.59 USSR and World Chemical Pulp Production 1977-87	145
3.60 USSR: Percent of World Unbleached Sulfite Pulp Production 1977-87	146
3.61 USSR and World Unbleached Sulfite Pulp Production (Volume) 1977-87	147
3.62 USSR: Percent of World Unbleached Sulfate Pulp Production 1977-87	148
3.63 USSR and World Unbleached Sulfate Pulp Production (Volume) 1977-87	149
3.64 USSR: Percent of World Dissolving Wood Pulp Production 1977-87	150
3.65 USSR and World Dissolving Wood Pulp Production (Volume) 1977-87	151
3.66 USSR: Production of Pulp by Type (Percent) 1977-87	153
3.67 USSR Production of Pulp by Type (Volume) 1977-87	154

<u>Figure</u>	<u>Page</u>
3.68 USSR: Pulp Production by Major Republic of Origin (Volume) 1950-87	155
3.69 USSR: Percent of World Paper and Paperboard Production 1977-87	157
3.70 USSR and World Production of Paper and Paperboard (Volume) 1977-87	158
3.71 USSR: Percent of World Newsprint Production 1977-87	159
3.72 USSR and World Production of Newsprint (Volume) 1977-87	160
3.73 USSR: Percent of World Printing and Writing Paper Production 1977-87	161
3.74 USSR and World Production of Printing and Writing Paper (Volume) 1977-87	162
3.75 USSR: Percent of World Other Paper and Paperboard Production 1977-87	163
3.76 USSR and World Production of Other Paper and Paperboard (Volume) 1977-87	164
3.77 USSR Paper Production by Type (Percent) 1977-87	165
3.78 USSR Paper Production by Major Republic of Origin (Volume) 1940-87	167
3.79 USSR Regional Paper Production (Percent) 1987	168
3.80 USSR Regional Distribution of Paperboard Production by Major Republic of Origin (Volume) 1940-1987	170
3.81 USSR Regional Paperboard Production (Percent) 1987	171
4.1 Foreign Trade of the USSR	174
4.2 USSR: Total Foreign Trade Turnover 1960-1987	176
4.3 USSR: Exports and Imports 1960-1987	177
4.4 USSR Foreign Trade Turnover Segregated by Country 1960-86	179
4.5 USSR: Percent Distribution of Total Ruble Turnover Value by Country Grouping 1960-86	180
4.6 USSR: Foreign Trade with CMEA Countries 1960-87	182
4.7 USSR: Foreign Trade with Industrialized Countries 1960-87	183
4.8 USSR: Foreign Trade with Developing Countries 1960-87	184
4.9 USSR: Foreign Trade with Other Socialist Countries 1960-87	185
4.10 Distribution of Soviet Imports by Category (Percent) 1960-87	188
4.11 Percent Distribution of Soviet Exports by Category (Percent) 1960-87	189

<u>Figure</u>	<u>Page</u>
4.12 Soviet Exports and Imports as a Percent of World Trade in Paper and Paperboard, Pulp, Wood Based Panels, Lumber and Logs 1987	195
4.13 USSR Exports and Imports, and Average of World Exports and Imports, Wood Based Panels, lumber, and logs	196
4.14 USSR Exports and Imports, and Average of World Exports and Imports of Pulp, and Paper and Paperboard 1987	197
4.15 USSR: Industrial Roundwood Production, Exports, Imports, and Apparent Consumption 1977-87	198
4.16 USSR: Lumber Production, Exports, Imports, and Inferred Consumption 1977-87	199
4.17 USSR: Total Pulp Production, Exports, Imports, and Apparent Consumption 1977-87	200
4.18 USSR: Paper and Paperboard Production, Exports, Imports and Apparent Consumption 1977-87	201
4.19 USSR: Wood Based Panel Production, Exports, Imports, and Apparent Consumption 1977-87	202
4.20 USSR: Total Exports and Forestry Exports (Products plus Manufacturing Machinery) 1977-87	204
4.21 USSR: Forestry Exports by Product and Manufacturing Machinery 1977-87	205
4.22 USSR: Total Imports and Forestry Imports (Products and Manufacturing Machinery) 1977-87	207
4.23 USSR: Forest Imports by Product and Machinery 1977-87	208
4.24 USSR: Total Forest Product and Forest Product Manufacturing Machinery Exports and Imports 1977-87	209
4.25 USSR Forest Trade: Relationships between Hard and Soft Currency Imports and Exports	210
4.26 Distribution of USSR Forest Product Exports by Product - Percent of Total Rouble Value 1977-87	212
4.27 Distribution of USSR Forest Products Imports by Product - Percent of Total Rouble Value 1977-87	213
4.28 USSR: Distribution of Forest Product Exports by Market Region 1977-87	215
4.29 USSR: Forest Product Exports to West Europe by Product 1977-87	216
4.30 USSR: Forest Product Exports to East Europe by Product 1977-87	217
4.31 USSR: Forest Product Imports by Regional Source 1977-87	218

<u>Figure</u>	<u>Page</u>
4.32 USSR: Forest Product Imports from West Europe by Product 1977-87	220
4.33 USSR: Forest Product Imports from East Europe by Product 1977-87	221
4.34 USSR: Forest Products Trade with East Europe 1977-87	222
4.35 USSR: Forest Products Trade with West Europe 1977-87	223
4.36 USSR: Share of World Sawlog Exports 1977-87	226
4.37 World and USSR Exports of Sawlogs: Conifer and Hardwood 1977-87	227
4.38 USSR: Share of Domestic Sawlog Production Exported 1977-87	228
4.39 USSR Exports and Domestic Production of Sawlogs (Conifer and Hardwood) 1977-87	229
4.40 Distribution of USSR Sawlog Exports by Major Market (Percent) 1977-87	231
4.41 USSR Sawlog Exports by Major Market 1977-87	232
4.42 USSR: Share of World Pulplog Exports 1977-87	233
4.43 World and USSR Exports of Pulplogs (Conifer and Hardwood) 1977-87	234
4.44 USSR: Share of Domestic Pulplog Production Exported 1977-87	235
4.45 USSR Exports and Domestic Production of Pulp- logs (Conifer and Hardwood) 1977-87	236
4.46 Distribution of USSR Pulp Log Exports by Major Market (Percent) 1977-87	238
4.47 USSR Pulp Log Exports by Major Market (Volume) 1977-87	239
4.48 USSR: Share of World Wood Chip, Particles and Residue Exports 1977-87	240
4.49 World and USSR Exports of Wood Chips, Particles and Residues 1977-87	241
4.50 USSR: Export of Chips and Particles (Percent) 1980-87	243
4.51 USSR: Wood Chip and Particle Exports (Volume) 1980-87	244
4.52 USSR: Share of World Lumber Exports 1977-87	245
4.53 World and USSR Exports of Lumber (Conifer and Hardwoods) 1977-87	246
4.54 USSR: Share of Domestic Lumber Production Exported 1977-87	248
4.55 USSR: Exports and Domestic Production of Lumber (Conifer and Hardwood) 1977-87	249
4.56 Distribution of USSR Lumber Exports by Major Market (Percent) 1977-87	251
4.57 USSR Lumber Exports by Major Market (Volume) 1977-87	252
4.58 USSR: Share of World Plywood Exports 1977-87	253

<u>Figure</u>	<u>Page</u>
4.59 World and USSR Exports of Plywood (Conifer and Hardwood) 1977-87	254
4.60 USSR: Share of Domestic Plywood Production Exported 1977-87	255
4.61 USSR Exports and Domestic Production of Plywood (Conifer and Hardwood) 1977-87	256
4.62 Distribution of USSR Plywood Exports by Major Market (Percent) 1977-87	258
4.63 USSR Plywood Exports by Major Market (Volume) 1977-87	259
4.64 USSR: Share of World Particleboard Exports 1977-87	260
4.65 World and USSR Exports of Particleboard 1977-87	261
4.66 USSR: Share of Domestic Particleboard Production Exported 1977-87	262
4.67 USSR Exports and Domestic Production of Particleboard 1977-87	263
4.68 Distribution of USSR Particleboard Exports by Major Market (Percent) 1977-87	265
4.69 USSR Particleboard Exports by Major Market (Volume) 1977-87	266
4.70 USSR: Share of World Fiberboard Exports 1977-87	267
4.71 World and USSR Exports of Fiberboard 1977-87	268
4.72 USSR: Share of Domestic Fiberboard Production Exported 1977-87	269
4.73 USSR Exports and Domestic Production of Fiberboard 1977-87	270
4.74 Distribution of USSR Fiberboard Exports by Major Market (Percent) 1977-87	272
4.75 USSR Fiberboard Exports by Major Market (Volume) 1977-87	273
4.76 USSR: Share of World Unbleached Sulfite Pulp Exports 1977-87	274
4.77 World and USSR Exports of Unbleached Sulfite Pulp 1977-87	275
4.78 USSR: Share of Domestic Unbleached Sulfite Pulp Production Exported 1977-87	277
4.79 USSR Exports and Domestic Production of Unbleached Sulfite Pulp 1977-87	278
4.80 Distribution of USSR Sulfite Pulp Exports by Major Market (Percent) 1977-87	279
4.81 USSR Sulfite Pulp Exports by Major Market (Volume) 1977-87	280
4.82 USSR: Share of World Unbleached Sulfate Pulp Exports 1977-87	281
4.83 World and USSR Exports of Unbleached Sulfate Pulp 1977-87	282

<u>Figure</u>	<u>Page</u>
4.84 USSR: Share of Domestic Unbleached Sulfate Pulp Production Exported 1977-87	284
4.85 USSR Exports and Domestic Production of Unbleached Sulfate Pulp 1977-87	285
4.86 Distribution of USSR Sulfate Pulp Exports by Major Market (Percent) 1977-87	286
4.87 USSR Sulfate Pulp Exports by Major Market (Volume) 1977-87	287
4.88 USSR: Share of World Paper and Paperboard Exports 1977-87	289
4.89 World and USSR Exports of Paper and Paperboard 1977-87	290
4.90 USSR: Share of Domestic Paper and Paperboard Production Exported 1977-87	291
4.91 USSR Exports and Domestic Production of Paper and Paperboard 1977-87	292
4.92 USSR: Share of Domestic Paper Production Exported 1977-87	293
4.93 USSR Exports and Domestic Production of Paper 1977-87	294
4.94 Distribution of USSR Paper Exports by Major Market (Percent) 1977-87	296
4.95 USSR Paper Exports by Major Market (Volume) 1977-87	297
4.96 USSR: Share of Domestic Paperboard Production Exported 1977-87	298
4.97 USSR Exports and Domestic Production of Paperboard 1977-87	299
4.98 Distribution of USSR Paperboard Exports by Major Market (Percent) 1977-87	301
4.99 USSR Paperboard Exports by Major Market (Volume) 1977-87	302
4.100 USSR: Share of World Industrial Roundwood Imports 1977-87	303
4.101 World and USSR Imports of Industrial Roundwood 1977-87	304
4.102 USSR: Share of Domestic Industrial Roundwood Production Imported 1977-87	306
4.103 USSR Imports and Domestic Production of Industrial Roundwood 1977-87	307
4.104 Distribution of USSR Roundwood Imports by Major Market (Percent) 1977-87	308
4.105 USSR Roundwood Imports by Major Source (Volume) 1977-87	309
4.106 USSR: Share of World Lumber Imports 1977-87	311
4.107 World and USSR Imports of Sawwood 1977-87	312
4.108 USSR: Share of Domestic Sawwood Production Imported 1977-87	313
4.109 USSR Imports and Domestic Production of Sawwood 1977-87	314

<u>Figure</u>	<u>Page</u>
4.110 Distribution of USSR Lumber Imports by Major Source (Percent) 1977-87	316
4.111 USSR Lumber Imports by Major Source (Volume) 1977-87	317
4.112 USSR: Share of World Plywood Imports 1977-87	318
4.113 World and USSR Imports of Plywood 1977-87	319
4.114 USSR: Share of Domestic Plywood Production Imported 1977-87	320
4.115 USSR Imports and Domestic Production of Plywood 1977-87	321
4.116 Distribution of USSR Plywood Imports by Major Source (Percent) 1977-87	322
4.117 USSR Plywood Imports by Major Source (Volume) 1977-87	323
4.118 USSR: Share of World Planed Veneer Imports 1977-87	325
4.119 World and USSR Imports of Planed Veneer 1977-87	326
4.120 Distribution of USSR Planed Veneer Imports by Major Source (Percent) 1977-87	327
4.121 USSR Planed Veneer Imports by Major Source the USSR by Geographic Region 1977-87	328
4.122 USSR: Share of World Bleached Sulfate Pulp Imports 1977-87	330
4.123 World and USSR Imports of Bleached Sulfite Pulp 1977-87	331
4.124 USSR: Share of World Total Pulp Imports 1977-87	332
4.125 World and USSR Imports of All Categories of Pulp 1977-87	333
4.126 USSR: Share of Domestic Pulp Production Imported 1977-87	334
4.127 World and USSR Imports of Pulp 1977-87	335
4.128 Distribution of USSR Pulp Imports by Major Source (Percent) 1977-87	337
4.129 USSR Pulp Imports by Major Source (Volume) 1977-87	338
4.130 USSR: Share of World Paper and Paperboard Imports 1977-87	339
4.131 World and USSR Imports of Paper and Paperboard 1977-87	340
4.132 USSR: Share of Domestic Paper and Paperboard Production Imported 1977-87	342
4.133 USSR Imports and Domestic Production of Paper and Paperboard 1977-87	343
4.134 USSR: Share of Domestic Paper Production Imported 1977-87	344
4.135 USSR Imports and Domestic Production of Paper 1977-87	345

<u>Figure</u>	<u>Page</u>
4.136 Distribution of USSR Paper Imports into the USSR (Percent) 1977-87	346
4.137 USSR Paper Imports by Major Source (Volume) 1977-87	347
4.138 USSR: Share of Domestic Paperboard Production Imported 1977-87	349
4.139 USSR Imports and Domestic Production of Paperboard 1977-87	350
4.140 Distribution of USSR Paperboard Imports by Major Source 1977-87	351
4.141 Distribution of Paperboard Imports by Major (Volume) 1977-87	352
4.142 Distribution of USSR Industrial Paper Imports by Major Source (Percent) 1977-87	353
4.143 USSR Industrial Paper Imports by Major Source (Volume) 1977-87	354

SUMMARY

Political, social, and economic changes occurring in the Soviet Union under policies of *perestroika* and *glasnost* are creating unprecedented interest, opportunities, and risk for current and potential participants in the Soviet forest products industry. The outcome of the changes is far from clear, not only for the forest products industry itself but also for the country as a whole. As the USSR grapples for clear direction along the twin paths towards political pluralism and a decentralized market-driven economy, these changes will continue to create uncertainty as well as opportunity.

The U.S.S.R. is a major country for forest land, wood volume, and annual growth of the forest. Its share (of world total figures) of stocked forest land is 27 percent, of inventoried volume of wood - 25 percent, and of estimated annual increment - 28 percent. Especially significant though is the share of world coniferous forest area (52 percent) and world coniferous volume (57 percent). While the U.S.S.R. contains significant volume of deciduous species (19.2 billion cubic meters), this represents only 8 percent of the total world volume of deciduous species and 13 percent of the deciduous forest area.

The interaction of climate, vegetation, and bedrock has resulted in 5 distinct vegetation zones characterized by certain major plant types. Soil and flora correspond to a north-south gradation in temperature, rainfall and other elements. In the Far North are the treeless cold deserts or tundras. Farther south, higher temperatures and a longer growing season have allowed the formation of forested zones consisting of a coniferous, mixed forest, and deciduous zones. South again, the forests are succeeded by steppes or temperate grasslands more suitable to the sub-humid conditions. The steppe conditions gradually yield to semi-desert and to desert. The U.S.S.R. contains significant mountain regions which have a similar vegetation zone distributed by elevation rather than by latitude as discussed above.

Forest inventories have been carried out in the U.S.S.R. annually between 1945 and 1953. Subsequent to this, inventories were carried out in 1956, 1961, 1966, 1973, 1978, 1983, and most recently 1988. The first reliable data on the entire USSR forest was obtained in 1957.

The inventory of the U.S.S.R. has been classified into 5 broad land categories. Each of these land categories is further sub-divided into a number of smaller categories. The smallest classification used to identify stands of timber is the cover type. Indicators used to separate cover types include predominate specie and composition, forest type, age class, site class, management intensity, stocking, growing

stock and merchantability, and average heights and diameters, and ownership.

Most of the forest industry activity is concentrated in the Russian Republic (identified as RSFSR). In 1987 92 percent of the harvest, 81 percent of the lumber production, 73 percent of the plywood production, 67 percent of the particleboard production, 77 percent of the fiberboard, 72 percent of the paperboard, 85 percent of the paper production were located in the RSFSR. Minor production of forest products is carried out in the Ukrainian and Belorussian SSR.

The forest industry of the Soviet Union is not evenly distributed throughout the country. Most of the industrial activity is located in the European region of the country where 75 percent of the people live. While this part of the country contains only 22 percent of the forest resource, it accounts for 62 percent of the timber harvest, 65 percent of lumber production, 86 percent of plywood production, 94 percent of paper production, and 80 percent of paperboard production.

Exports and imports of forest products are only a minor component of general Soviet foreign trade. In 1987, exports of forest products were only 3 percent of total exports by value. Imports of forest products in 1987 were one percent of total Soviet imports.

While Soviet total exports have increased, the forest products component has increased at a slower rate. Between 1977 and 1987, total Soviet exports grew by 106 percent.

Forest products exports grew by only 29 percent. The same is true for imports. While Soviet imports grew by 102 percent, forest product imports grew by only 35 percent.

Exports are characterized by low value added products such as logs and lumber. While the percentage share of these commodities has been declining since 1977 (when combined, they represented more than 70 percent of the forest product exports by value), they still represented a major proportion in 1987 (57 percent) of total forest product exports.

During the same period, the share of higher value added products has been steadily increasing. Export share of pulp, paper, and paperboard increased from 21 percent in 1977 to more than 30 percent in 1987.

The trend in higher value-added imports is opposite to the trend in forest product exports. The share of manufactured fiber products (pulp, paper, paperboard, and industrial paper) remained relatively constant between 1977 and 1987. In 1977, these four products represented 81 percent of imports. In 1987, these products represented 86 percent of the total forest product imports.

Opportunities may exist for firms interested in forming joint-ventures with domestic firms in order to modernize Soviet (domestic mills) manufacturing facilities. This particular approach may serve two purposes. First, joint ventures may serve to gain access to the Soviet domestic market. Second, such enterprises can serve to facilitate for established importers of Russian forest products a guaranteed

supply source in face of tighter internal demands within the Soviet Union.

By modernizing mills, improved utilization of the timber input is achieved. Thus, the increased output can be directed to internal domestic markets without impeding the flow of products to the foreign importer/partner.

Four general impediments to investing in the USSR are:

- There is no central repository for information about potential business partners resident in the USSR.
- There are unclear bureaucratic responsibilities which are leading to fragmented relationships with suppliers and a deteriorating international credit rating.
- Unclear regulations governing the export of products from the USSR are placing added uncertainty on whether a foreign firm can repatriate its returns on investment in hard currency.
- The Soviet culture has at this point only a very limited understanding of the basic Western business concepts of profit, loss, depreciation, or marketing, which in turn makes international communication and decision-making by joint management very difficult if not perilous.

Near-Term Outlook

The Soviet Union, together with the forestry sector, is in a continuing state of flux. The outcomes of *perestroika* and *glasnost* are far from certain. However, it is clear that

the future will not be "business as usual" within the forestry sector, and that fundamental relationships of harvesting, production, distribution and consumption, and international trade will all be significantly affected. The following points reflect the near-term prospects for this sector.

1. The Soviet Union from a forest sector viewpoint will increasingly be segregated into two distinct geographic regions. First, the European region, lying west of the Ural mountains, is where the majority of the population, consumption, and forest products manufacturing facilities are situated. Second, an Asian region, lying east of the Yenisey River, has a low population, very limited manufacturing capacity and infrastructure, but has more abundant forest resources. Lying between the two, immediately east of the Ural mountains, is a transition region called West Siberia. Development in the Asian region will be driven by cultivating potential export markets in the Pacific basin, while the European region will be driven by greater internal consumption and increasingly limited timber resources.
2. There will be a greater emphasis on developing the forest resource within the European region of the country. This will result in increasing emphasis on development of products which utilize low quality wood material (hardwood and softwood) and waste material from other manufacturing processes (lumber and plywood manufacturing). This will

lead to increasing capacity for production of fiberboard, particleboard, pulp, paper, and paperboard.

3. The high level of roundwood production in the Asian region of the country relative to the manufacturing capacity will lead to a rationalization of manufacturing capacity throughout the country to minimize transportation of the roundwood resource. Thus, the intensification of utilization of the resource throughout the country will result in roundwood hitherto imported to European USSR from the Asian region being reduced in preference for more intensive utilization of the European resource. In the short term, this will mean that there will be a higher volume of roundwood available for export to Pacific Rim markets from the Asian region.
4. In the long-term, the roundwood harvest level will not increase at the same rate as the growth in manufacturing capacity. The lower levels of growth will be compensated for by more intensive utilization of the forest resource rather than higher harvests. Thus, the overall increase in harvest can be expected to be muted, but will be larger in the Asian region.
5. There will be a shift away from an emphasis on the export of logs and lumber to higher value added products. While there is still a need to generate hard currency to compensate for the import of equipment and higher value added products (which the USSR can not itself produce at this time) , the same level of foreign exchange can

potentially be earned with a lower roundwood equivalent if the wood is manufactured into pulp, paper, fiberboard or other higher valued products.

6. Exports of forest products which are of a quality and standard which can be sold in market economies will increasingly be shifted away from countries which do not trade in hard currency. This applies to the CMEA countries which have to date not traded with the USSR for goods and services in hard currencies. Should the CMEA countries move toward free multidirectional trade and not limit trade to bilateral flows with the USSR as has been the case to date, then this shift (away from non-market economies) will potentially decline.
7. West Europe will be the main source for forest product imports into the European part of the Soviet Union. Opportunities for the sale of manufacturing machinery into the Asian part of the country will also be available for firms based in Japan and North America.
8. Joint venture opportunities will continue to emerge for participation in the intensification of forest resource utilization. This will take two directions, likely incorporated within a single joint venture. The Western partner will be expected to provide the technology and management assistance for a more intensive and rational utilization of the resource. Second, the Western partner will also need to provide marketing expertise, and thus a window to the world markets as an alternative to relying

on the marketing services available through Exportles, the major Soviet marketing organization for forest products. Further, export marketing of products will likely substitute for the repatriation of profits due to the non-convertability of the Rouble.

9. Increasing consumption within the Soviet Union can be expected in light of moves to restructure the economy, promote economic development, and improve the standard of living for the Soviet citizens. As levels of per-capita consumption increase, there will be added pressures on the efficient utilization of the Soviet timber resource, and may well provide opportunities for niche marketing of forest products from other supplier countries. Increased domestic consumption may additionally limit the potential and incentives for wood product exports in favor of domestic utilization. Export flows to traditional customers in Eastern Europe may well decline in the future due to both increased Soviet consumption and declining supplies in the Soviet European region.
10. Doing business in the Soviet Union will remain difficult, expensive, time consuming, and bureaucratic. In the near term, lines of responsibility will remain confused, infrastructure will be limited, and risk will remain high.

INTRODUCTION

The opening of the decade of the 90's is significant with respect to social, political, and economic change taking place within the USSR. Under the general terms of *perestroika* and *glasnost* the Soviet Union has embarked on an unprecedented set of reforms, the outcome of which is yet uncertain. It is clear, however, that these reforms will have substantial impacts on the forestry and forest products sector of the Soviet Union, and thus foreign trade in forest products in both Europe and the Pacific Rim.

There is still a relatively large void in the Soviet Union centered on who will lead the country into the twenty-first century. Gorbachev continues to weaken the traditional sources of leadership - the Communist Party and the Red Army, which have held the country together in the last 80 years. The possibility that new social forces based on pluralism will emerge from below to take charge is increasing. But the barriers to these forces are also enormous. Pluralistic societies do not arise overnight. They require habits of self-discipline and understanding of functional democracy that take years to evolve. Also, any new social forces are still subject to the whims of the old regime.

It can be argued that *perestroika* and *glasnost* have not been successful to date since the Soviet Union has not adequately addressed the key impediments to shifting from a command economy to a decentralized market economy. The forestry sector is no exception, and the traditional limitations continue to influence day-to-day activities within this sector. Nevertheless, an understanding of the scope and outlook for the Soviet forestry and forest products sector can significantly influence our ability to anticipate the consequences of change yet to come.

Perestroika II

When Gorbachev came to power in 1985, he and the faction he represented were intent on limited change. The Soviet leaders were searching not for reforms, but rather to implement policy changes that use the existing system which was designed to improve the performance of the economy. These intended changes involved a number of new measures ranging from minor wage increases designed to increase labor productivity, to major changes such as restructuring the allocation of investments from extensive-oriented growth to intensive growth.

In early February 1990, the Soviet Communist Party leadership endorsed Gorbachev's proposals for sweeping economic reform, thus setting the stage for *Perestroika II*.

While Gorbachev called for the abolition of Article 6 of the Soviet Constitution (which gives the Communist Party a leading role in the Soviet political system), some of the other new laws could lead to more far reaching change in the economic system. It has been argued that the most important issue for the Soviet future will be whether the legislature enacts a proposed law legalizing private property and defining the rights of property ownership for individuals, enterprises, and government at the local, provincial, and national level.

The passage of laws does not necessarily break the grip of local parties and bureaucrats, who are often one and the same. While Central Committee (Communist Party) members voted to give up some of their authority and benefits, they also reportedly recommended that Party benefits be transferred to holders of government posts, most of whom are currently members of the *nomenklatura*. Thus, the system is largely still intact.

Changes which lie outside the traditional Soviet system include modifications to enterprise management. The most significant ones include the large scale experiment, experiments with self-financing, the joint venture decree, and the Law of State Enterprises.

As these and other experiments developed, they exposed the intrinsic shortcomings of the command economy and a collective thinking process that had been held captive by the Marxist philosophy. All change had to be defended against

intimidating branch ministries; shortages of supplies frustrated attempts at cutting costs and devalued the benefits of additional profit; no sensible principle of pricing or effective means to raise quality could be easily found. The problems of stimulating labor aroused questions about the alienating effects of centralized state ownership.

The welfare of the Soviet consumer has stagnated and deteriorated. Economic change, however, is only part (and perhaps not the most important part) of the problems with *perestroika*. It has been stressed that the economic reforms of the 1950's and 1960's bogged down because of the inflexibility of the political structure of the Soviet society. Today, forward movement is often held up or slowed when it conflicts with the socio-economic group interests of the influential stratum that occupies a privileged position in the administrative system and does not want to lose it. This of course is the bureaucracy, the large army of high and low level professional administrators whose power, influence, and income depends upon the distribution of the plan and the allocation of inputs.

It is against this pattern of reforms, restructuring, and bureaucracy that the forestry and forest products sector must be appraised.

Geo-Economic Background

The USSR is an immense country, with approximately 8.65 million square miles (22.4 million square kilometers) of land

area. This is an area 2.4 times larger than the United States, and 15.7 percent larger than the U.S. and Canada combined. As would be expected for such a large country, spanning from Europe on the west to the Pacific on the east, the USSR contains five of the world's fifty highest mountains of over sixteen thousand feet elevation, 14 of the world's seventy-two longest rivers, and nine of the world's thirty-eight largest natural lakes (Figure 1.1).

Figure 1.1
Topography of the Soviet Union



Source: Hammond World Atlas, Gemini Edition 1989

The Soviet Union has a total population estimated at between 262.4 million and 285.7 million (World Bank, 1989). This represents a total population slightly larger than the combined total for the United States and Canada. Population has been projected at about 315 million by 2000 at the current rate of increase.

Life expectancy, at birth was estimated at 69 years in 1988. Fertility was 2.4 births per woman in 1988, a level constant from 1970 (World Bank, 1989). Illiteracy (15 years and over) was estimated at less than five percent.

Major shifts have occurred within the Soviet labor force. The total labor force has increased significantly over the last half-century, from 59.3 million in 1940 to an estimated total of 131.3 million in 1987.

The most dramatic change has been in agriculture, where the proportion of the work force in this sector has declined from 47.4 percent in 1940 to 18.6 percent in 1987. The work force in industrial production has increased only moderately, from 22.1 percent in 1940 to 29 percent in 1987. The forestry sector has remained small in terms of labor force, accounting for less than 0.5 percent since 1940, with an estimated 0.3 percent share in 1987.

The Soviet Union is ethnically diverse, with over twenty native languages used as the primary language. Although the Russian Soviet Federated Socialist Republic is the largest in terms of both land area and population, the Soviet Union includes fourteen additional Socialist Republics ranging from

Kazakh with over a million square miles and a population of over 14.6 million and the Ukraine with 233 thousand square miles and over 49 million population, to Armenia with only 11.5 thousand square miles and a population of 3 million as shown in Table 1.1.

Table 1.1

Soviet Union - Area and Population by Republic

UNION REPUBLICS

	AREA (sq. mi.)	AREA (sq. km.)	POPULATION	CAPITAL and LARGEST CITY
RUSSIAN S.F.S.R.	6,592,812	17,075,400	137,551,000	Moscow 7,831,000
KAZAKH S.S.R.	1,048,300	2,715,100	14,684,000	Alma-Ata 910,000
UKRAINIAN S.S.R.	233,089	603,700	49,755,000	Kiev 2,144,000
TURKMEN S.S.R.	188,455	488,100	2,759,000	Ashkhabad 312,000
UZBEK S.S.R.	173,591	449,600	15,391,000	Tashkent 1,780,000
WHITE RUSSIAN S.S.R.	80,154	207,600	9,560,000	Minsk 1,262,000
KIRGIZ S.S.R.	76,641	198,500	3,529,000	Frunze 533,000
TADZHIK S.S.R.	55,251	143,100	3,801,000	Dushanbe 494,000
AZERBAIDZHAN S.S.R.	33,436	86,600	6,028,000	Baku 1,022,000
GEORGIAN S.S.R.	26,911	69,700	5,015,000	Tbilisi 1,066,000
LITHUANIAN S.S.R.	25,174	65,200	3,398,000	Vilna 481,000
LATVIAN S.S.R.	24,595	63,700	2,521,000	Riga 835,000
ESTONIAN S.S.R.	17,413	45,100	1,466,000	Tallinn 430,000
MOLDAVIAN S.S.R.	13,012	33,700	3,947,000	Kishinev 503,000
ARMENIAN S.S.R.	11,506	29,800	3,031,000	Erivan 1,019,000

Source: Hammond World Atlas, Gemini Edition 1989

Approximately 4.9 million square miles (12.6 million square kilometers) of the Russian Republic is east of the Ural mountains. This represents approximately 56 percent of the USSR land area, yet the population is only 23.5 million, or less than 9 percent of the USSR total population.

Overall population density is 33 persons per square mile, although this is heavily weighted towards the western or European Soviet Union. Population density in much of the Eastern Soviet Union (East Siberia and the Far East) is below 3 persons per square mile, with densities of 3-25 persons per square mile in Kazakh and the southern Republics.

The Soviet Economy

Confirmed measures of the economy of the Soviet Union are difficult to obtain. The estimated Gross National Product for the Soviet Union was \$2,446 Billion (US\$) in 1987, with projected growth to \$2,635.7 Billion for 1989. Annual growth has averaged about 3.0 percent in recent years in real terms, ranging from a low of 1.8 percent in 1987 to 4.0 percent in 1986. The estimated growth for 1989-90 is 3.5 percent (Table 1.2).

GDP per capita was approximately \$7,100 in 1988. However, increasing economic difficulties and inflation have eroded many of the economic gains in recent years. As is indicated in Table 1.1, inflation of consumer prices was approximately 5 percent in 1986-87, with rapid increases in 1988-89 to approximately 20 percent. Inflation is projected at a rate of at least 25 percent in 1990.

TABLE 1-2:
Key Economic Indicators
Country: USSR

	History		Current	Forecast	
	1986	1987	1988	1989	1990
GDP per Capita (\$)	5,667	6,355	7,100	7,200	7,600
Real GDP Growth (%)	4.0	1.8	3.5	3.5	3.5
Nominal GDP (\$M)	1,593,009	1,802,668	2,029,000	2,089,700	2,207,900
Exports Merchandise FOB (\$M)	27,897	32,639	35,700	38,400	42,500
Imports Merchandise FOB (\$M)	27,330	26,510	31,600	36,000	40,100
Trade Balance (\$M)	567	6,129	4,100	2,400	2,400
Current Account Balance (\$M)	1,192	4,700	3,500	1,700	1,800
Reserves with Gold (\$M) Year-end	44,185	52,074	51,900	55,500	60,000
Total External Debt (\$M) Year-end	34,714	39,017	42,200	42,300	42,400
Money Growth (M1) Year-end (%)	9.0	9.0	9.5	10.0	10.0
Consumer Price Inflation (%)	5.0	5.0	12.5	20.0	25.0
Exchange Rate (L.C./\$) Year-end	0.70	0.58	0.70	0.80	1.00

Source: Bank of America World Information Services

As a centrally planned economy, the USSR has experienced increasing difficulty in meeting plan targets. As reported by Business International (1989), economic growth indicators for both 1987 and 1988 fell below target levels in most areas (Table 1.3). Both industrial production and consumer goods have lagged planned rates of development. Agriculture has experienced chronic difficulties, and accomplishments have been well below targets. Nevertheless, "key production targets" for basic energy sources (oil, gas, coal, electricity) have been largely achieved. Production of grains, however, has slipped below planned levels.

Table 1.3

Soviet Growth Indicators
(% annual increase)

	1986-90 plan*	1987 plan	1987 actual	1988 plan	1988 actual	1989 plan
National income	4.1	4.1	2.3	4.3	4.4	3.8
Industrial production	4.6	4.4	3.8	4.5	3.9	4.0
Capital goods	4.5	4.3	3.8	n.a.	3.5	3.0
Consumer goods	4.9	4.5	3.8	n.a.	5.0	7.0
Agriculture	2.7	2.2	0.2	3.4	0.7	2.0
Capital investment	4.9	6.0	4.7	3.6	4.8	2.3

Key Production Targets

	1987 plan	1987 actual	1988 plan	1988 actual	1989 plan
Oil (m tons)	617	624	n.a.	624	632
Gas (b cu m)	712	727	n.a.	770	820
Coal (m tons)	744	760	n.a.	772	782
Electricity (b kwh)	1,665	1,665	1,733	1,705	n.a.
Grain (m tons)	232	211	n.a.	195	n.a.

* Annual average.
Sources: Pravda, Izvestiya

BUSINESS INTERNATIONAL

MARCH 20, 1989

Problems in energy, transportation and labor have all contributed to a slowdown in economic growth. The lack of convertibility of the Soviet rouble has necessitated limited economic activity with the major industrialized countries of the West, with most trade within the socialist bloc.

Nevertheless, the USSR has sought hard currency credits, and currently has a foreign (convertible) debt of about \$40 billion (\$US). By international standards, this represents a favorable position, with an external debt/export ratio of between 110-130 percent over the past three years. Defense expenditures have consumed about 15 percent of the national budget, limiting the expansion of consumer-based economic activities.

Overall, the Soviet economy has resulted in a central government budget deficit of approximately 4 percent of GDP. A fiscal deficit of \$58 billion (\$US) was estimated for 1989, with expectations that the actual deficit could well be much larger. "Official" estimates of as much as \$60.5 billion have been reported. This would be approximately 7.7 percent of the 1989 state budget of \$790 billion.

Trade

Major aspects of Soviet foreign trade are discussed in more detail later in this report. In summary, Soviet exports have increased (f.o.b. basis) from about 50 billion roubles in 1980 to a peak of 74.4 billion roubles in 1984, then experienced a decline to 68 billion roubles in 1986 and 1987. The majority of exports have been petroleum, raw materials, and machinery and equipment. Exports of forest products have accounted for only about 2 billion roubles or just over 3 percent of total export trade (The Economist, 1989, Bank of America, 1988).

Total Soviet imports have also increased, from about 44.5 billion roubles in 1980 to a high of 69.4 billion roubles in 1985. Imports then declined to 60.7 billion roubles in 1987.

The Soviet Union had a trade deficit with the U.S. of approximately \$1.2 billion in 1986 and \$1 billion in 1987. At the same time, the Soviet Union had a positive trade balance with other socialist trading partners, \$3.8 billion in 1986 and \$2.1 billion in 1987.

Overall, the Soviet Union has had a trade deficit with Western countries, with the deficit estimated at about \$3 billion (\$US) in 1988 and projected at \$5 billion for 1989. Wood and paper products have accounted for a slightly increasing share of Soviet exports to non-socialist trading partners, reaching 4.4 percent in 1986 before declining to 4 percent in 1987. This was a increase from about 2.8 percent in 1984. Wood and paper imports, on the other hand, accounted for 3.5 percent of imports from non-socialist partners in 1987, an increase from 2.4 percent in 1984.

Economic Reforms

The Soviet Union is presently seeking \$4-\$5 billion per year in foreign capital to support current economic reforms and modernization of basic Soviet industries.

The Soviet Union, under Gorbachev, has publicly acknowledged the economic inertia of the centrally planned

command system, and the consequences for the Soviet people. Major concerns repeated in public statements relate to food supplies, living conditions, market rationing, poor health services and environmental pollution. A target of 20 percent increase in consumer goods over the 1991-95 period has been announced, representing an increased budget expenditure of approximately \$40 billion. Agriculture - and the food supply - has been called the "most crucial problem" facing the Soviet economy.

Reforms in agriculture and industry have been widely discussed with relatively little evidence of actual success to date. Programs of leasing of land to farmers for a period of up to 50 years have been introduced as means of stimulating productivity. Reforms of state-sector industrial enterprises and re-drafting of many aspects of joint-venture legislation have likewise targeted greater emphasis on profitability and productivity.

The reforms of State enterprises on the basis of profitability holds many implications for future economic development, including the forestry and forest products sector. State subsidies and output quotas (assured markets) are being greatly reduced. Wage rates linked to productivity and generally rising labor costs have contributed to "transitional" unemployment. An estimated 4,000 State enterprises have been judged unprofitable, accounting for about 13-14 million workers. Such enterprises face closure or substantial restructuring.

Cutbacks in mandatory State quotas for deliveries has permitted greater freedom to local managers for directing operations, but has also introduced major problems in marketing and distribution - an unfamiliar function for many enterprises and managers. Most State subsidies also face elimination - a category accounting for an estimated 25 percent of total State budget expenditures.

The Soviet government has announced plans for three free trade zones, in the Baltic States, the Far North, and the Far East. The first, in the Far North near the Finnish border, is projected to begin operation in 1991. The zone in the Far East, near Nakhodka, will according to plans emphasize raw materials (including timber) and fish products. The major advantage for the planned free trade zones will be customs exemptions and a three-year tax holiday. At the same time, the Soviet Union has announced plans to cut import duties to an average 20 percent of prior levels and to reduce or remove export subsidies - at least partially in response to desires to move towards membership in GATT.

To "encourage" exports, enterprises (State and joint venture) will be allowed to retain up to 40 percent of hard currency export earnings. Central planning is targeted to focus on smaller projects with lower capital requirements in contrast to past development of large, centralized projects (Far East Economic Review, 1989). As of April 1989, all enterprises were authorized to deal directly with foreign partners, with relaxing of regulations on foreign ownership

and management.

Currency conversion remains a major obstacle to both trade and economic reforms. The Politburo has "endorsed" a three-step process towards establishing rouble convertibility to include: 1) internal inter-company markets, 2) convertibility within the Eastern Bloc, and 3) convertibility with the Western Bloc. The latter has been discussed as occurring "sometime" in the mid 1990's.

FOREST RESOURCES OF THE U.S.S.R.

World Forest Resources

General forest land of the world occupies more than 4 million hectares of which stocked forests are located on nearly 3 million hectares. More than half of the stocked forest land and about 17 percent of the open grown forest land is located in Europe, North America, and the U.S.S.R. The degree of forest cover¹ in these three regions is about 34 percent. The degree of forest cover in Latin America, Africa, Asia and Australia (with Oceania) is on average 17 percent. This ranges from a high of 34 percent in Latin America to a low of 8 percent in Africa. Nearly all of the degraded forest land and brush forests, and more than 70 percent of the non-stocked forest land are located in Latin America, Africa, and Asia. The major portion of coniferous forests is located in North America, Europe, and the U.S.S.R. (88 percent); while the major portion of deciduous forests is located in Latin America, Africa, and Asia (65 percent). These deciduous forests are primarily tropical forests.

Figure 2.1 shows the distribution of the forests of the world. Notice that the distribution of tropical forests is restricted to South America, Africa and Southeast Asia, and that of coniferous forests primarily to North America and the U.S.S.R.

FIGURE 2-1: THE FORESTS OF THE WORLD



FIG. 5. The forests of the world. 1-6: MAJOR FOREST REGIONS. 1. *Coniferous forests*. Northern portion (*taiga*) mainly spruce-fir; at lower latitudes spruce and fir with other conifers and some broadleaf hardwoods. Timber, pulpwood. 2. *Mixed broadleaf-coniferous forests*. Broadleaf forests usually on better soils, coniferous types on poorer soils or in special habitats. Timber, forest products; general farming on better soils after clearing; pome and stone fruits. 3. *Tropical rain forests*. Important timbers, special tree crops, shifting agriculture. Includes unmapped areas of light forest, especially in Africa, and undifferentiated montane forest, as in Indonesia. 4. *Light tropical forest*. Timbers, important woods, special tree crops; often supports intensive tropical agriculture after clearing. 5. *Undifferentiated montane forests*. Regionally variable and complex, altitudinal tree line usually present. Timber, plateau agriculture and grazing. 6. *Thorn forest and scrub*. A few special woods and other products; seasonal grazing. 7-8: TRANSITION TYPES. 7. *Xeric scrub and woodland* ("Mediterranean scrub" forest). Local lumber, fuel, other products; specialized horticulture, winter pasture. 8. *Gallery forest and groves*. Grasslands with gallery forest along streams and scattered upland groves. Local lumber, fuel. Clearing and repeated fires produce aspect of treeless grassland. Two types may be distinguished: (a) *Prairie*; temperate regions above 30° N and S latitude; the great grain-raising regions of the world. (b) *Savanna*; tropical latitudes; partly natural but often follows disturbance of light forest; grazing, semisedentary to shifting agriculture. 9-11: AREAS WITH NO FORESTS. 9. *Steppe*. Bunch-grass, low shrubs and herbage; sometimes a few trees along main watercourses. Cattle and sheep ranching. 10. *Desert and desert scrub*. As mapped, includes some uplands with steppe and small areas of sparse forest. 11. *Tundra*. Low vegetation.

SOURCE: A World Geography of Forest Resources, S. Haden-Guest et alia, Ed., page 36

The world supply of wood volume in 1980 was 356.7 billion cubic meters of which 338.8 billion cubic meters was contained in stocked forest land. The largest volume is located in Latin America (29 percent) and in the U.S.S.R. (24 percent). Europe contains 4 percent while Australia and Oceania contain 2 percent.

There is a large variation in the productivity of the forests, estimated to be 3.2 billion cubic meters of wood annually. Nearly two-thirds of this annual increment occurs in U.S.S.R., Europe, and North America.

The harvest of wood is also unevenly distributed. While the total harvest is less than the annual growth for the world, Africa (434 %), Asia (161 %), and Latin America (157 %) all significantly overcut their estimated annual growth. The USSR (39 %) and North America (57 %) significantly undercut the general annual growth. The figures for the U.S.S.R. and North America however should be taken in the light of total forest resource unadjusted for accessibility or other deductions.

The U.S.S.R. is the major location for forest land, wood volume, and general growth. Their share of stocked forest land is 27 percent, of general volume of wood - 24 percent, and of general annual increment -28 percent. Especially significant though is the share of world conifer forest area (52 percent) and world conifer volume (57 percent). While the U.S.S.R. contains significant area and volume of deciduous species (250.9 million ha. and 19.2 billion cubic

meters), this represents only 13 percent of the area and 8 percent of total world volume of deciduous species.

Tables 2.1 and 2.2 illustrate the significant place that the U.S.S.R. has in terms of the forest resources of the world. Table 2.1 contains the distribution of forest area by seven geographic regions of the world. Table 2.2 shows the distribution of wood volume by the same seven regions.² The year shown denotes the period for the specific data displayed.

The U.S.S.R.

The U.S.S.R. occupies a major portion of northeastern Europe and of northern and central Asia. It stretches from west to east for more than 9,000 kilometers and from north to south for more than 4,500 kilometers. Its physical environments range from the cold Arctic tundra in the north to the deserts of Central Asia in the south, and from the grasslands of the Ukraine to the forests of Siberia.

Vegetation Zones

The interaction of climate, vegetation, and bedrock has resulted in 5 distinct vegetation zones characterized by certain major plant types. Soil and flora correspond to a north-south gradation in temperature, rainfall and other elements. In the Far North are the treeless cold deserts or tundras. Farther south, higher temperatures and a longer growing season have allowed the formation of forested zones consisting of a coniferous, mixed forest, and deciduous zones. South again, the forests are succeeded by steppes or

TABLE 2-1: FORESTS OF THE WORLD

	World 1980	USSR 1983	Europe (excl. USSR) 1983	North America 1977	Latin America 1980	Africa 1980	Asia (excl. USSR) 1976	Australia & Oceania 1976
Total Land Area	13,033.0	2,144.0	468.0	1,875.0	2,031.0	2,970.0	2,703.0	842.0
Forested Land	4,136.2	938.0	175.0	620.0	939.5	751.2	522.1	190.4
Stocked Forest	2,985.6	810.9	145.2	583.0	690.5	223.0	451.2	81.8
coniferous	1,082.4	560.0	86.0	306.0	26.3	3.8	87.8	12.5
deciduous	1,903.2	250.9	59.2	277.0	664.2	219.2	363.4	69.3
Unstocked (thinned out) Forest	1,150.6	127.1	29.8	37.0	249.0	528.2	70.9	108.6
Degradated Land with Vestiges of Forest	408.5	0.0	0.0	0.0	169.2	166.0	73.3	0.0
Brush	624.2	0.0	0.0	0.0	145.9	442.8	35.5	0.0
<i>Lesistoci'</i>	22.8	37.8	31	31	34	7.5	16.7	9.7

Source: Lesnaya Entsiklopediya, V. II, page 63

TABLE 2-2: WOOD RESOURCES OF THE WORLD

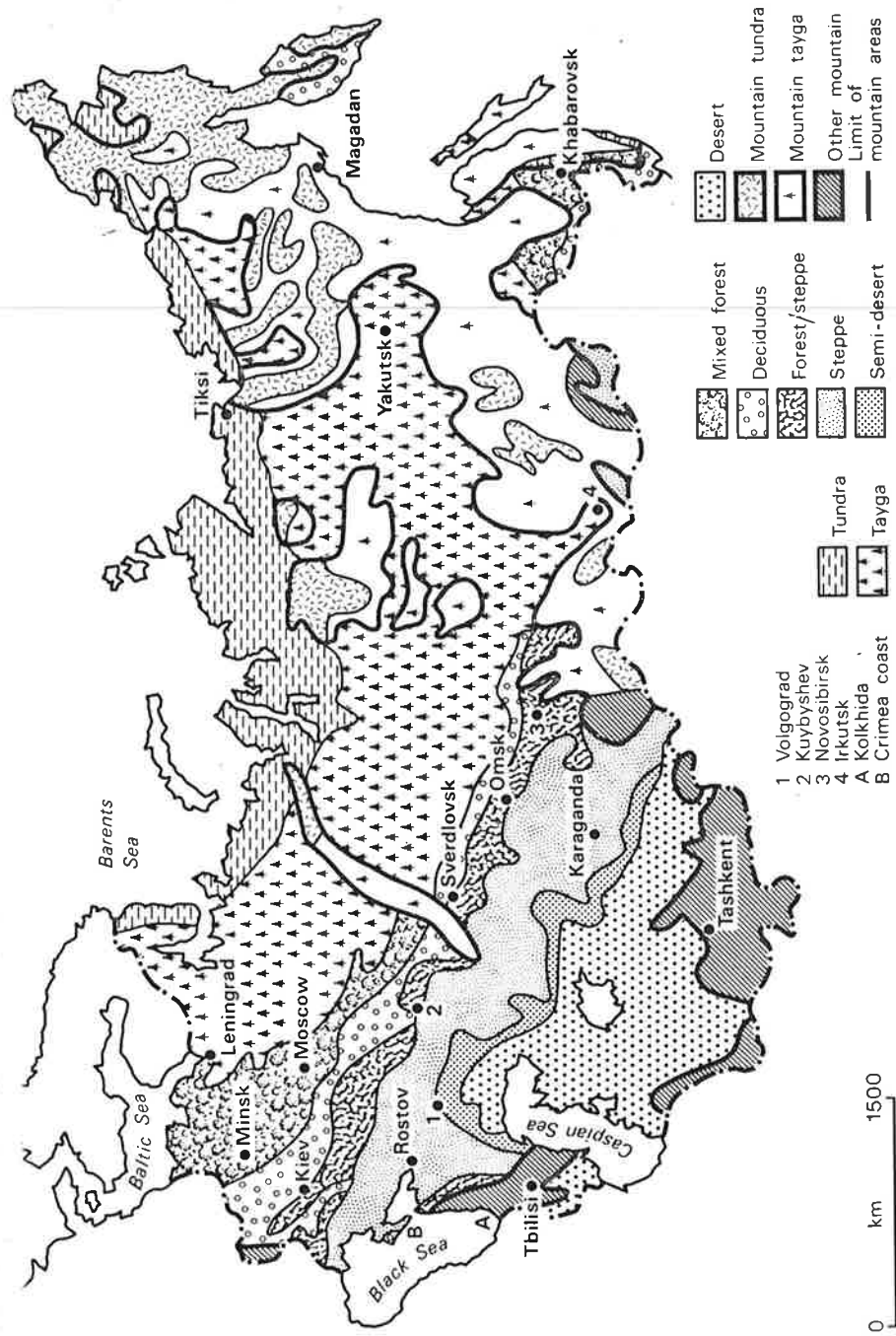
	World 1980	USSR 1983	Europe (excl. USSR) 1983	North America 1977	Latin America 1980	Africa 1980	Asia (excl. USSR) 1976	Australia & Oceania 1976
Total Volume of which in stocked forest	356.7 338.8	85.9 85.9	14.9 14.9	41.7 41.7	102.9 93.3	50.2 45	54.4 51.5	6.7 6.5
Volume of coniferous forests of which in tropical forests	116.9 3.2	66.7 0	10 0	29.6 0	2 1.85	0.1 0.1	8.04 1.7	0.5 0
Volume in deciduous forests of which in tropical forests	239.8 191.1	19.2 0	4.9 0	12.1 0	100.9 97.4	50.1 49.6	46.36 41.7	6.2 0
Annual Growth of Wood Annual Harvest	3,217.0 3,020.3	906 356	460 394.3	851 483.6	230 362.4	100 433.9	630 1017.1	40 33

Source: Lesnaya Entsiklopediya, V. II, page 63

temperate grasslands more suitable to the sub-humid conditions. The steppe conditions gradually yield to semi-desert and to desert. The U.S.S.R. contains significant mountain regions which have a similar vegetation zone distributed elevationally rather than latitudinally as discussed above. Figure 2.2 shows the distribution of these natural zones. Table 2.3 delineates the proportion of total land occupied by each zone. Figure 2.3 shows the distribution of tree species.

Tundra: The tundra zone extends along the entire length of the Arctic coast of the USSR and as far south as the Kamchatka peninsula on the Pacific coast. This zone accounts for approximately 14 percent of the entire continental territory. Summers are short, lasting for three months; while the winters are long and severe. Snow covers the ground for at least half the year and even in the warmest month the mean temperature is below 10 degrees centigrade. The tundra soils are thin, often rocky and poorly formed. The characteristic peaty-grey soil results from bad drainage and insufficient penetration of oxygen. The harsh climate conditions support a minimal vegetation cover. The more northerly parts of the tundra are polar deserts, while further south mosses and lichens form a solid ground cover and forest trees appear, making a transition zone between the tundra and the forest. In much of the zone, permafrost keeps the subsoil solid to within some 60 centimeters of the surface.

FIGURE 2-2: NATURAL ZONES OF THE USSR



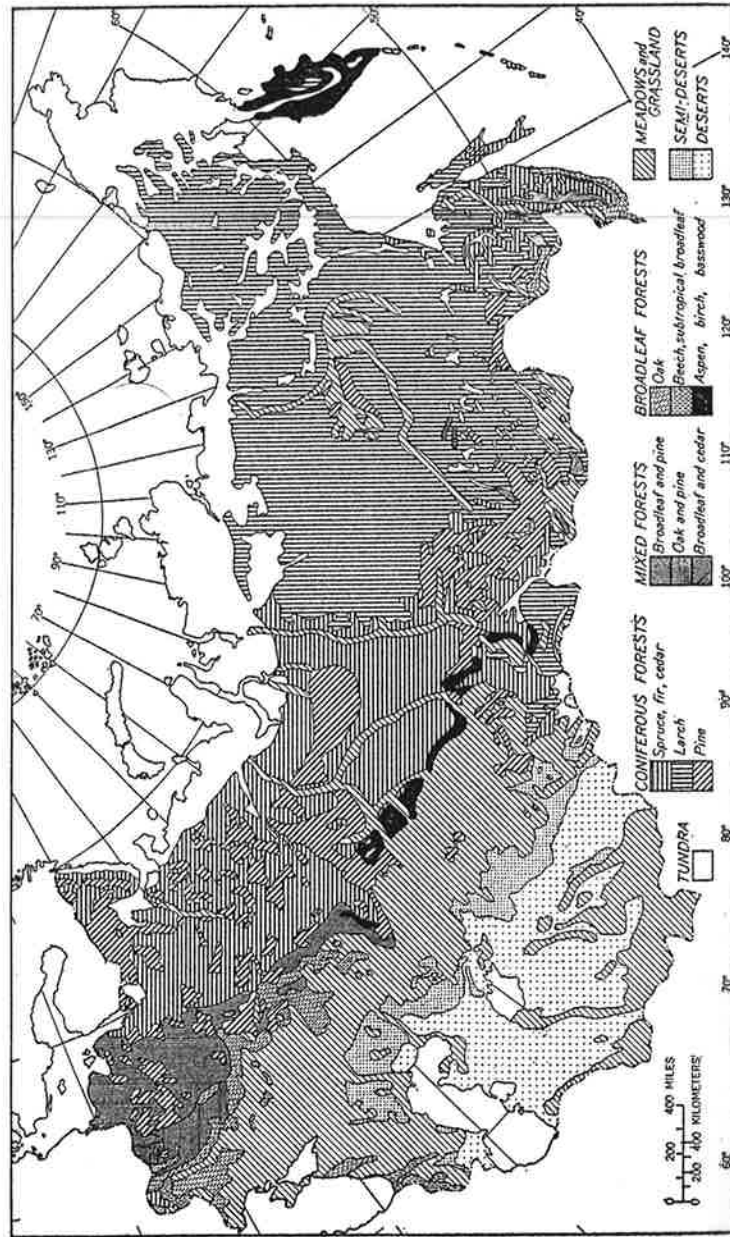
Source: Geography of the Soviet Union, J.P. Cole, page 68

**TABLE 2-3: ESTIMATED PROPORTION OF LAND
AREA IN EACH VEGETATION ZONE**

Tundra and Mountain Tundra	14%
Coniferous Forest (Taiga)	33%
Mixed Forest	5%
Broadleaved Forest	4%
Forest Steppe/Steppe	10%
Semi-desert/desert	15%
Mountain Taiga Forest	13%
Other Mountain Forest	6%

Source: Derived from Figure 2-2

FIGURE 2-3: USSR - MAJOR FOREST REGIONS



394

U.S.S.R.: major forest regions. Based on map in Great Soviet Encyclopedia, Moscow, 1918.

SOURCE: A World Geography of Forest Resources, S. Haden-Guest et Aliaq, Ed., page 394

Along the southern margin of the tundra zone in the so-called wooded tundra where the tundra merges into the coniferous forest (taiga), scattered dwarf and stunted trees grow in places. Coniferous forest extends northward into the tundra zone along some valley floors where soil and local climatic conditions are favorable.

The Coniferous Forest (Taiga): The conifer forest or taiga extends from the Finnish border in the west to the Pacific coast in the Far East. It extends southwards into other zones of vegetation along mountain ranges, as in the Southern Urals. Conifer species reappear also in isolated mountain regions of European USSR, notably the Carpathians and the Caucasus. This zone occupies approximately 33 percent of the land area of the U.S.S.R.

In the conifer forest zone of the USSR, the humid conditions and lack of plant remains produce podzols and grey forest soils. Average temperatures in winter vary from -10°C near Moscow to less than -40°C near Yakutsk. Mean summer temperatures range from less than 12°C in the Far North to more than 16°C in the south of the zone.

Evergreen coniferous species commonly found in this zone include Scotch pine, Norway spruce, and fir species (Abies). Within the European USSR and West Siberia, deciduous broadleaf species form a minor component of the coniferous stands. Here conditions are warmer and soils are better. This allows species such as oak, beech, and birch to grow.

The Mixed Forest: Mixed forest is the term given to a zone of

vegetation in European USSR in which evergreen coniferous and deciduous broadleaf trees are both widely found. This zone occupies approximately 5 percent of the total land area of the U.S.S.R.

In European USSR, it is unusual to find both types of tree in the same local area. The conifers are generally associated with drier, lighter soils. The broadleaf species grow on the heavier, less well drained soils. The mixed forests consist of a mosaic of stands of coniferous trees, such as pine, and broad-leaved deciduous species (lime, oak, elm, and maple). These latter species, because they occupy the more fertile soils, have been widely cleared for agriculture.

The Broadleaf Hardwood Forest: A narrow zone of broadleaf forest extends eastward from the Western Ukraine to the edge of East Siberia. This zone occupies approximately 4 percent of the land area. In this zone conditions are mild and moist enough for deciduous trees to flourish. Species such as beech, oak, and ash are found in a zone extending across European U.S.S.R. East of the Urals, the zone continues but the birch and aspen are the most common deciduous trees. The soils of the zone are described as gray forest soils, but east of the Urals they are also mixed with meadow black-earths. They have some humus and have been fertile enough to be cleared for cultivation in many places.

Forest Steppe and Steppe: The northern limit of forest in the USSR is determined by thermal conditions, while its southern limit is related to moisture. In the drier conditions of the southern part of European USSR and West Siberia the deciduous forest thins out and disappears. There is a southern fringe zone referred to as forest/steppe where, depending on local conditions, either forest or steppe may occur. This zone occupies 10 percent of the total area of the U.S.S.R.

The forest-steppe consists primarily of oak woodland among areas of grassland. The forest zone is generally characterized by the downward seepage of water and leaching, with the removal of humus. In contrast the steppe zone is affected by uprising seepage and the accumulation of humus in the soil.

With decreasing precipitation and increasing summer heat to the south-east, the forest-steppe is replaced by fertile steppe or prairie grassland. The natural vegetation of the steppe is a cover of grasses, sedges, legumes and other flowering herbs, densest in the moister north and known as the meadow steppe; more open in the dryer south where grasses form tussocks and there are fewer herb species. The soils of the zone are described as blackearths (chernozems) or dark chestnut soils, the colour describing the darkness produced by the presence of humus.

Semi-Desert and Desert: The southern fringe of the steppe zone is characterized by a sparse cover of grass. This thins out as the steppe merges with the zone of semi-desert.

Southwards from the blackearth zone the soils are browner in colour, and are referred to as chestnut soils. These in turn are replaced by brown soils of the semi-deserts and gray brown and gray desert soils. Southwards the soils become increasing saline. This zone occupies 15 percent of the land area of the U.S.S.R.

The driest and hottest parts of the USSR have little natural vegetation at all. When the erratic rain does fall in quantity various plants flourish briefly. Plants that are less ephemeral include some stunted trees such as saksaul (Haloxylon) and various hardy shrubs. Much of the central part of the desert zone consists of brown sands (Karakum and Kyzylkum deserts) with virtually no vegetation. In places, as along river valleys, fertile soils occur, while the southern mountains are fringed with extensive loess soils.

Mountain Forests: Mountain tundra and mountain taiga are versions of tundra and coniferous forests respectively. Other mountains comprise the southern mountains of the U.S.S.R. This zone displays great diversity in vegetation and soil conditions. In the mountains of Kirgizhistan, Central Asia, and the Caucasus, zones of steppe and semi-desert are on either sides of the mountain. Broadleaf and coniferous forests occur on wetter mountain slopes. Mountain taiga occupy 13 percent of the total land area while other mountain terrain occupy 6 percent.

The Forest Resource

Inventory: According to Barr and Braden³, forest inventories have been carried out in the U.S.S.R. annually between 1945 and 1953. Subsequent to this, inventories were carried out in 1956, 1961, 1966, 1973, 1978, 1983, and most recently 1988. The first reliable data on the entire U.S.S.R forest was obtained in 1957.

Inventories taken in 1961, 1966, 1973, 1978 and 1983 are considered reliable by Soviet foresters in evaluating the remote forests in the North, Siberia, and the Far East. The data published after each of the last three inventories have been generally consistent with previous publications. Table 2.4 shows changes in forested land and standing volume of wood for the inventories taken between 1961 and 1983.

Inventory Classification: The inventory of the U.S.S.R. has been classified into 5 broad land categories. Each of these land categories is further sub-divided into a number of smaller categories. The smallest classification used to identify stands of timber is the cover type. Indicators used to separate cover types include predominate specie and composition, forest type, age class, site class, management intensity, stocking, growing stock and merchantability, and average heights and diameters, and ownership.

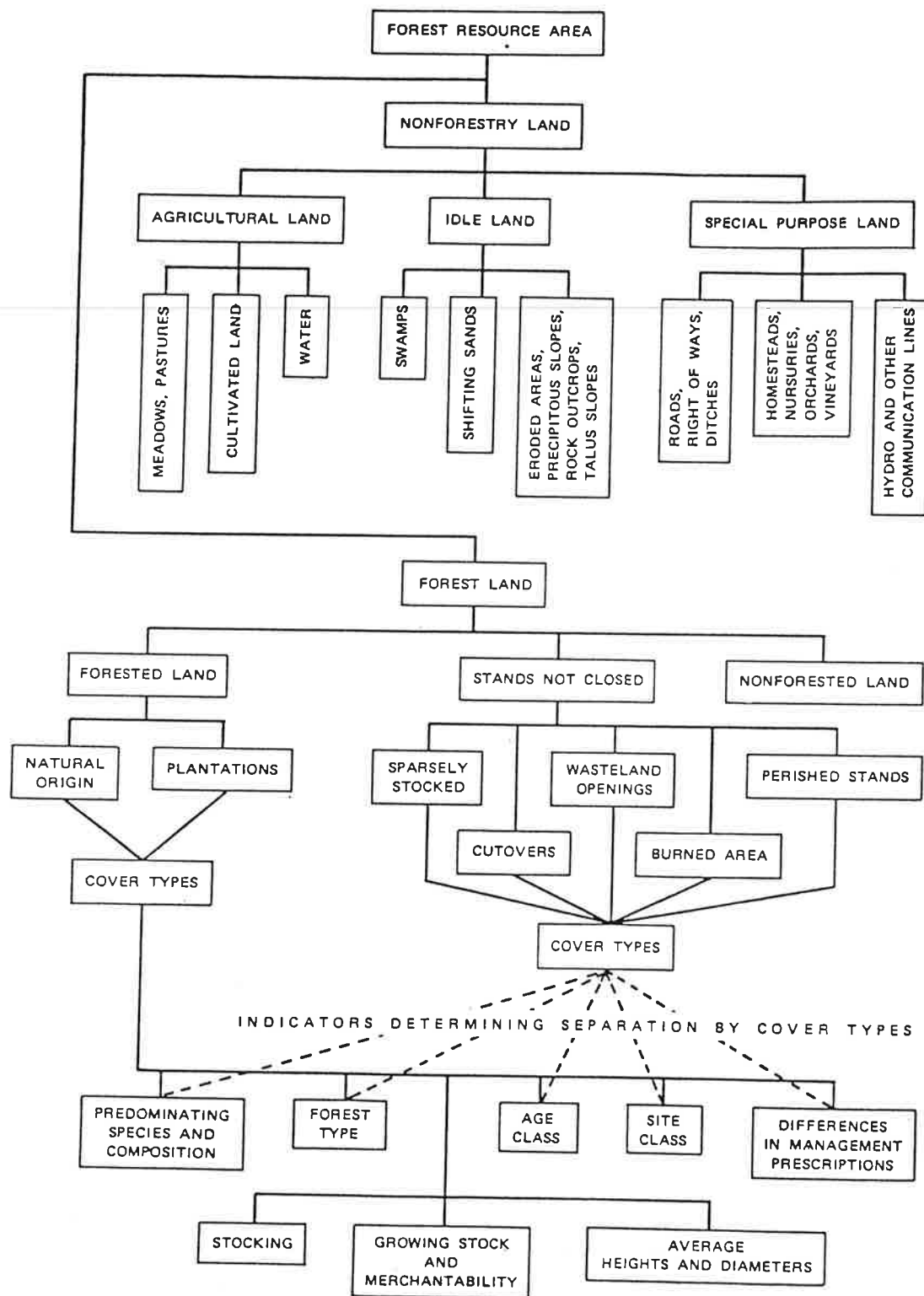
Figure 2.4 shows a schematic diagram of the land classification system for forest regulation in the U.S.S.R.

**TABLE 2-4: THE CHANGING NATURE OF STOCKED FOREST LAND
AND VOLUME OF WOOD (1961 - 1983)**

	Year in which the Inventory took place				
	1961	1966	1973	1978	1983
Stocked Forest Land					
of which forests of government control	738.1	746.8	768.8	791.6	810.9
	705.9	720.6	748.8	772.2	792.1
General volume of forests	80.2	79.7	81.9	84.1	85.9
in forests of government control	78	78	80.4	82.4	83.9

Source: Lesnaya Entsiklopediya, page 407

FIGURE 2-4: LAND CLASSIFICATION FOR FOREST REGULATION IN THE USSR



SOURCE: Forest Inventory of the USSR, T.G. Horner et alia, page 4

Ownership: The forest resources of the U.S.S.R. are entirely owned by the government. However administration of the forests is allocated to different state organizations. The organizations include the central forest authority, various ministries and agencies, state farms, and collective farms. The All-Union State Committee of Forestry, through its republic counterparts, exercises forest management control on the forests held by the various ministries and agencies and state farms in addition to the central forest authority.

These ministries and agencies as a rule are not engaged in harvesting and processing timber on an industrial scale. The forests under their jurisdiction are not primarily managed for timber supply. Thus the Ministry of Agriculture holds forest land devoted to field shelterbelts as well as land within various parks and game preserves. The Ministry of Defence is assigned forest land for troop maneuvers and for weapons testing. Various research institutions, schools, hospitals and sanatoria are allocated small areas of forest land. Collective farms and state farms hold forest land used for the supply of fuelwood and timber required for minor, rural repairs.

As of the 1983 inventory, land administered by the central forestry authorities was 1,182.8 million hectares or 94 percent of a total forest area of 1259.4 million hectares of forest land. These forests contained 92 percent (78.65 billion cubic meters) of the total standing volume of 85.9 billion cubic meters. Forests held by other ministries, state

farms and collective farms accounted for respectively 24.7 million hectares (2 percent), 32.2 million hectares (3 percent), and 19.7 million hectares (2 percent). These stands contained 2.1 billion, 3.2 billion, and 2.0 billion cubic meters of growing stock respectively. Stocked forest land held by the central authorities amounted to 745.5 million hectares or 92 percent of a total stocked forest land area of 810.9 million hectares. Forested land held by other ministries and agencies amounted to 15.7 million hectares or 2 percent of the total stocked forest area. Stocked forest land of both state farms and collective farms contained 30.9 million hectares and 18.8 million hectares amounting to 3 percent and 2 percent of the total stocked land respectively.

Table 2.5 shows the distribution of land and volume by type of government organization categories of land according to the 1983 inventory.

Land Classifications: Stocked forested land is defined as land supporting either natural or man-made forest stands. Recent clearcuts or regenerating forest in which the crowns have not closed are not considered in this category. Until crown closure is achieved, all kinds of lands under regeneration, whether cut-over or burned areas are held as a "silvicultural fund". According to the 1983 inventory, stocked forest land covered 810.9 million hectares.

Not-sufficiently stocked but productive forest land covering 252 million hectares is land that fails to meet the

TABLE 2-5: FOREST RESOURCES OF THE USSR AS PER THE 1984 INVENTORY

	Area (million ha.)		Growing Stock on Forest Land (million m3)			
	Forested Land	Non-forested, productive & non-prod. land	Total Forest Land	Total Volume, all Ages	Including mature & overmature	Conifers
Forest land administered by central forestry authorities						
Group I	142.8	113.8	256.6	15,150	6,780	
Group II	57.2	12.4	69.6	6,970	2,200	
Group III	545.5	311.1	856.6	56,530	40,670	
Sub-total, administered by central forestry authorities	745.5	437.3	1182.8	78,650	49,670	42,020
Forest land held by various ministries and agencies	15.7	9	24.7	2,060	810	580
Forest land held by state farms	30.9	1.3	32.2	3,230	880	520
Sub-total, forest land of national significance	792.1	447.6	1239.7	83,940	51,360	42,120
Forest land held by collective farms	18.8	0.9	19.7	1,960	340	140
Grand Total	810.9	448.5	1259.4	85,900	51,700	43,260

Source: Forests of the USSR, J. Holowacz, The Forestry Chronicle, October, 1985, page 367

criteria identified immediately above. Halowacz⁴ believes that these are remote from the existing forest fire protection network. He indicates that according to the 1983 inventory, about 32.6 percent of this land was in various stages of regeneration, about 1.4 percent was in need of minor assistance to attain an adequate level of stocking, while the remaining 66 percent required a major undertaking to secure a forest cover. In addition, virtually all the land in this category (97 percent) was considered inaccessible and only 4.8 million hectares had been set aside for immediate treatment.

Productive forest land is equal to stocked forest land plus productive but unstocked forest land. According to the 1983 inventory, productive forest land covered 1,062.9 million hectares.

Unproductive forest land, for physical or economic reasons, is not suitable for forest production. It includes small portions of land committed to agriculture, swamps, talus slopes, steep hillsides, rock outcrops, shifting sands, right-of-ways for roads and communication lines, fire breaks, tree nurseries, building sites, and homesteads. This land category covers about 196.5 million hectares and is administered by the central forestry authorities.

The fifth land category is obtained from the summing up of categories three and four and represents the entire land area administered by forestry authorities and collective farms. According to the 1983 inventory, forest land category

contained 1,259.4 million hectares.

Detailed information from the 1983 inventory is not available. However, detailed figures are available from the 1978 inventory for the distribution of forest land (area) by land category for every republic of the U.S.S.R. Differences between the 1983 and 1978 inventories appear minor, restricted to how currently inaccessible forest land has been classified. Table 2.6 shows the distribution of the forest land for the inventory of 1978.

Table 2.7 shows the distribution of forest land under management of the state forest sector by category of land and Republic⁵. Table 2.8 shows the percentage distribution of the State sector forest land by Republic. Table 2.9 shows the distribution of non-productive forest land by categories and republics⁶. Table 2.10 shows the percentage distribution of non-productive forestland by Republic. As Table 2.8 clearly shows, Asian USSR contains the majority of the forest land, with nearly 80 percent of stocked forest land located there. The Russian SSR contains the dominant share of the forest resource, with 96 percent of the stocked forest land.

Non-forested but productive forest land accounted for 10 percent of the general forest land, of which 5 percent are small openings and 3 percent are burned and damaged stands.

Non-forest land occupies 25 percent of the general forest area. More than half of the land is accounted for by swamps. Another 34 percent of the area has been classified as ravines, steep slopes, and stone deposits.

TABLE 2-6: DISTRIBUTION OF GOVERNMENT FOREST LAND IN THE USSR

	TOTAL AREA	THE FOREST		LAND NON-FOREST LAND
		Stocked Forests	Unstocked Forests	
Government Controlled Forests				Total
Under the management of the forest sector of this, under long-term use	1,185,946 128,048	729,359 45,021	134,294 23,747	863,654 68,768
Reserved for other ministries and government de of this, state farms	50,954 31,960	42,900 30,584	2,639 1,376	45,539 31,960
Collective farms	20,398	19,387	1,012	20,398
Total	1,257,298	791,646	137,945	929,591

Source: Lesnaya Entsiklopediya V. I., page 522

TABLE 2-7: DISTRIBUTION OF THE FOREST LAND OF THE USSR UNDER THE MANAGEMENT OF THE GOVERNMENT
(including group I, II, and III forest lands), '000 hectares.

	TOTAL LAND IN THE FOREST FUND	FORESTLAND										Total Unstocked Forest land		
		FOREST LAND		Forest		Rehabilitated Forest Stands		Stocked		Unstocked			Land Cutover Lands	Open Stocked & Waste land
		Total	Plantations	Forest	Plantations	Forest	Plantations	Glades	Burned and Destroyed	Forest				
USSR	1,057,898.3	794,885.6	684,337.6	13,546.5	177.7	4,627.5	56,402.9	30,466.3	10,428.9	8,622.4	105,920.5			
European USSR	189,160.0	158,311.1	148,636.9	11,716.5	150.3	3,265.3	416.4	783.5	4,409.2	799.8	6,408.9			
Asian USSR	868,738.3	636,574.5	535,700.7	1,830.0	27.4	1,362.2	55,986.5	29,682.8	6,019.7	7,822.6	99,511.6			
Russian SSR	1,018,250.0	762,753.8	657,647.4	8,054.1	114.4	3,623.9	54,281.0	30,299.3	10,072.2	6,830.0	101,482.5			
European Russian SSR	166,547.8	138,111.7	129,572.0	7,045.8	87.1	2,655.9	307.8	771.4	4,224.8	579.8	5,883.8			
Asian Russian SSR	851,702.2	624,642.1	528,075.4	1,008.3	27.3	968.0	53,973.2	29,527.9	5,847.4	6,250.2	95,598.7			
Ukrainian SSR	6,950.5	6,307.5	5,961.5	2,673.4	18.9	214.7	3.9	3.8	54.9	68.7	131.3			
Belorussian SSR	6,423.9	5,981.8	5,727.5	1,134.5	16.8	156.6	1.6	3.3	74.1	18.7	97.7			
Uzbekistan SSR	2,642.1	1,771.8	1,114.4	207.1	0.0	102.9	247.8	9.3	12.1	285.3	554.5			
Kazakhstan SSR	10,124.4	7,588.0	5,056.1	513.9	0.1	224.8	1,163.4	142.2	157.5	844.0	2,307.1			
Georgian SSR	2,421.7	2,253.6	2,146.5	40.2	0.3	27.1	53.7	0.4	1.8	24.1	80.0			
Azerbaijani SSR	976.8	871.5	792.8	26.8	0.2	18.2	26.6	0.9	2.3	30.7	60.5			
Lithuanian SSR	1,465.3	1,280.1	1,225.2	209.9	2.5	38.6	0.0	0.6	10.4	5.3	16.3			
Moldavian SSR	324.5	300.5	243.1	85.7	0.0	25.6	0.4	0.3	3.7	27.4	31.8			
Latvian SSR	2,105.3	1,746.0	1,656.1	270.2	22.5	57.9	0.1	1.3	21.3	9.3	32.0			
Kirgizian SSR	1,105.6	592.9	405.7	31.1	0.0	23.0	80.9	1.8	2.6	78.9	164.2			
Tadzhikistan SSR	515.9	191.0	111.2	13.1	0.0	12.6	31.7	0.8	0.0	34.7	67.2			
Armenian SSR	404.6	345.0	269.0	19.4	0.2	29.6	19.9	1.3	0.0	25.2	46.4			
Turkmenistan SSR	2,648.1	1,788.7	937.9	56.5	0.0	30.9	489.5	0.8	0.1	329.5	819.9			
Estonian SSR	1,539.6	1,113.4	1,043.2	210.6	1.8	41.1	2.4	0.2	15.9	10.6	29.1			

Source: Lesnaya Entsiklopediya, V. I, page 522

**TABLE 2-8: PROPORTION OF FOREST LAND OF THE USSR UNDER THE MANAGEMENT OF THE GOVERNMENT
(including group I, II, and III forest lands) Percent of Each Land Category by Geographic Region**

	Total Land	Stocked Forest Land			Unstocked Forest Land			Total		
		Forest Land Total	Forest Plantations	Rehabilitated Forest Stands	Low Stocked Plantations	Glades	Burned and Destroyed Lands	Cutover Lands	Open Stocked & Waste land	Unstocked Forest land
USSR	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
European USSR	17.9%	19.9%	21.7%	86.5%	0.7%	2.6%	42.3%	9.3%	6.1%	
Asian USSR	82.1%	80.1%	78.3%	13.5%	99.3%	97.4%	57.7%	90.7%	93.9%	
Russian SSR	96.3%	96.0%	96.1%	59.5%	64.4%	78.3%	96.6%	79.2%	95.8%	
European Russian SSR	15.7%	17.4%	18.9%	52.0%	49.0%	57.4%	0.5%	2.5%	6.7%	5.6%
Asian Russian SSR	80.5%	78.6%	77.2%	7.4%	15.4%	20.9%	95.7%	96.9%	72.5%	90.3%
Ukrainian SSR	0.7%	0.8%	0.9%	19.7%	10.6%	4.6%	0.0%	0.0%	0.5%	0.1%
Belorussian SSR	0.6%	0.8%	0.8%	8.4%	9.5%	3.4%	0.0%	0.0%	0.7%	0.1%
Uzbekistan SSR	0.2%	0.2%	0.2%	1.5%	0.0%	2.2%	0.4%	0.0%	0.1%	0.5%
Kazakhstan SSR	1.0%	1.0%	0.7%	3.8%	0.1%	4.9%	2.1%	0.5%	1.5%	2.2%
Georgian SSR	0.2%	0.3%	0.3%	0.3%	0.2%	0.6%	0.1%	0.0%	0.0%	0.1%
Azerbaijani SSR	0.1%	0.1%	0.1%	0.2%	0.1%	0.4%	0.0%	0.0%	0.0%	0.1%
Lithuanian SSR	0.1%	0.2%	0.2%	1.5%	1.4%	0.8%	0.0%	0.0%	0.1%	0.0%
Moldavian SSR	0.0%	0.0%	0.0%	0.6%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%
Latvian SSR	0.2%	0.2%	2.0%	2.0%	12.7%	1.3%	0.0%	0.0%	0.2%	0.0%
Kirgizian SSR	0.1%	0.1%	0.1%	0.2%	0.0%	0.5%	0.1%	0.0%	0.0%	0.0%
Tadzhikistan SSR	0.0%	0.0%	0.0%	0.1%	0.0%	0.3%	0.0%	0.0%	0.0%	0.1%
Armenian SSR	0.0%	0.0%	0.0%	0.1%	0.1%	0.6%	0.0%	0.0%	0.0%	0.0%
Turkmenistan SSR	0.3%	0.2%	0.1%	0.4%	0.0%	0.7%	0.9%	0.0%	0.0%	0.8%
Estonian SSR	0.1%	0.1%	0.2%	1.6%	1.0%	0.9%	0.0%	0.0%	0.2%	0.1%

Source: Derived from Lesnaya Entsiklopediya V. I, page 522

TABLE 2-9: DISTRIBUTION OF NON FOREST LAND OF THE USSR UNDER THE MANAGEMENT OF THE GOVERNMENT
(including group I, II, and III forest lands), '000 hectares.

TOTAL NON-FOREST LAND	LAND			LAND OF SPECIAL PURPOSE				UNUSEABLE		LAND	
	Cultivated Land	Hayfields	Pasture	Water	Roads, R of W, Canals	Farmsteads, & other lands	Swamps	Deserts	Gorges, Steep Slopes, Stone deposits		
USSR	263,012.7	447.7	4,004.0	17,858.9	2,683.7	1,301.3	135,909.7	4,465.4	89,679.2		
European USSR	30,848.9	232.9	1,384.0	3,206.4	1,125.5	814.7	21,908.4	293.0	1,411.6		
Asian USSR	232,163.8	214.8	2,620.0	14,652.5	1,558.2	486.6	114,001.3	4,172.4	88,267.6		
Russian SSR	255,496.2	277.5	3,505.5	17,654.9	2,339.4	1,069.7	134,731.5	3,743.6	87,783.5		
European Russian SSR	28,436.1	124.3	1,151.4	3,120.0	829.5	633.9	20,919.8	221.4	1,171.3		
Asian Russian SSR	227,060.1	153.2	2,354.1	14,534.9	1,509.9	435.8	113,811.7	3,522.2	86,612.2		
Ukrainian SSR	643.0	36.4	82.3	40.8	84.9	59.3	187.7	22.1	98.5		
Belorussian SSR	442.1	12.1	56.2	7.1	80.9	34.4	240.2	3.3	0.4		
Uzbekistan SSR	870.3	7.6	0.8	33.4	7.8	9.9	46.0	34.3	297.5		
Kazakhstan SSR	2,536.4	47.1	255.1	66.2	36.3	28.8	67.6	312.3	766.5		
Georgian SSR	168.1	4.1	10.1	4.6	2.6	7.5	5.3	15.3	56.9		
Azerbaijani SSR	105.3	11.5	7.6	2.9	1.1	7.2	0.9	9.9	33.6		
Lithuanian SSR	185.2	18.7	21.8	4.6	30.6	28.0	55.7	0.1	0.5		
Moldavian SSR	24.0	1.2	0.6	0.3	2.0	4.4	0.7	0.4	14.4		
Latvian SSR	359.4	14.8	25.9	10.5	59.2	14.6	198.2	12.8	6.4		
Kirgizian SSR	512.7	3.9	8.7	6.2	1.1	5.2	0.7	44.3	200.0		
Tadzhikistan SSR	324.9	0.7	0.6	8.9	0.3	2.4	5.5	0.5	251.7		
Armenian SSR	59.6	2.0	4.4	0.6	0.8	5.0	0.1	4.4	19.0		
Turkmenistan SSR	859.4	0.7	377.9	2.8	4.5	69.8	258.8	139.7	426.2		
Estonian SSR	426.2	7.8	23.7	15.0	33.9	20.4	299.8	3.3	10.6		

Source: Lesnaya Entsiklopediya V. I, page 522

**TABLE 2-10: PROPORTION OF NON FOREST LAND OF THE USSR UNDER THE MANAGEMENT OF THE GOVERNMENT
(Including group I, II, and III forest lands) Percent of Each Land Category by Geographic Region**

	Total Non-Forest Land	Land of Special Purpose Unuseable Land										
		Cultivated Land	Hayfields	Pasture	Water	Roads, R of W, Canals	Farmsteads, Swamps & other lands	Deserts	Gorges, Steep Slopes, Stone deposits			
USSR	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
European USSR	11.7%	52.0%	34.6%	7.1%	18.0%	41.9%	16.1%	6.6%	1.6%			
Asian USSR	88.3%	48.0%	65.4%	92.9%	82.0%	58.1%	83.9%	93.4%	98.4%			
Russian SSR	97.1%	62.0%	87.5%	65.9%	98.9%	87.2%	82.2%	99.1%	97.9%			
European Russian SSR	10.8%	27.8%	28.8%	4.0%	17.5%	30.9%	48.7%	15.4%	5.0%			
Asian Russian SSR	86.3%	34.2%	58.8%	61.9%	81.4%	56.3%	33.5%	83.7%	96.6%			
Ukrainian SSR	0.2%	8.1%	2.1%	0.5%	0.2%	3.2%	4.6%	0.1%	0.1%			
Belorussian SSR	0.2%	2.7%	1.4%	0.1%	0.0%	3.0%	2.6%	0.2%	0.0%			
Uzbekistan SSR	0.3%	1.7%	0.0%	6.5%	0.2%	0.3%	0.8%	0.0%	0.3%			
Kazakhstan SSR	1.0%	10.5%	6.4%	14.4%	0.4%	1.4%	2.2%	0.0%	0.9%			
Georgian SSR	0.1%	0.9%	0.3%	0.9%	0.0%	0.1%	0.6%	0.3%	0.1%			
Azerbaijani SSR	0.0%	2.6%	0.2%	0.5%	0.0%	0.0%	0.6%	0.0%	0.0%			
Lithuanian SSR	0.1%	4.2%	0.5%	0.4%	0.0%	1.1%	2.2%	0.0%	0.0%			
Moldavian SSR	0.0%	0.3%	0.0%	0.0%	0.0%	0.1%	0.3%	0.0%	0.0%			
Latvian SSR	0.1%	3.3%	0.6%	0.3%	0.1%	2.2%	1.1%	0.1%	0.3%			
Kirgizian SSR	0.2%	0.9%	0.2%	3.6%	0.0%	0.0%	0.4%	0.0%	0.2%			
Tadzhikistan SSR	0.1%	0.2%	0.0%	0.8%	0.0%	0.0%	0.2%	0.0%	0.3%			
Armenian SSR	0.0%	0.4%	0.1%	0.3%	0.0%	0.0%	0.4%	0.0%	0.0%			
Turkmenistan SSR	0.3%	0.2%	9.4%	0.0%	0.0%	0.2%	5.4%	0.2%	0.5%			
Estonian SSR	0.2%	1.7%	0.6%	0.2%	0.1%	1.3%	1.6%	0.2%	0.0%			

Source: Derived from Lesnaya Entsiklopediya V. I, page 522

Management Intensity: The forests of the Soviet Union have been divided into three categories depending on the significance of the forest, their location, and their designated function. Forests under government control have been divided into categories I, II, and III, while collective and state farm forests have been divided into groups I and II. Table 2.11 delineates the distribution of forest area and volume by management intensity group for forests administered by the central forestry authorities.

Group I forests, which occupy 22 percent of the general forest land and 19 percent of the volume (administered by the central authorities), perform mainly watershed, protective, sanitary-hygienic, and health functions. These are: protective strips along banks of rivers, lakes water reservoirs, and other water bodies (including protective strips along spawning grounds for commercial fish); protective forests (including sections of forest on steep mountain slopes), protective strips along railway lines, major highways, and of areas of republic and oblast significance such as whole mountain ranges; city forests around cities, other population centers and industrial enterprises, forest zones protecting springs of water supply and protective forests around vacation resorts. In group I forests are also located restricted forests, national parks, forest parks, forests and forested regions having scientific or historical significance. In Group I forests, is established the most strict and stringent regulations for

**TABLE 2-11: DISTRIBUTION OF GOVERNMENT FOREST LAND BY
MANAGEMENT INTENSITY CLASS
FOR THE 1983 INVENTORY**

Management Intensity Class	Total Land	Stocked	Total	Volume of
	Million Ha.	Forest Land Million Ha.	Volume Forest Stands Billion m3	Mature and Overmature Wood Billion m3
Group I	256.6	142.7	15.15	6.78
Group II	69.6	57.2	6.97	2.2
Group III	856.6	545.6	56.53	40.69
Total	1182.8	745.5	78.65	49.67

Source: Lesnaya Entsiklopediya, V. II, page 404

utilization. (for example, harvesting of wood in this group can only occur for the purpose of forest restoration, as well as the cutting of intermediate utilization - output from the forest associated with restoration of the less adequately stocked forest stands).

Group II forests, which occupy 6 percent of the general forest land and 9 percent of the volume contains forests located in high density population areas and where there is a high density of transportation networks, having protective and organizational importance, as well as forest with insufficient forest material. To preserve the character of these areas, and to provide continuous and inexhaustible utilization, more stringent regulations are needed than in Group III. Included in Group II are all collective farm forests. In this group clear cutting, selective cutting and intermediate cutting can occur.

Group III forests contain 72 percent of the general forest area and 72 percent of the growing stock. They are located in the most heavily forested regions of the country (located primarily east of the Ural mountains). They have mainly exploitive significance and are intended chiefly for the continuous satisfaction of the needs of the economy for wood without damaging the forest. Clear cutting is the chief form of cutting in Group III forests.

Site Quality and Stocking Density: There are 5 main site classes, running from I through V. Outside of this range, there are two additional classes called Ia and Va. The

highest class is Ia while the lowest class is Va. I

In addition to the site classification, the Soviets utilize a measure of stocking density which is related either to the total sum of basal area or to the degree of crown closure. The two measures do not produce similar results. The results vary depending on the specie, age, and condition of the stand.

Stocking density can be divided into absolute and relative densities. Absolute stocking density is expressed as the sum of the basal area of all trees higher than 1.3 meters or as the general area of crown closure. Relative density is expressed as a percentage figure of 1.0.

For the purposes of the inventory, the forests of the Soviet Union are divided into three site class groupings and 3 stocking class groupings. The site groupings are high site -containing the site classes II and higher, medium site -containing site class III and IV; and poor site class -containing site classes V and lower. The quality groupings are fully stocked with sites containing 70 percent density or higher, average stocking containing a density of between 31 to 69 percent, and sparsely stocked containing a stocking density of below 30 percent.

Distribution of forest stands by site class and stocking density are not available separated by stand types. A breakdown of forest stand area by site class and stocking density was completed by Barr-Braden. Table 2.12 clearly shows that more than 70 percent of the stands of the USSR lie

TABLE 2-12
DISTRIBUTION OF FOREST STANDS BY SITE QUALITY AND STOCKING
DENSITY
(% OF TOTAL STANDS)

Site Quality ^a	Stocking Density ^b	High			Medium			Low		
		Total	F	Av	Sp	F	Av	Sp	F	Av
USSR	100	6	4	<1	20	41	8	3	12	5
RSFSR	100	5	3	<1	21	42	8	3	13	5
Northwest	100	>4	>2	>-	28	41	>3	>3	15	3
Center	100	55	23	<1	13	8	<1	<1	<1	>-
Volgo-Vyatka	100	41	16	<1	24	16	1	1	1	>-
Black Earth	100	51	16	1	19	12	<1	>-	1	>-
Volga Littoral	100	28	11	1	31	27	2	<1	<1	>-
North Caucasus	100	24	19	1	23	28	2	1	2	<1
Urals	100	16	9	<1	35	35	>1	2	2	>-
Western Siberia	100	5	5	1	17	47	7	4	12	2
Eastern Siberia	100	2	2	<1	26	48	6	1	12	3
Far East	100	1	2	<1	13	41	14	4	16	9
Belorussia	100	44	21	<1	19	13	<1	1	1	>-
Latvia	100	43	21	1	21	13	1	-	-	-
Lithuania	100	45	21	1	20	12	<1	<1	>-	>-
Ukraine	100	62	16	<1	13	7	<1	1	<1	>-
USSR Europe-Uralia	100	19	9	<1	27	31	2	2	8	1
USSR Asia	100	2	3	<1	18	45	10	3	13	6

^aHigh-site quality contains Class 2 and above according to the M. M. Orlov Scale; medium-site quality contains Classes 3 and 4; low-site quality contains Class 5 and below.

^bStocking: F = fully stocked, 70 percent density and above; Av = average stocking, 31-69 percent density; Sp = sparsely stocked, 30 percent density and below.

Source: Derived from Vorob'yev *et al.* (1979, p. 83).

SOURCE: The Disappearing Russian Forest, Brenton Barr and Kathleen Braden, page 50

in the medium site class; and more than 80 percent of the stands are either fully stocked or averagely stocked.

Age Class and Specie Groupings: The forests of the U.S.S.R. are divided into five age class groupings.

1. Establishment

This stage continues from stand establishment until crown closure. In the conifers and shade tolerant hardwoods, this period continues from stand establishment until age 20 to 30. In shade intolerant hardwood species, this period extends from stand establishment until age 10.

2. Young stand

This stage is characterized by high rates of height growth, leaf growth, and trunk growth. This stage is reached at age 15 to 20 and ends anywhere from 30 to 40 years. This stage depends on the biological characteristics of the tree, the density and the rate of growth.

3. Middle Aged Forests

This stage usually occurs in the conifer and shade tolerant hardwoods between the ages of 40 and 60; and between 20 and 30 for the shade intolerant species. In this age class of forests, intermediate cuttings are scheduled.

4. Mature Forests

Forests are considered mature for conifer and shade tolerant species between the ages of 60 - 120 and for

intolerant hardwood species between 40 - 50. It is in this and the overmature age class forests that primary cutting is concentrated.

5. Over Mature Forests

These types of stands are characterized by poor growth in the canopy, and slow increases in the volume of wood. In the European part of USSR, this category is attained at approximately age 120-140 years for conifer species, and 50-70 years for hardwood species.

The forest inventory is also broken down into broad forest specie groupings consisting of conifers, "soft" hardwoods and "hard" hardwood trees. "Soft" hardwood trees include lime tree, poplar, and alder. The hardness of wood is less than 40 MPa. "Hard" hardwood trees include hornbeam, beech, oak, and ash. The hardness of the wood is greater than 40 MPa.

Table 2.13 shows a breakdown of stands by age class for the three species groupings for stocked forest land under management of the central authorities.

Conifer species occupy 74 percent of the total area, followed by "hard" hardwood trees representing 3 percent and "soft" hardwoods representing 16 percent. Scrub occupies 6 percent of the area. The major age classes are mature and overmature which collectively contain 51 percent of total area.

TABLE 2-13: DISTRIBUTION OF STOCKED FOREST LAND UNDER THE MANAGEMENT OF THE FOREST SECTOR BY AGE CLASS AND SPECIE TYPE (PERCENT)

	Young	Middle Aged	Approaching Mature	Mature & Overmature	Total Forest	Scrub
Coniferous	11	12	6	44	74	
Hardwood deciduous trees	1	1	0	1	3	
Softwood deciduous trees	4	5	2	6	16	
Total	16	18	8	51	94	6

Source: Derived from Lesnaya Entsiklopediya, V. I- page 522, V. II - page 404

Mountain Forests: Another classification system is to differentiate between mountain forests and non-mountain forests. Nearly 36 percent of the stocked forest land of the U.S.S.R. is classified as mountain forests. These are located primarily in the eastern part of the Soviet Union - in East Siberia and in the Far East. Tables 2.14 and 2.15 show the distribution of the mountain forests by Republic.

The importance of the mountain forests to the overall forest land varies depending on the Republic, varying from a low of 2 to 3 percent in West Siberia to 100 percent of the general and stocked forest land in the republics of Kirgizstan and Armenia. The distribution of wood volumes follows a similar distribution as that of the forest land area.

Species Distribution: Table 2.16 shows the distribution the major species by area and volume for the land under control of the state forest organizations. This excludes the amount of land set aside for long-term usage. There are more than 570 types of trees and more than 1050 varieties of brushes in the forests of the USSR. In addition many species of plants have been introduced from other countries in the last 250 years. The largest area of the forest fund is occupied by coniferous species (74%) including larch (38.3%), pine (16.6%), spruce (11.1%), cedar pine (5.8%), and true firs (2.3%). The share of "hard" hardwood trees is 5% and the "soft" hardwoods 16.8%. The "hard" hardwoods are mainly distributed in the European-Uralean part of the U.S.S.R.

**TABLE 2-14: MOUNTAIN FORESTS AS A PROPORTION OF
TOTAL GOVERNMENT FOREST BY REPUBLIC**

	General Land	Stocked Forest Land
USSR	39.0%	36.0%
European Part	12.0%	13.0%
Asian Part	45.0%	43.0%
Russian SSR	40.0%	37.0%
European Part	10.0%	11.0%
Asian Part	45.0%	43.0%
North-west	3.0%	2.0%
Povolzhshiy	41.0%	42.0%
North Caucasus	79.0%	85.0%
Uralian	27.0%	28.0%
West Siberia	7.0%	9.0%
East Siberia	40.0%	39.0%
Far East	59.0%	56.0%
Ukrainian SSR	22.0%	23.0%
Kazakhstan SSR	22.0%	21.0%
Uzbekistan SSR	22.0%	10.0%
Georgian SSR	96.0%	98.0%
Azerbaijani SSR	83.0%	87.0%
Kirgiz SSR	100.0%	100.0%
Tadzhikshan SSR	95.0%	92.0%
Armenian SSR	100.0%	100.0%
Turkmenistan SSR	9.0%	5.0%

Source: Gorniye Lesa, page 8

**TABLE 2-15: DISTRIBUTION OF MOUNTAIN FOREST AREA
BY GEOGRAPHIC REGION**

USSR	100.0%
European Part	5.2%
Asian Part	94.8%
Russian SSR	96.6%
European Part	4.1%
Asian Part	92.5%
North-west	0.7%
Povolzhshiy	1.0%
North Caucasus	0.6%
Uralian	1.8%
West Siberia	2.3%
East Siberia	24.8%
Far East	65.4%
Ukrainian SSR	0.3%
Kazakhstan SSR	0.9%
Uzbekistan SSR	0.0%
Georgian SSR	0.0%
Azerbaijani SSR	0.0%
Kirgiz SSR	0.0%
Tadzhikshan SSR	0.4%
Armenian SSR	0.1%
Turkmenistan SSR	0.1%

Source: Gorniye Lesa, page 8

TABLE 2-16: GOVERNMENT FORESTS BY MAJOR FOREST SPECIES FOREST TREE SPECIES (AREA AND VOLUME) OF FORES
(excl. forests under long-term use)

Tree Species	LAND million ha.	AREA Percent	GENERAL Billions m3	VOLUME MATURE AND OVERMATURE STANDS			Volume billion m3	Percent
				Percent	Area million ha.	Percent		
Larch	267.8	38.3	25.4	33.3	162.4	45.7	18.6	38.8
Pine	116.3	16.6	14.8	19.4	48	13.5	7.8	16.3
Spruce	77.4	11.1	11.2	14.7	54.4	15.3	8.8	18.4
Cedar Pine	40.6	5.8	7.4	9.7	21	5.9	3.9	8.1
Fir (Abies)	15.9	2.3	2.7	3.6	9.4	2.6	1.8	3.8
Juniper	0.3	0.1	0.008	0	0.09	0	0.003	0
Total Coniferous	518.3	74.2	61.5	80.7	295.3	83	40.9	85.4
High Oak	5.8	0.8	0.6	0.8	1.1	0.3	0.2	0.4
Coppice Oak	3.9	0.6	0.4	0.5	0.8	0.2	0.1	0.2
Stone Birch	5.5	0.8	0.5	0.7	3.8	1.1	0.4	0.8
Beech	2.6	0.4	0.6	0.8	0.7	0.2	0.2	0.4
Hornbeam	0.8	0.1	0.1	0.1	0.2	0.1	0.04	0.1
Ash	0.8	0.1	0.1	0.1	0.3	0.1	0.05	0.1
Maple	0.4	0.06	0.05	0.1	0.3	0.1	0.03	0.1
Elm	0.4	6	0.04	0	0.1	0	0.02	0
Saksaul (Haloxylon)	3.9	0.6	0.009	0	0.8	0.2	0.002	0
Belia Acacia	0.2	0.03	0.008	0	0.02	0	0.002	0
Total Hard deciduous spec	24.3	3.5	2.4	3.1	8.1	2.3	1	2.1
Birch	87.3	12.5	8	10.5	27.5	7.7	3.7	7.7
Aspen	18.5	2.7	2.6	3.4	8.5	2.4	1.8	3.8
Lime tree	2.9	0.4	0.4	0.5	0.9	0.3	0.2	0.1
Black Alder	1.8	0.3	0.2	0.3	0.2	0.1	0.04	0.1
Gray Alder	0.7	0.1	0.07	0.1	0.5	0.1	0.08	0.2
Popular	0.9	0.1	0.1	0.1	0.5	0.1	0.08	0.2
Willow	0.9	0.1	0.06	0.1	0.2	0.1	0.02	0.1
Total Softwood deciduous	113	16.2	11.4	15	37.9	10.7	5.8	12.1
Total predominate tree sp	655.6	93.9	75.3	98.8	341.3	96	47.7	99.6
Other tree species	0.6	0.1	0.04	0.1	0.2	0.1	0.02	0.01
Brush	42.7	6.1	0.84	1.1	14.1	3.9	0.2	0.4
TOTAL	698.9	100	76.2	100	355.6	100	47.9	100

Source: Lesnaya Entsiklopediya, V. II, page 404.

Larch, the principal specie, is located primarily in East Siberia, east of the Ural mountains. Distribution of major species by Republic and region is delineated in Table 2.17.

Accessibility

The Soviet forests are also categorized according to accessibility. Forests are either currently exploitable (accessible), potentially accessible, and either inaccessible or precluded from exploitation. Inaccessible forests are generally of low productivity (site class Va and lower), and considered not suitable for commercial exploitation under current economic conditions. Precluded from harvest are protection forests where industrial harvest is prohibited or at least markedly restricted and consequently made "inaccessible" by law.

Table 2.18 shows the distribution of mature and overmature timber by accessibility class. By combining exploitable accessible forests the predominantly accessible protection forests, the overall accessibility of the Soviet forest resources is approximately 55 percent of forest volume. The location of accessible and inaccessible forests is delineated in Figure 2.5.

Allowable Annual Cut

The general overall growth of the forests under the management of the central government is 905.2 million cubic meters of which the main forest species represent 890.7

TABLE 2-17
SPECIES COMPOSITION OF FORESTED AREAS
(% OF AREA TOTAL)

	Conifers				Hardwoods					
	Total - Including: Pine Spruce & Fir	Larch	SIHS	STHS	- Including High Forest - Of which: Oak Beech	Scrub				
USSR ^a	75	17	14	38	17	3	2	1	<1	5
RSFSR	76	17	14	40	>16	2	<2	<1	>-	5
Northwest	80	32	47	<1	20	-	-	-	-	-
Center	46	28	18	-	51	3	1	1	-	-
Volgo-Vyatka	51	29	22	-	45	4	2	2	-	-
Black Earth	28	28	-	-	18	54	18	17	-	-
Volga Littoral	21	16	3	-	53	26	3	3	-	-
North Caucasus	10	8	-	-	16	74	37	13	24	-
Urals	77	18	54	-	15	-	-	-	-	-
RSFSR: Europe-Uralia	65	29	35	<1	30	5	<2	1	<1	<1
Western Siberia	69	35	6	6	31	-	-	-	-	-
Eastern Siberia	85	16	6	48	15	-	-	-	-	-
Far East	69	3	12	51	24 ^b	7	2	2	-	-
RSFSR: Asia	79	13	9	50	13	2	2	<1	-	-
Belorussia	68	58	9	>-	28	<5	<5	4	>-	-
Baltics(Latvia)	68	51	17	>-	32	<1	<1	<1	-	-
Southwest (Ukraine)	47	36	11	-	11	41	31	21	9	1
Caucasus (Georgia)	19	4	15	-	8	66	61	7	49	7
USSR: Europe-Uralia	63	30	32	-	29	8	4	2	<2	-
USSR: Asia	78	13	9	49	13	2	2	<1	-	7

^aEach row sums to 100 percent.

^bIncludes scrub.

Source: Derived from Vorob'yev *et al.* (1979, p. 78).

SIHS=Shade intolerant hardwood species corresponds to our terminology of "soft" hardwoods

STHS=Shade tolerant hardwood species corresponds to our terminology of "hard" hardwoods.

SOURCE: The Disappearing Russian Forest, Brenton Barr and Kathleen Braden, page 42

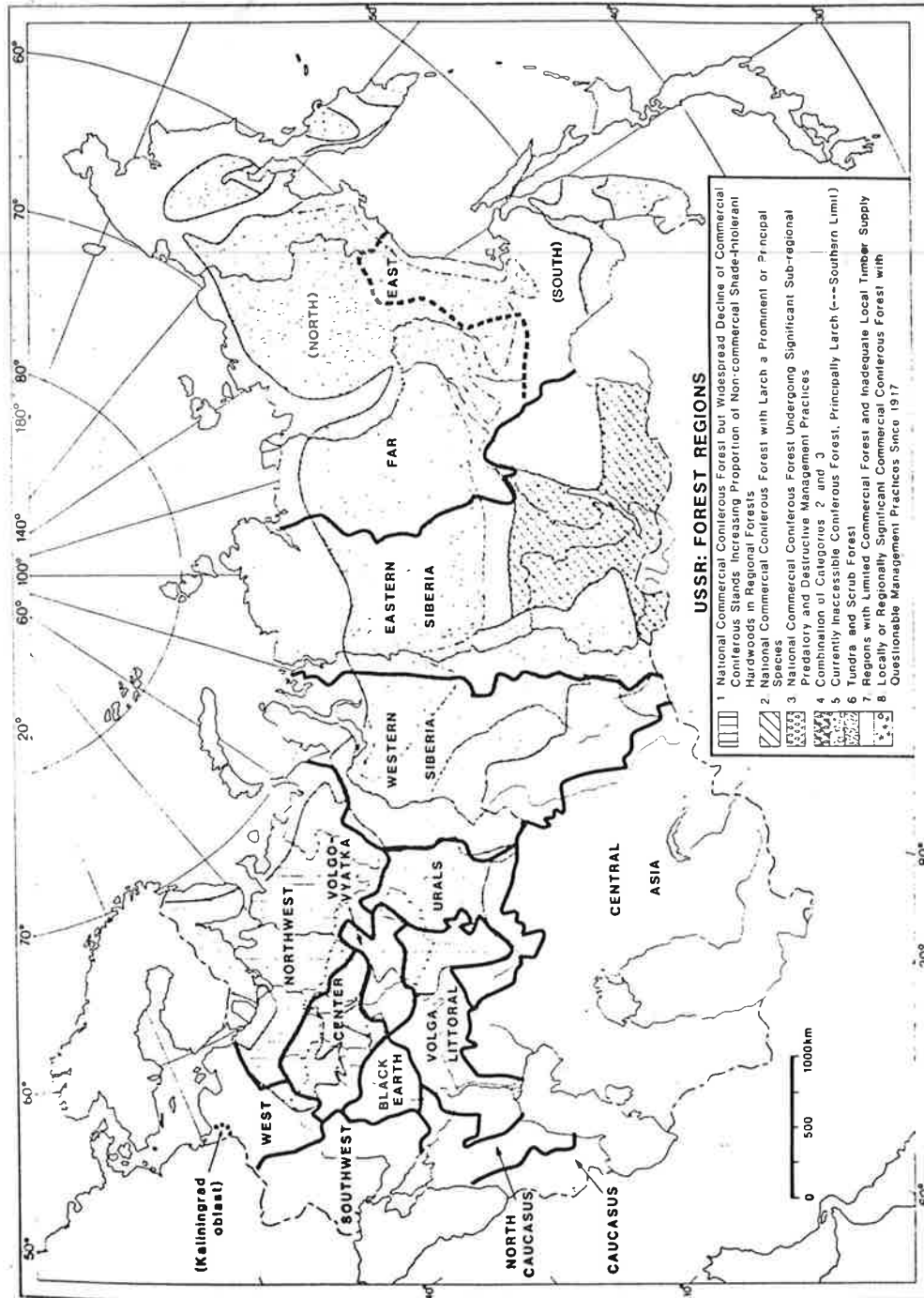
TABLE 2-18
VOLUME OF MATURE TIMBER IN ACCESSIBLE AND POTENTIALLY
ACCESSIBLE FORESTS (BY FOREST GROUP)
(MILLIONS OF CUBIC METERS)

	All Groups				Conifers			
	Total	Group:			Total	Group:		
		3	2	1		3	2	1
USSR	28,168	24,414	2,080	1,674	22,589	20,084	1,307	1,198
USSR Europe-Uralia	7,762	5,758	1,382	622	6,022	4,901	792	329
USSR Asia	20,406	18,656	698	1,052	16,567	15,183	515	869
RSFSR	27,868	24,353	1,939	1,576	22,427	20,033	1,239	1,155
RSFSR Europe-Uralia	7,564	5,758	1,258	548	5,934	4,901	733	30
RSFSR Asia	20,304	18,595	681	1,028	16,493	15,132	506	855
	SIHS				STHS			
	Total	Group:			Total	Group:		
		3	2	1		3	2	1
USSR	4,981	3,958	645	378	598	372	128	98
USSR Europe-Uralia	1,521	820	494	207	219	37	96	86
USSR Asia	3,460	3,138	151	171	379	335	32	12
RSFSR	4,916	3,943	606	362	525	372	94	59
RSFSR Europe-Uralia	1,483	820	463	200	147	37	62	48
RSFSR Asia	3,433	3,128	143	162	378	335	32	11

Source: Compiled from Vorob'yev *et al.* (1979, pp. 46-47).

SOURCE: The Disappearing Russian Forest, Brenton Barr and Kathleen Braden, page 52

FIGURE 2-5: USSR - MAJOR FOREST REGIONS...accessibility, utility, and extent of management



SOURCE: The Disappearing Russian Forest, Brenton Barr and Kathleen Braden, page 5

million cubic meters. Coniferous forest contains 602.4 million cubic meters, soft hardwoods 252.5 million cubic meters and hard deciduous trees 35.8 million cubic meters of this overall growth. About 15 percent of the annual growth occurs in forested stands of site class Va and lower. These forests (site class Va and lower) do not have industrial use, but have large importance for protection.

The main tool used to regulate the harvest is the allowable annual cut. The allowable annual cut in accessible and potentially accessible forests is 634.3 million cubic meters. This consists of nearly 400 million cubic meters in coniferous species, 15 million in hard wood deciduous species, and more than 220 million cubic meters in softwood deciduous species. Besides this, there is an estimated 201 million cubic meters in reserve and inaccessible forests.

Thus, the potential allowable cut in forests currently accessible and those potentially accessible, plus those in inaccessible and reserve forests, is more than 835 million cubic meters. Table 2.19 shows the distribution of the allowable cut for 1982 and the amount of use. Table 2.20 shows the distribution of the allowable cut for 1979 by management intensity class. Table 2.21 shows the allowable cut in Reserve and potentially accessible forests.

TABLE 2-19: ALLOWABLE ANNUAL CUT AND PERCENT UTILIZED IN 1982 (in forests under the management of the Forest Ministry), '000 m³

	ALLOWABLE CUT				WOOD ACTUALLY HARVESTED				PERCENTAGE USE OF THE ALLOWABLE CUT				THINNINGS	
	Total Of which according to specie type				Total Of which, according to specie type				Total Of which, according to specie type				Thinning and Sanitation Cuttings	Other cuttings
	Coniferous	Hardwood Deciduous Species	Softwood Deciduous Species	Total	Coniferous	Hardwood Deciduous Species	Softwood Deciduous Species	Total	Coniferous	Hardwood Deciduous Species	Softwood Deciduous Species	Total		
USSR	634,268	396,889	15,438	221,929	317,600	225,207	7,711	84,682	50.1%	56.7%	49.9%	38.2%	42,281	16,614
European Part of the Country	250,060	134,374	9,496	106,190	192,356	118,925	6,542	66,889	76.9%	88.5%	68.9%	62.9%	35,849	7,285
of which, much forested regions	171,299	107,611	2,090	61,598	129,852	95,885	236	33,731	75.8%	89.1%	11.3%	54.8%	5,441	3,694
of which, the remaining regions	78,761	26,763	7,406	44,592	62,504	23,040	6,306	33,158	79.4%	86.1%	85.1%	74.4%	30,408	3,591
Asian Part of the Country	384,208	262,525	5,942	115,739	125,244	106,282	1,169	17,793	32.6%	40.5%	19.7%	15.4%	6,432	9,329
of which, much forested regions:	103,464	49,344	0	54,120	28,690	18,685	0	10,005	27.7%	37.9%	0.0%	18.5%	2,111	4,184
West Siberia	174,175	125,588	0	48,567	61,068	55,219	0	5,849	35.1%	44.0%	0.0%	12.0%	2,337	3,102
East Siberia	103,395	85,898	5,684	11,813	33,671	31,444	1,011	1,166	32.6%	36.7%	17.8%	9.9%	1,331	1,863
Far East														
of which, the remaining regions	3,098	1,677	202	1,219	1,759	884	102	773	56.8%	52.7%	50.5%	63.4%	55	142
Kazakhstan SSR		74	56	0	56	0	56	0	75.7%	0.0%	100.0%	0.0%	101	11
Central Asia (Uzbekistan, Kirgiz SSR, Turkmenistan, Tadzhikistan)														

Source: Lesnaya Entsilopediya, V. II, page 404

TABLE 2-20
CALCULATED ALLOWABLE CUT IN ACCESSIBLE AND POTENTIALLY
ACCESSIBLE FORESTS UNDER CENTRAL STATE FOREST MANAGEMENT
(MILLIONS OF CUBIC METERS)

	All Forest Groups				Group 3			
	Total	Conifers	SIHS	STHS	Total	Conifers	SIHS	STHS
USSR	636.7	403.3	218.1	15.3	479.5	334.2	139.0	6.3
USSR Europe-Uralia	250.0	137.5	103.3	9.2	131.6	91.7	38.4	1.5
USSR Asia	386.7	265.8	114.8	6.1	347.9	242.5	100.6	4.8
RSFSR	618.9	395.3	210.7	12.9	478.2	333.2	138.6	6.4
RSFSR Europe-Uralia	235.5	131.2	97.1	7.2	131.6	91.7	38.4	1.5
RSFSR Asia	383.4	264.1	113.6	5.7	346.6	241.5	100.2	4.9
	Group 2				Group 1			
	Total	Conifers	SIHS	STHS	Total	Conifers	SIHS	STHS
USSR	106.4	47.2	54.1	5.1	50.8	21.9	25.0	3.9
USSR Europe-Uralia	86.0	35.4	47.1	4.4	31.5	10.4	17.8	3.3
USSR Asia	19.5	11.8	7.0	0.7	19.3	11.5	67.2	0.6
RSFSR	95.5	41.8	49.6	4.1	45.2	20.3	22.5	2.4
RSFSR Europe-Uralia	76.5	30.2	42.8	3.5	27.4	9.3	15.9	2.2
RSFSR Asia	19.0	11.6	6.8	0.6	17.8	11.0	6.6	0.2

Source: Compiled from Vorob'yev *et al.* (1979, p. 57).

SIHS=Shade intolerant hardwood species corresponds to our terminology of "soft" hardwoods
STHS=Shade tolerant hardwood species corresponds to our terminology of "hard" hardwoods.

SOURCE: The Disappearing Russian Forest, Brenton Barr and Kathleen Braden, page 54

TABLE 2-21
CALCULATED ANNUAL ALLOWABLE CUT IN RESERVE AND INACCESSIBLE
FORESTS
(MILLIONS OF CUBIC METERS)

	Total	Conifers	SIHS	STHS
USSR	201.2	178.1	21.9	1.2
RSFSR	<201.2	<178.1	21.9	1.2
Northwest	>4.5	4.1	>0.4	
North Caucasus	>-		>-	
RSFSR Europe-Uralia	4.6	4.1	0.5	
Western Siberia	13.7	9.2	>4.5	
Eastern Siberia	100.1	87.5	12.6	
Far East	82.7	77.3	4.2	1.2
RSFSR Asia	<196.6	<174.0	21.4	1.2
USSR Europe-Uralia	4.6	4.1	0.5	
USSR Asia	196.6	174.0	21.4	1.2

*Reserved for future or other (unspecified) uses.

Source: Compiled from Vorob'yev *et al.* (1979, p. 57).

SIHS=Shade intolerant hardwood species corresponds to our terminology of "soft" hardwoods

STHS=Shade tolerant hardwood species corresponds to our terminology of "hard" hardwoods.

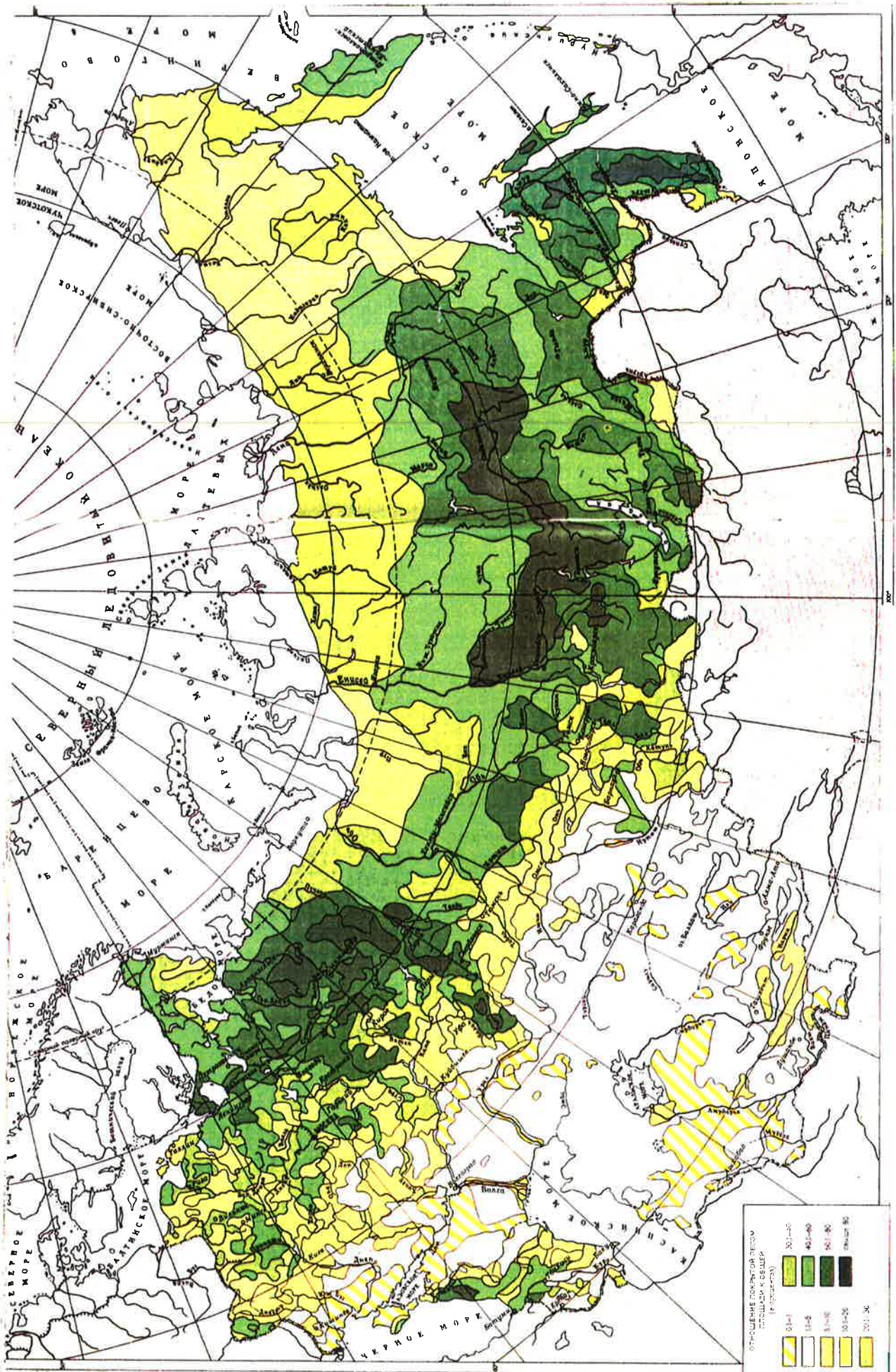
SOURCE: The Disappearing Russian Forest, Brenton Barr and Kathleen Braden, page 56

Geographic Distribution

The forest resources of the Soviet Union are unevenly distributed throughout the country. The European region of the country supports 74 percent of the population but contains only 22 percent of the forest land and 23 percent of the growing stock. While the average degree of forest cover for the U.S.S.R. is 36 percent, this varies from a low of 2.4 percent in Kazakhstan to a high of 59 percent in East Siberia (see Figure 2.6). Table 2.22 delineates the distribution of forests by territory.

The degree of forest cover corresponds quite closely to the system which the Soviet foresters have of dividing Soviet forest regions into forest surplus zones and forest deficit zones. This classification is a direct result of both the historic pattern of harvest or natural conditions which do not favour forest development. Forest surplus zones exist in the Urals, West Siberia, East Siberia, the Far East, and Northern European RSFSR. Forest deficit zones include the Central region, Volga-Vyatka, Central Black Earth, the Volga-Littoral, North Caucasus, West, Caucasus, Southwest, and Central Asia (Figure 2.7). Industrial harvest is supposed to be located in forest surplus zones, but in the past, overlogging in European Russia resulted in severe loss of forest stocks, and has contributed to the shift in harvest eastward and northwestward.

FIGURE 2-6: RATIO OF STOCKED FOREST LAND TO GENERAL LAND (Percent)



Source: Lesnaya Entsiklopediya, V. II, page 408

TABLE 2-22
DISTRIBUTION OF FORESTED AREA: CHARACTERISTICS OF INDUSTRIAL
STANDS UNDER CENTRAL STATE FOREST MANAGEMENT

	Forested Area Mill. ha	Total Growing Stock Mill. cu. m	% of Forested Area by Age Group of Stands				% of MOM* Comprising Stands of:			MOM as % of GS ^c Vol.	Utilization of CAC ^b for each Species (%)			
			J ^a	MA	AM	MOM	C ^d	SIHS	STHS		C	SIHS	STHS	Total
USSR	675,206	74,872	15	18	10	57	85	13	2	69				
RFSFR	646,102	72,216	14	17	10	59	86	(14 - both)		71				
Northwest	68,806	7,366	20	17	5	58	89	11	0	72	104	41		87
Center	12,446	1,542	38	36	13	45	53	2	22	104	79	62		87
Volgo-Vyatka	9,911	1,209	42	25	9	24	57	42	1	44	114	80	62	94
Black Earth	1,113	125	48	35	10	7	19	47	34	13	102	92	92	95
Volga Littoral	8,925	1,023	27	31	14	28	20	62	18	38	89	58	32	61
North Caucasus	2,853	391	23	33	15	29	19	11	70	44	114	82	80	99
Urals	24,306	3,014	31	20	9	40	77	23	0	61	110	67	57	93
RFSFR Europe-Uralia	128,360	14,670	26	21	8	41								
Western Siberia	75,716	9,655	7	15	15	63	68	32		72	44	16		30
Eastern Siberia	216,026	27,191	9	17	10	64	92	8		74	48	6		36
Far East (South)	226,000	20,700	14	16	9	61								
	70,216	8,948					77	15	8	70	53	13	15	45
(North)	155,784	11,752					99	1	0	74	12			13
RFSFR Asia	517,742	57,546	11	16	10	63				74				
Belorussia	5,378	535	59	28	10	3	43	43	14	6	97			97
Baltics (excl. Kaliningrad)	3,986	506	38	43	11	8	80	(20 - both)		12	97	98		97
Estonia	997	121	39	38	12	11				18				
Latvia	1,714	228	35	47	10	8				11				
Lithuania	1,275	157	41	43	10	6				9				
West	9,364	1,041												
Southwest	6,020	823	53	30	10	7	36	9	55	13	102	98		97
Caucasus	3,082	475	11	48	17	24	35	(65 - both)		36	56			64
USSR Europe-Uralia	146,826	17,009	28	23	8	41	77	19	4	53				
Central Asia	10,638	317												
(Excl. Kazakhstan)	1,538	25	19	31	20	29	100			46				
Kazakhstan	9,100	292					71	29		48	57	58	66	5
USSR Asia	528,380	57,863	11	16	10	63	87	11	2	74				

Note: Blank spaces in table indicate that data are not available.

*J = juvenile stands; MA = medium age stands; AM = stands approaching maturity; MOM = mature and overmature stands.

^bCAC = calculated allowable cut.

^cGS = growing stock.

^dC = conifers; SIHS = shade-intolerant hardwood species; STHS = shade-tolerant hardwood species.

^eAll data in this row except those in columns 1 and 2 refer to Ukraine only.

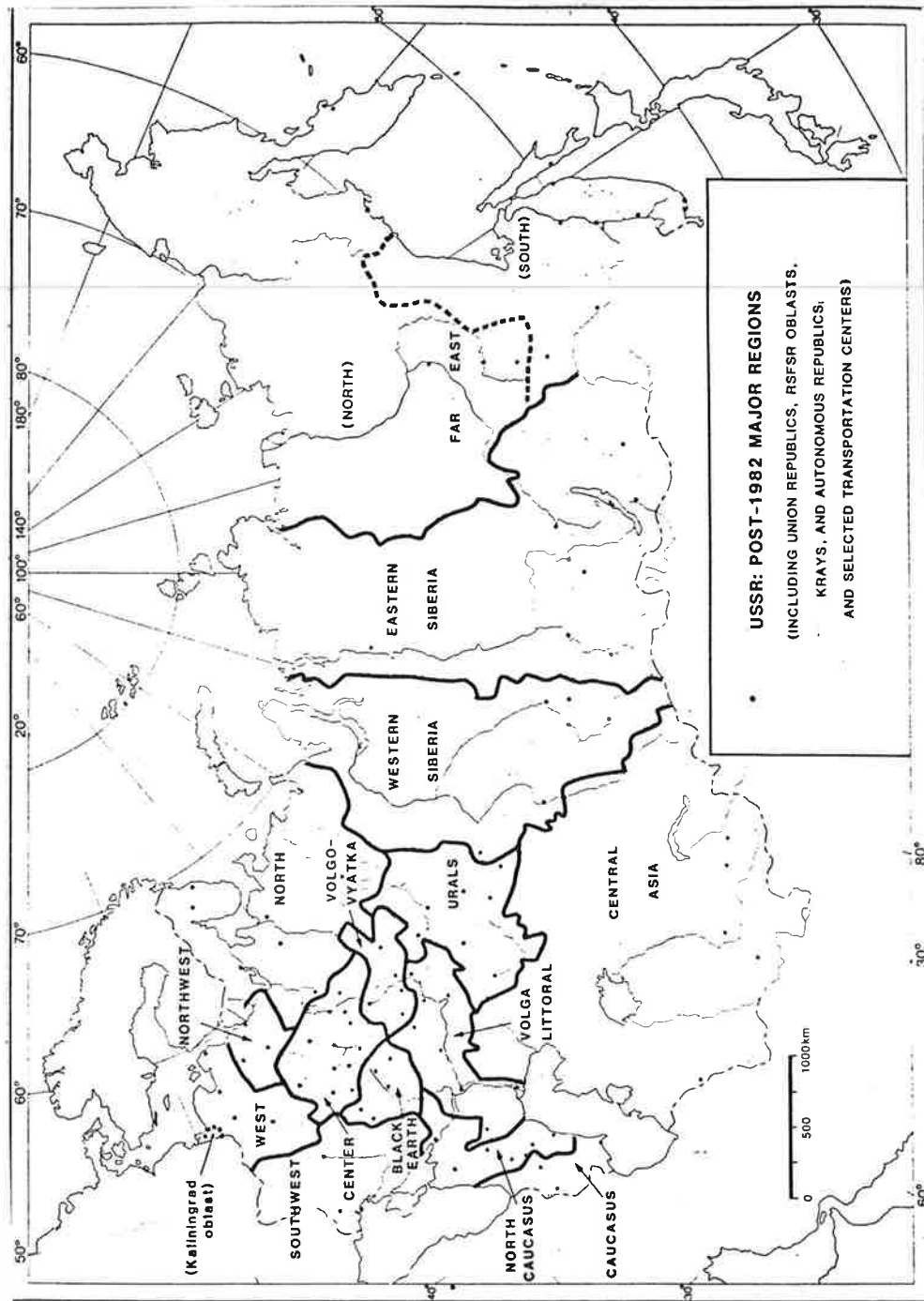
Source: Compiled and adapted from Vorobyev *et al.* (1979), various pages; Timofeyev (1980), pp. 17-18; and *Lesnoye Khozyaystvo SSSR* (1977, p. 57). Values are net of forests administered by collective farms, nonforestry ministries and agencies, or held under long-lease by sheep and reindeer herding enterprises.

SIHS=Shade intolerant hardwood species corresponds to our terminology of "soft" hardwoods

STHS=Shade tolerant hardwood species corresponds to our terminology of "hard" hardwoods.

SOURCE: The Disappearing Russian Forest, Brenton Barr and Kathleen Braden, page 44

FIGURE 2-7: USSR - MAJOR ADMINISTRATIVE REGIONS - POST 1982



SOURCE: The Disappearing Russian Forest, Brenton Barr and Kathleen Braden, page 12

As Barr and Braden note, important differences in quality and stocking density also distinguish European forests from those in Asia. European regions south of the main forested area have larger portions of their stands rated as high quality with full or average stocking than those in Asia. European-Uralian forested regions like those in the East are dominated by medium quality sites with full or average stocking. Thus, extensive European areas south of the forest surplus regions have superior growing conditions, better quality forests, more cost effective and established infrastructure, and cheaper access to domestic and foreign markets than those in the East. Major European-Uralian forest regions have superior MAI per hectare than those of the East, but their site qualities and stocking densities are similar. The regional imbalance in MAI per hectare, the sizable magnitude of annual growing stock, and the superior site qualities and stocking densities all favour Europe-Uralia.

Accessibility varies east and west of the Urals. Although approximately 55 percent of the Soviet mature timber volume is situated in accessible or potentially accessible forests, these forests comprise 87 percent of the European-Uralian growing stock and only 48 percent on that in the Asian RSFSR.

NOTES

- 1 In the U.S.S.R., the term is lesistost' This is calculated as the ratio of forested land (pokrytaia lesom ploshad') to the general area (obshchaia ploshchad') of the country, region, or state being referenced.
- 2 The seven regions are the U.S.S.R., Europe, North America, Latin America, Africa, and Australia/Oceania
- 3 Brenton Barr and Kathleen Braden. The Disappearing Forest, page 74.
- 4 "Forests of the USSR", J. Holowacz, The Forestry Chronicle, October, 1985.
- 5 It is related to table 2.6 in the following way. Area designated as set aside for long-term use has been subtracted from area identified as under the management of the forest sector.
- 6 It is related to Table 2.7 in the following way. Non-productive land is derived by subtracting forest land from the general area of the forest fund.

THE SOVIET FOREST INDUSTRY

Geographic Distribution

European-Asian Divide

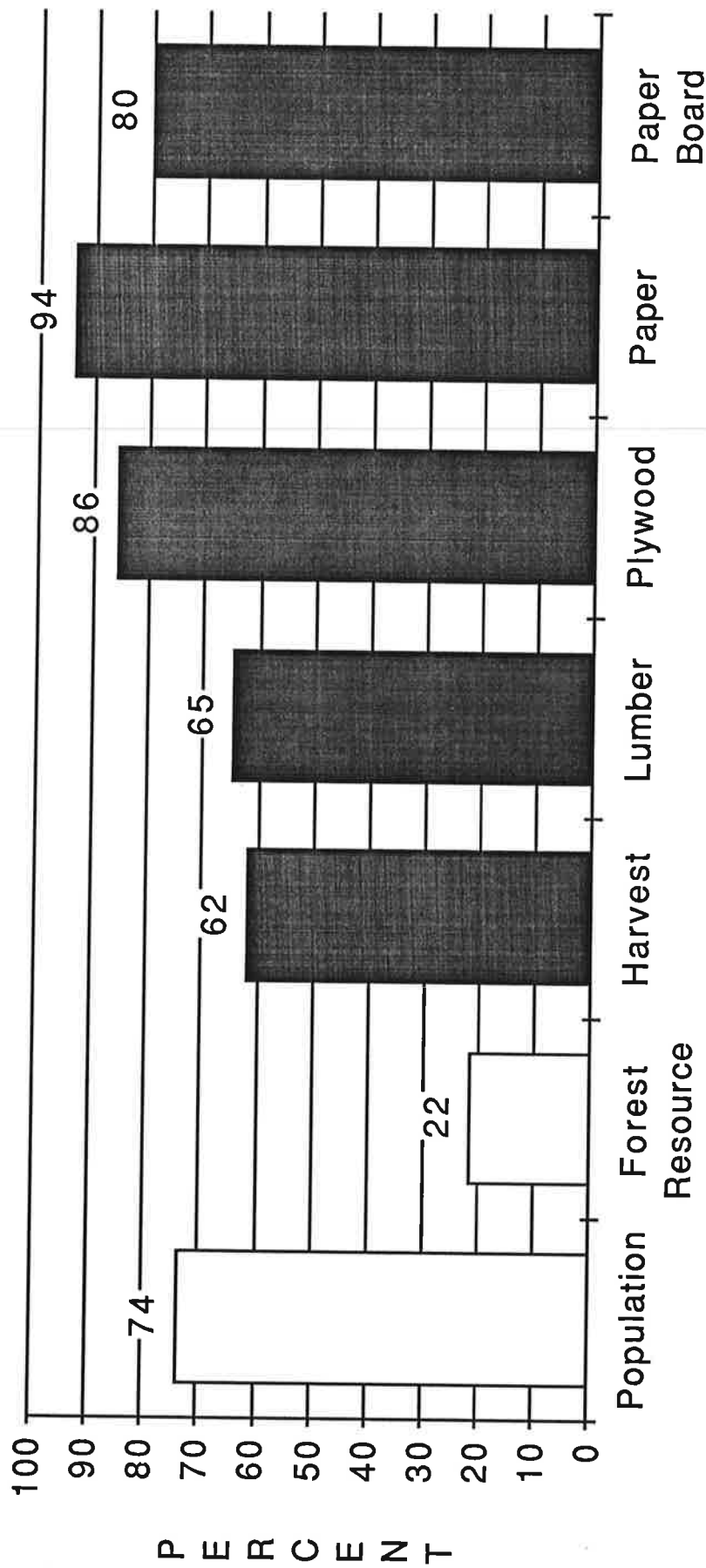
The forest industry of the Soviet Union is not evenly distributed throughout the country. As can be seen from Figure 3.1 most of the industrial activity is located in the European part of the country where 74 percent of the people live. While this part of the country contains only 22 percent of the forest resource, it accounts for 62 percent of timber harvest, 65 percent of lumber production, 86 percent of plywood production, 94 percent of paper production, and 80 percent of paperboard production. Pulp, particleboard, and fiberboard production figures are not available separated by region within the RSFSR. Thus, it is not possible to provide a breakdown for the European and Asian regions of the USSR.

An indication of industrial activity is illustrated in Map A which shows the location of major processing facilities, general location of the forest resource, and flow of forest products trade within the Soviet Union. It is obvious that most of the industrial activity is centered west of the Ural mountains.

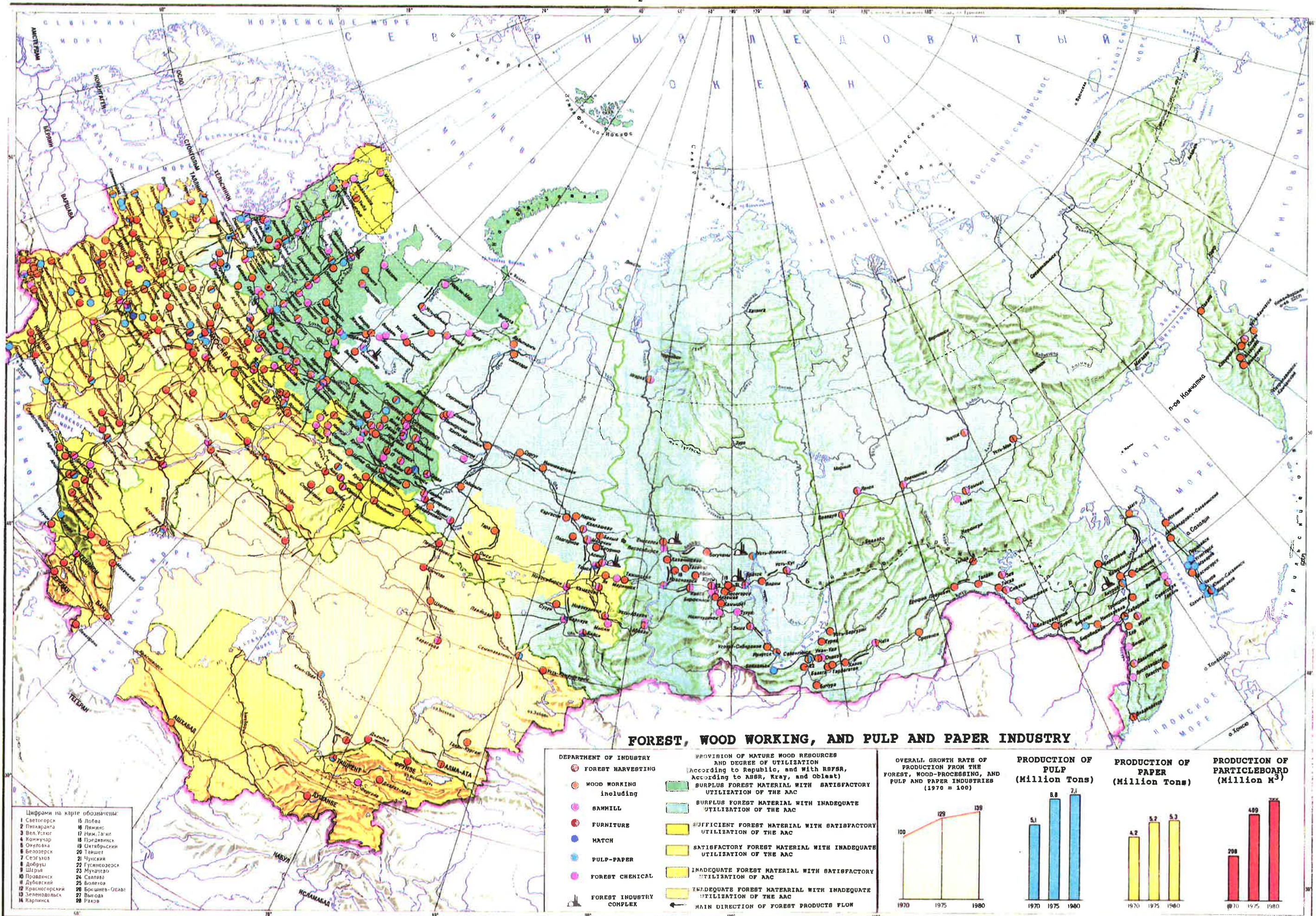
Soviet Union - Republic Distribution

Most of the forest industry activity is concentrated in the Russian SSR. This republic contains 96 percent of the forest resource, and in 1987, produced 92 percent of the harvest, 81 percent of lumber production, 73 percent of

FIGURE 3-1 * USSR: EUROPEAN (WESTERN) REGIONAL SHARE OF POPULATION, FOREST, AND FOREST PRODUCTS OUTPUT



SOURCE: SSSR Narodnaye khozaystvo v 1987g, RSFSR Narodnaye khozaystvo v 1987 g



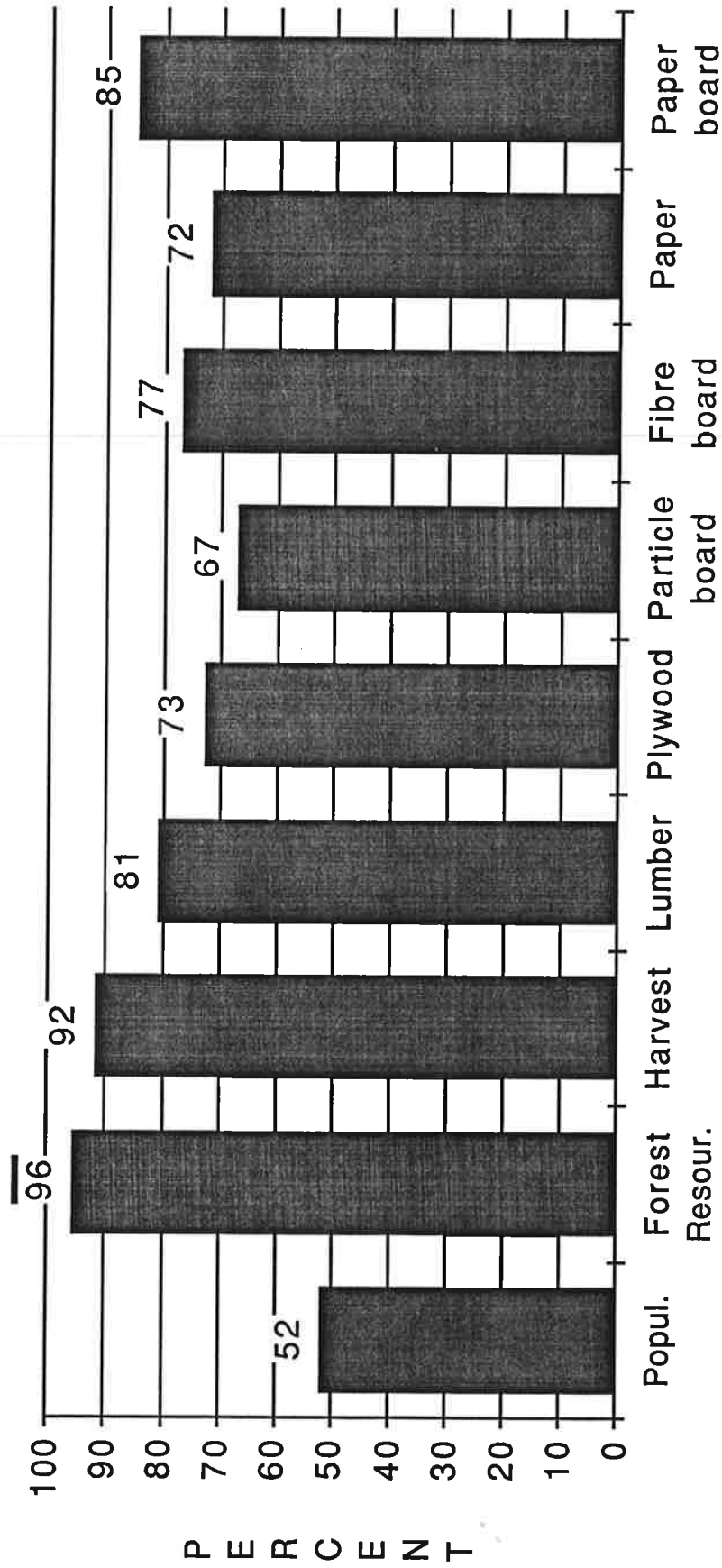
plywood production, 67 percent of the particleboard production, 77 percent of fiberboard production, 72 percent of paperboard production, 85 percent of paper production, and 95 percent of chemical pulp production. Minor production of forest products was carried out in the Ukrainian and Belorussian SSR. Figure 3.2 shows the distribution of forest activities contained in the RSFSR.

Regional Self Sufficiency

From the above discussion, it is clearly evident that there is a regional imbalance between production and consumption of forest products. Regional data delineating self sufficiency is available for commercial roundwood and lumber deliveries by Republic. Only five republics are more than fifty percent self sufficient in the delivery of round-wood. They are the Russian, Belorussian, Lithuanian, Latvian, and Estonian Republics. In 1987, each of these republics provided respectively 100 percent, 91 percent, 62 percent, 79 percent, and 77 percent of their consumption.

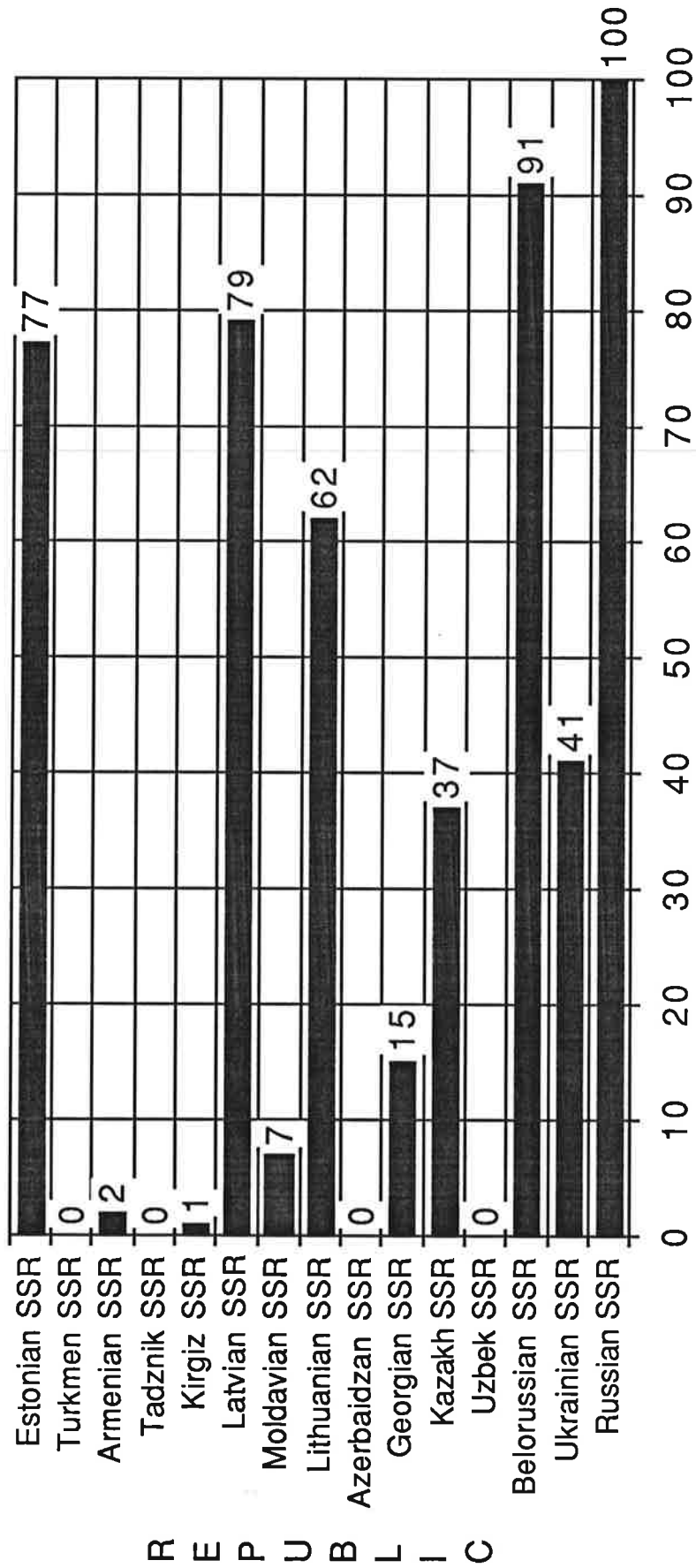
A similar pattern emerges when examining the delivery of lumber by republic. In addition to the above mentioned five republics, Kazakhstan produced 67 percent of the lumber delivered for end use in 1987. Figure 3.3 shows self sufficiency of commercial wood by Republic for 1987. Figure 3.4 shows self sufficiency of lumber by Republic for 1987.

FIGURE 3-2 * RSFSR: Share of Population, Forest, and Forest Products Output



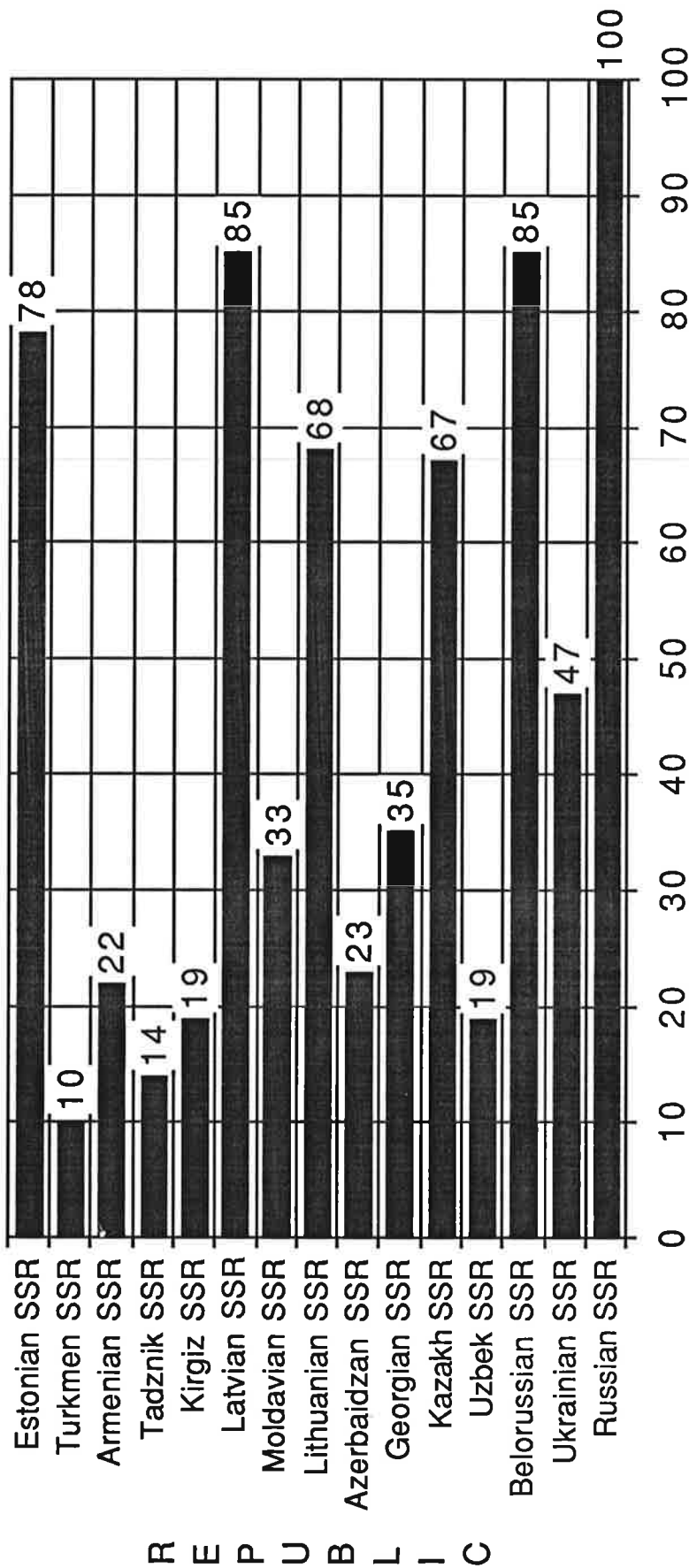
SOURCE: SSSR Narodnaye khozaustvo v 1987 g, RSFSR Narodnaye khozaystvo v 1987 g

FIGURE 3-3 * USSR: Percent of Commercial Roundwood Deliveries to Republic Which Originate in that Republic in 1987



SOURCE: Material'no-Tekhnicheskoye Obespecheniye Narodnogo Khozaistva SSR, 1988, page 164

FIGURE 3-4 * USSR: Percent of Lumber Deliveries to Republic
Which Originate in that Republic in 1987



SOURCE: Material'no-Tekhnicheskoye Obecpecheniye Narodnogo Khozaistva SSSR, 1988, page 170

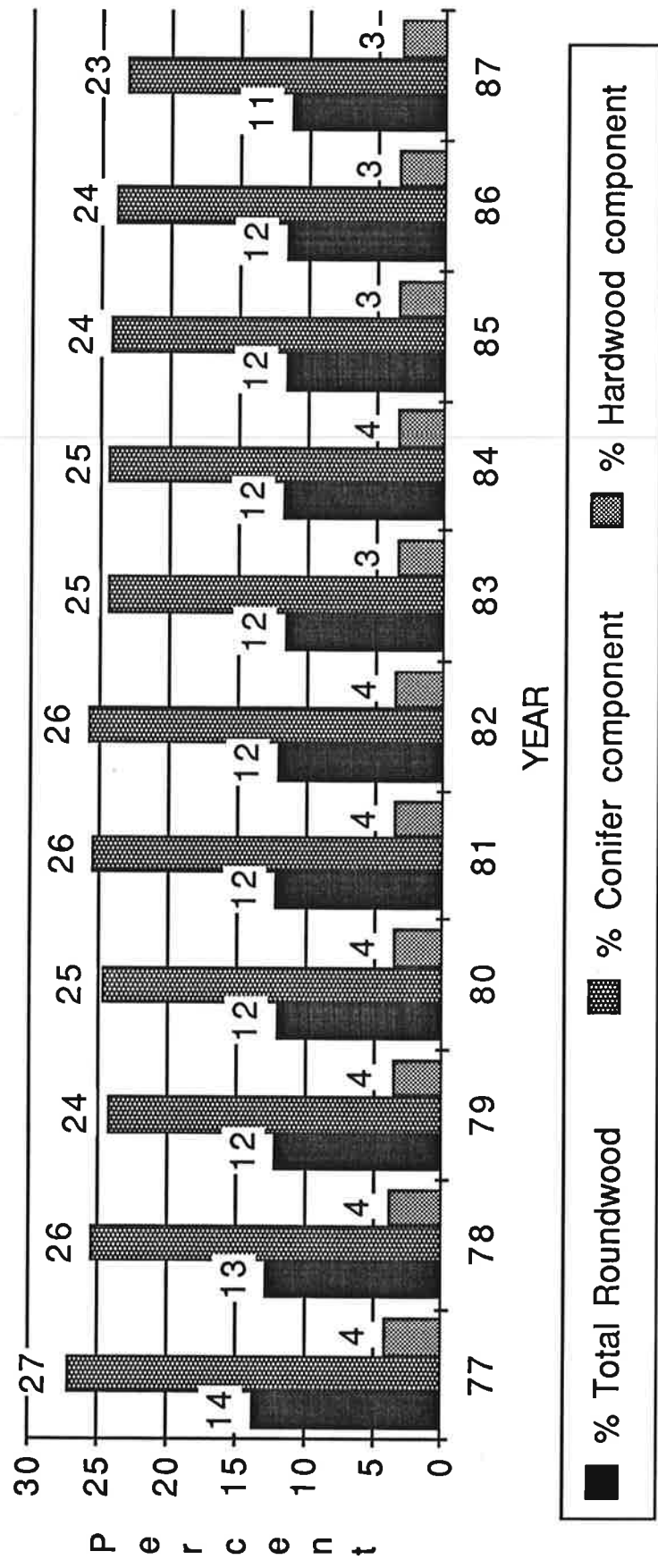
Harvesting

The logging sector is the beginning point for the forest product manufacturing cycle. The ultimate success of the other wood using sectors depends critically on the volume and quality of the forest harvest. The Ministry of the Forest Industry is responsible for most logging operations in the country, accounting for nearly 60 percent of the roundwood removals.

In 1987, the Soviet Union produced 11 percent of the world roundwood harvest. Its share of coniferous harvest was significantly higher, representing 23 percent of the coniferous roundwood output. Non-coniferous output, on the other hand, constituted only 3 percent of the world non-coniferous harvest. As Figure 3.5 shows, these proportions have remained relatively constant over the last decade, although a slight decreasing trend is evident. Figures 3.6 through 3.8 show total roundwood production and the coniferous and non-coniferous component for the world and for the USSR for the period 1977 through 1987.

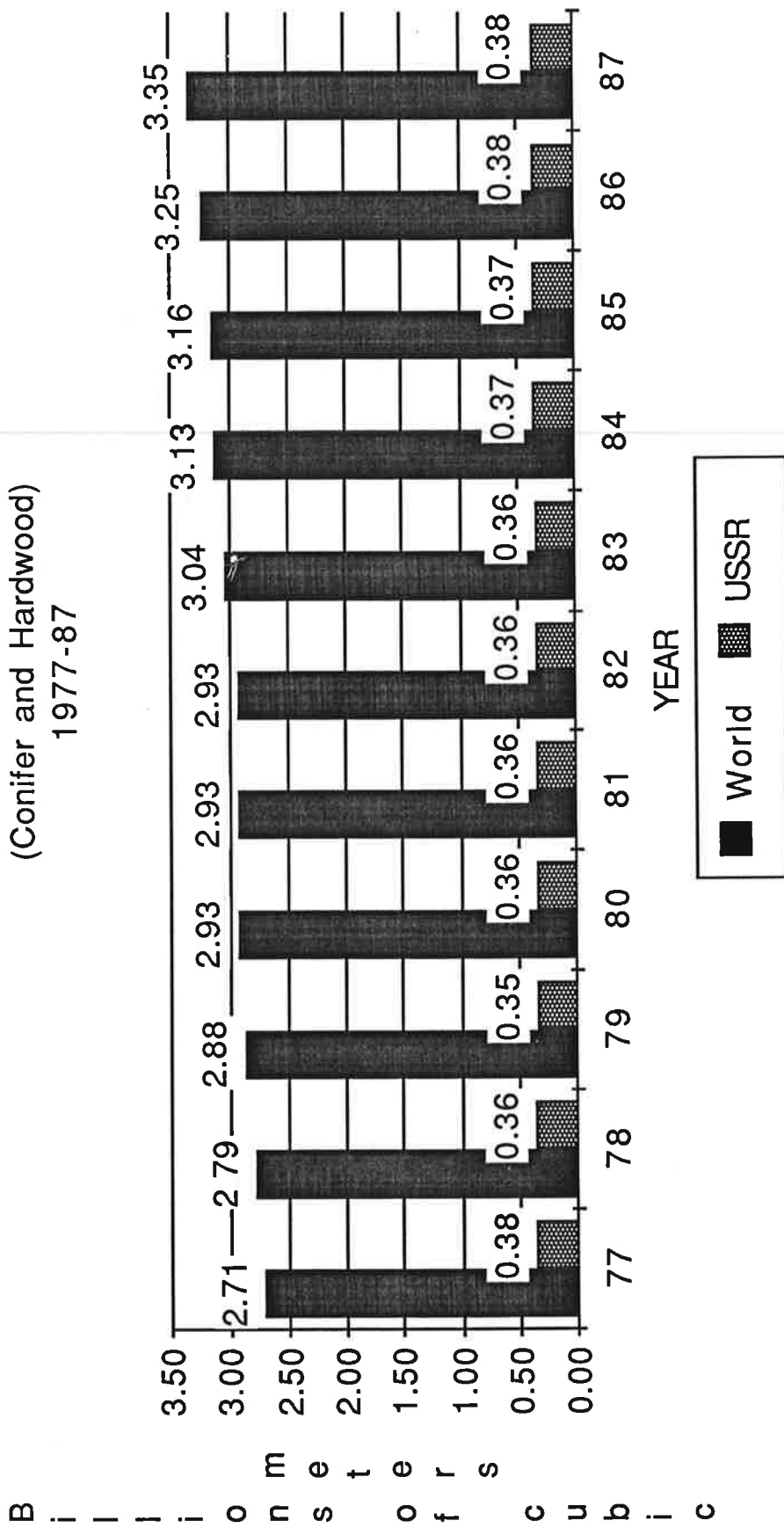
The Soviet share of world industrial roundwood production is somewhat higher. In 1987, the Soviet Union harvested 18 percent of the world total. When the coniferous component is considered, the proportion rises to 23 percent of world conifer harvest. The hardwood component, on the other hand, represents only 7 percent of world deciduous harvest. As Figure 3.9 shows, these proportions have remained relatively constant over the last decade, although there has

FIGURE 3-5 * USSR CONTRIBUTION TO WORLD TOTAL
 ROUNDWOOD PRODUCTION (Percent)
 1977-87



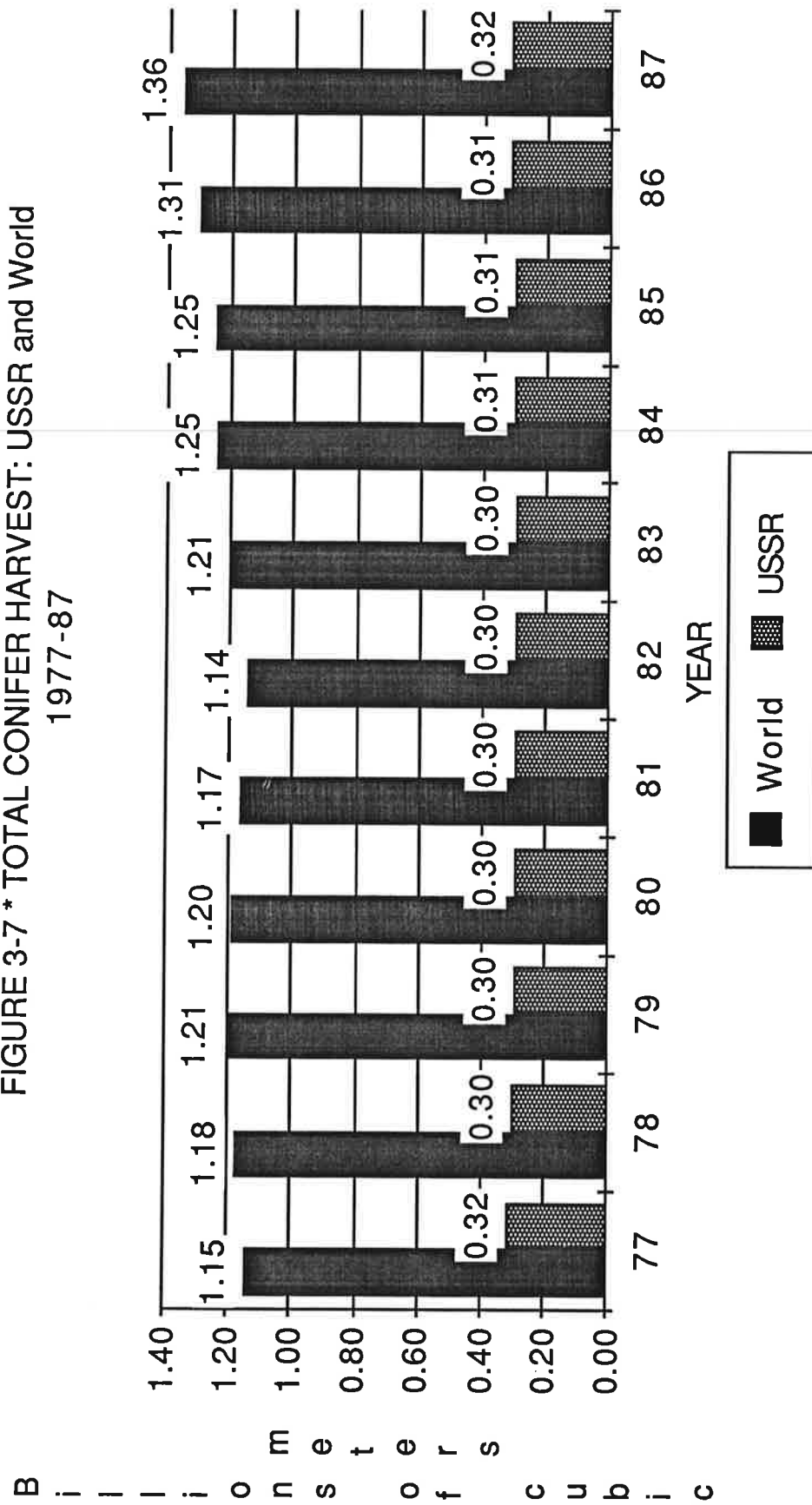
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-6 * TOTAL ROUNDWOOD HARVEST - USSR and World
(Conifer and Hardwood)
1977-87



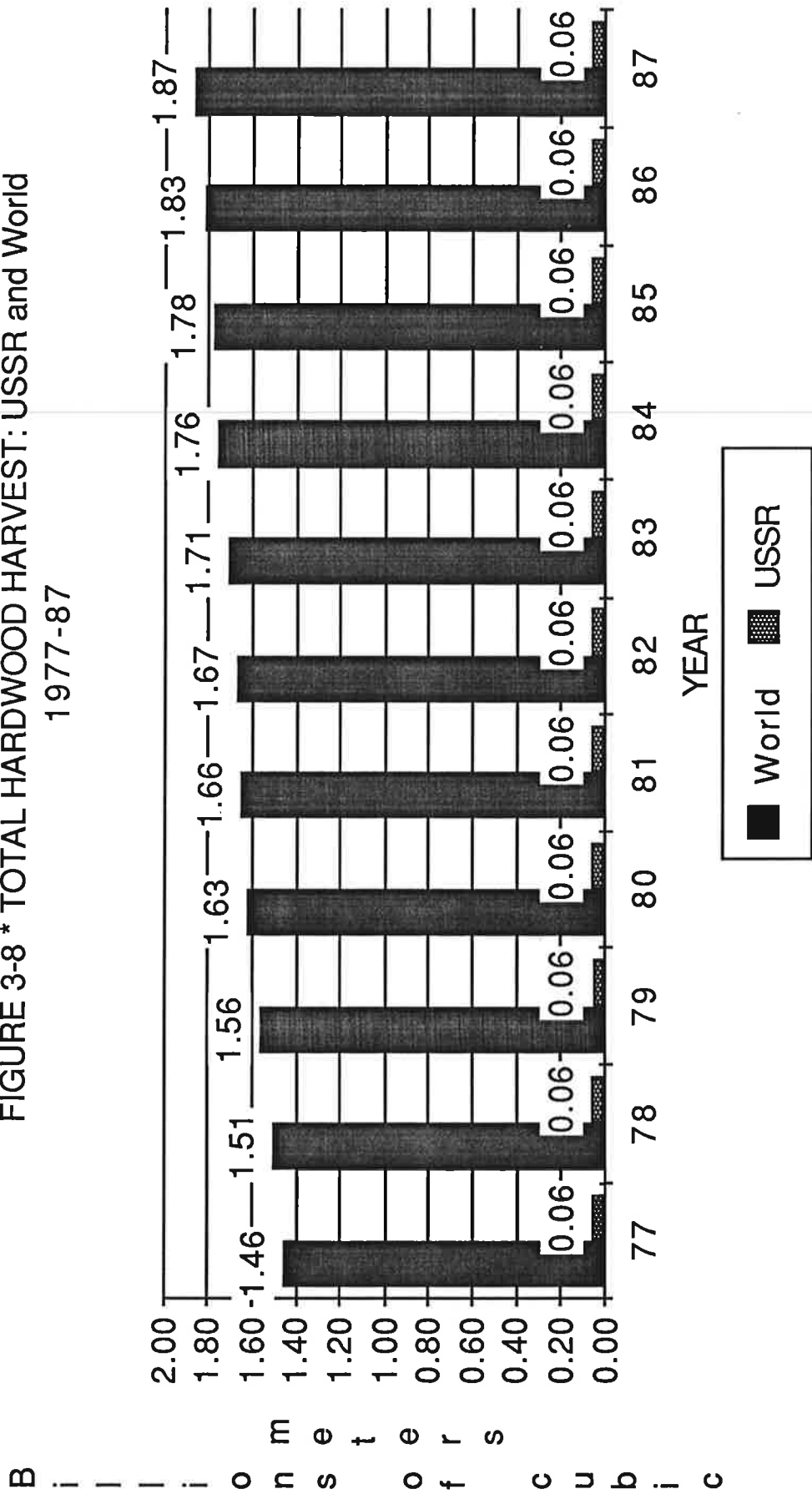
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-7 * TOTAL CONIFER HARVEST: USSR and World
1977-87



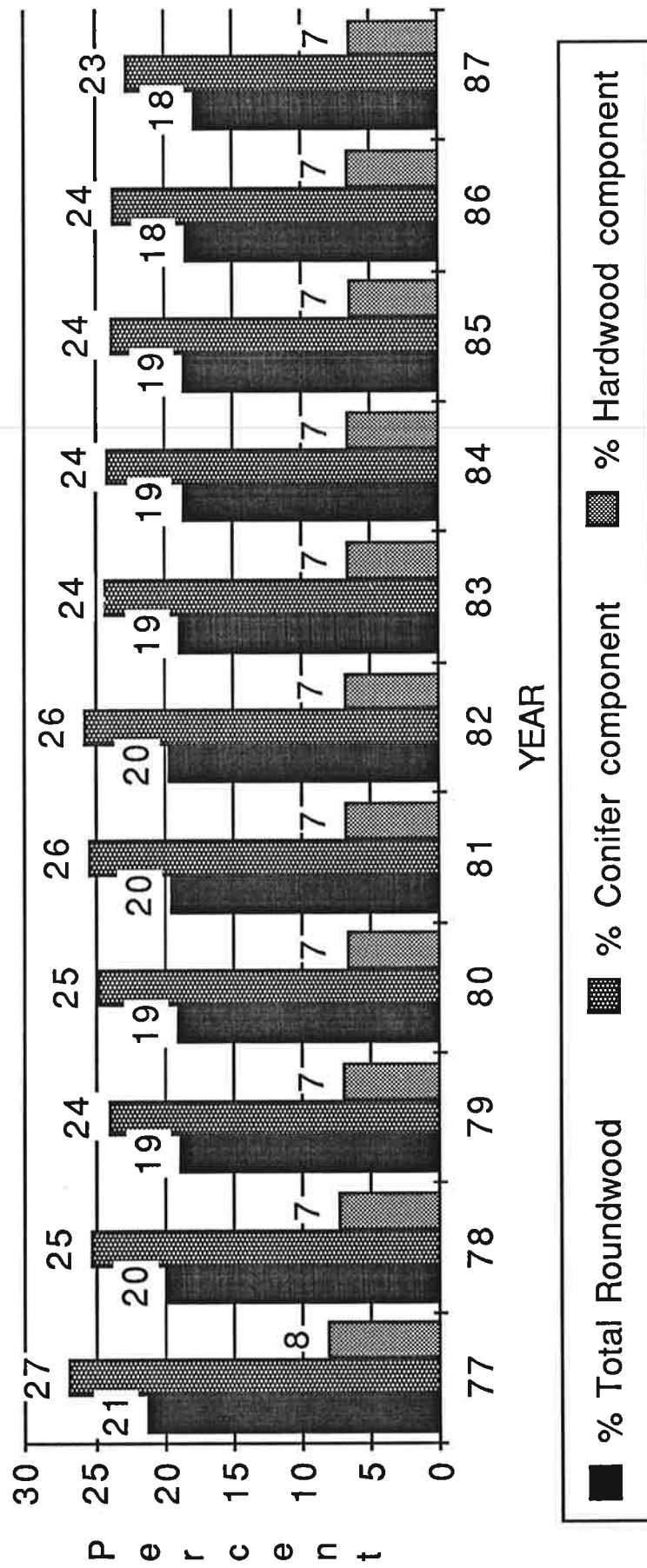
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-8 * TOTAL HARDWOOD HARVEST: USSR and World
1977-87



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FIGURE 3-9 * USSR CONTRIBUTION TO WORLD INDUSTRIAL
 ROUNDWOOD PRODUCTION (percent)
 1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

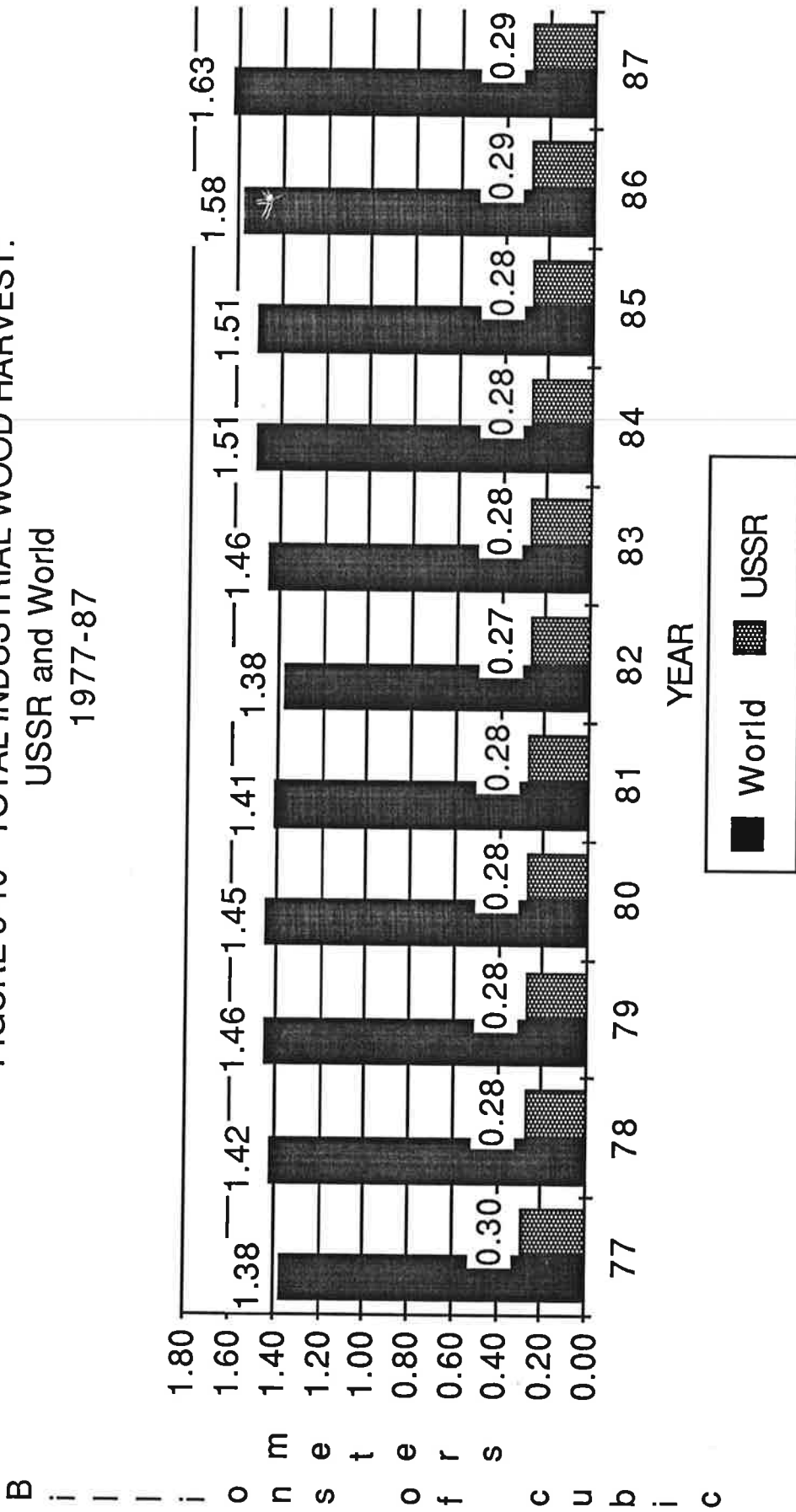
been a slight decreasing trend. Figures 3.10 to 3.12 show total industrial roundwood production and the conifer and hardwood components for the world and for the USSR for the period 1977 through 1987.

The higher proportion of industrial wood harvest to total world harvest is due to the smaller firewood component to total harvest volume characteristic of Soviet Union. In recent years, only 22 percent of the USSR roundwood harvest has gone for fuel wood uses. The proportion for the world, on the other hand, has been close to 50 percent. Figure 3.13 shows world and USSR percent of fuelwood to total roundwood harvest for the period 1977 through 1987.

The Soviet industrial roundwood harvest consists of a conifer and hardwood component. In recent years, according to UN data, the hardwood component has not amounted to more than 18 percent of total harvest. Interestingly, according to a recently released Soviet study, this component has been significantly higher, and in 1987 hardwoods were reported as 33 percent of the total harvest. Figure 3.14 shows the percentage contribution of each component to total harvest according to UN data. Figure 3.15 shows the percentage breakdown of harvest into the conifer and hardwood component according to Burdin (FAO, 1989). Figure 3.16 shows the volume of the component parts of the harvest for the period 1977 through 1987 according to UN data.

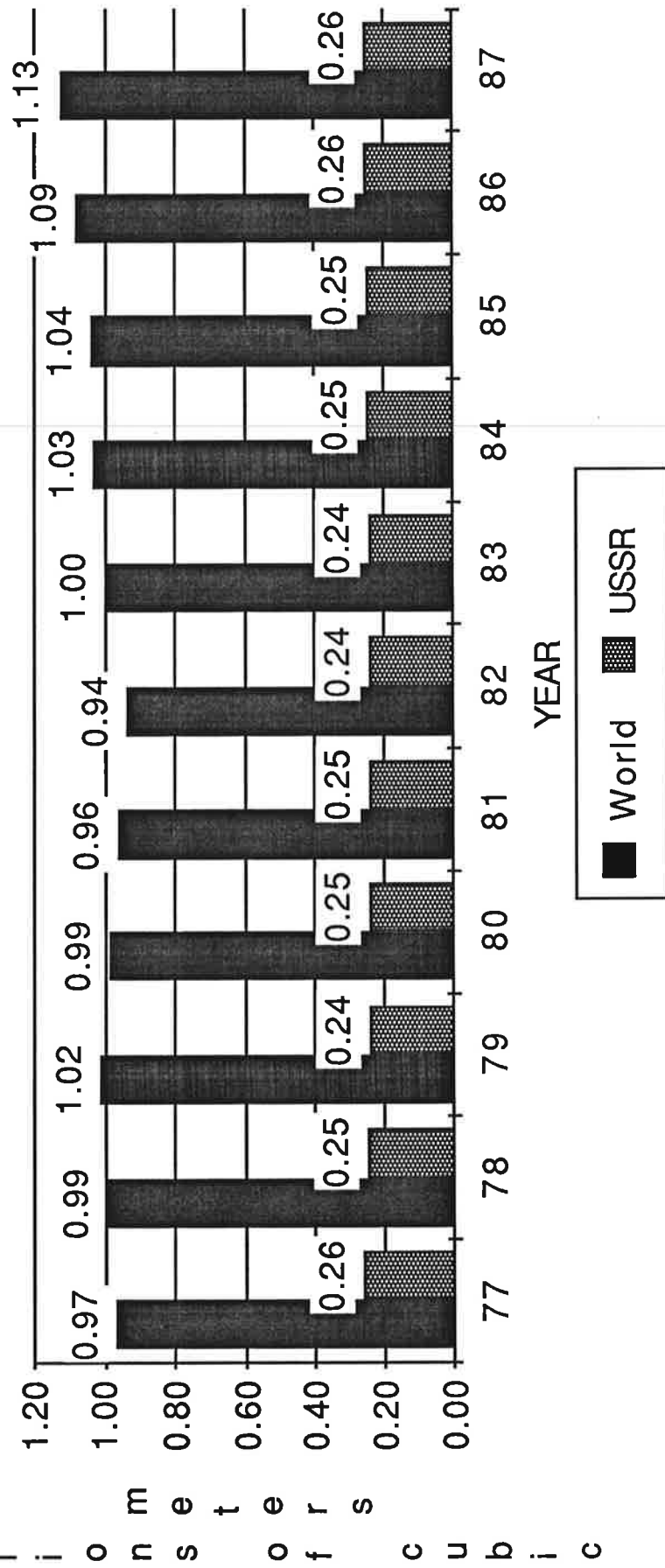
Despite the obvious increase in utilization of the hardwood resource, it is still underutilized relative to its

FIGURE 3-10 * TOTAL INDUSTRIAL WOOD HARVEST:
USSR and World
1977-87



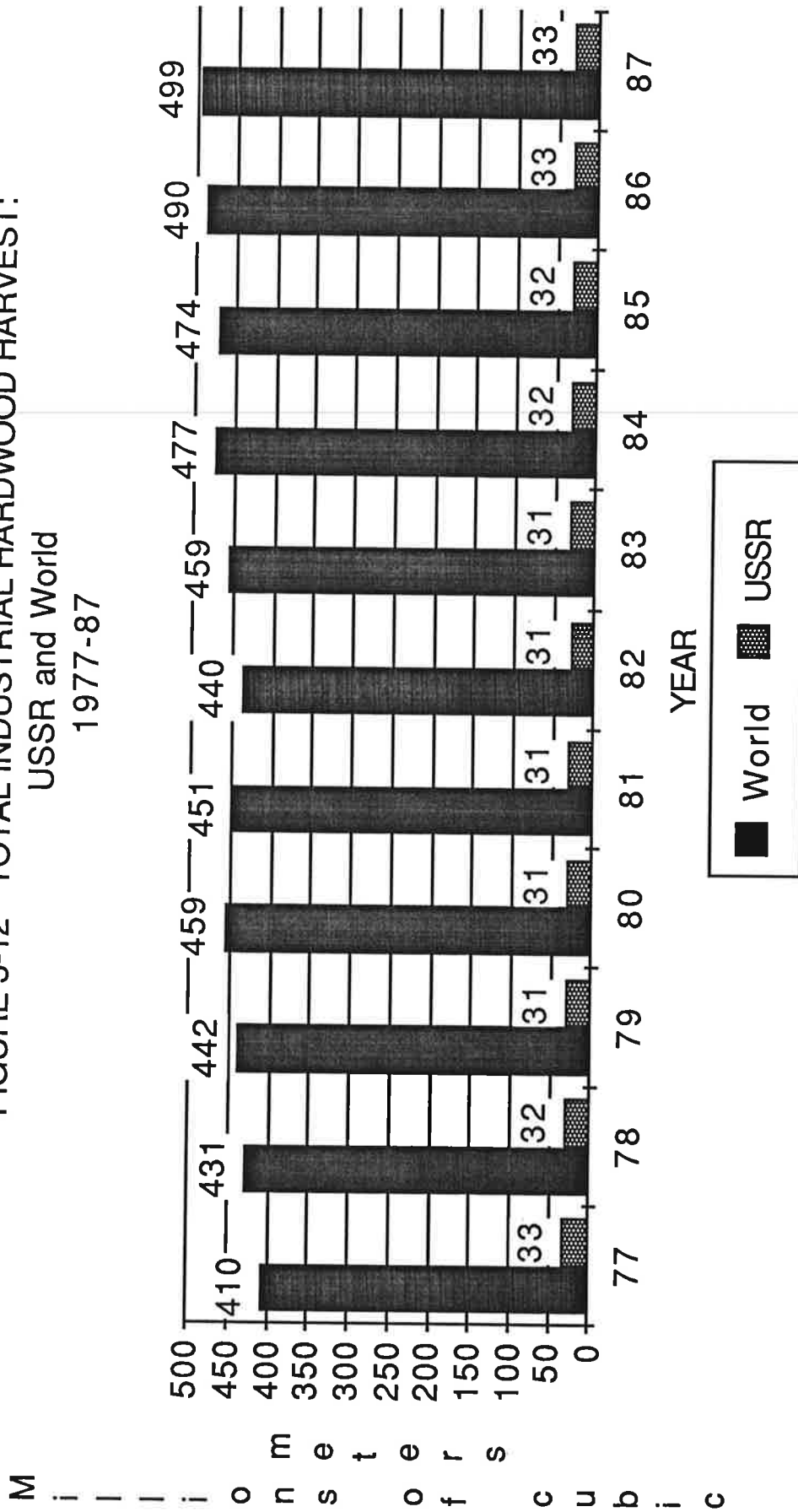
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-11 * TOTAL CONIFER INDUSTRIAL WOOD HARVEST:
USSR and World
1977-87



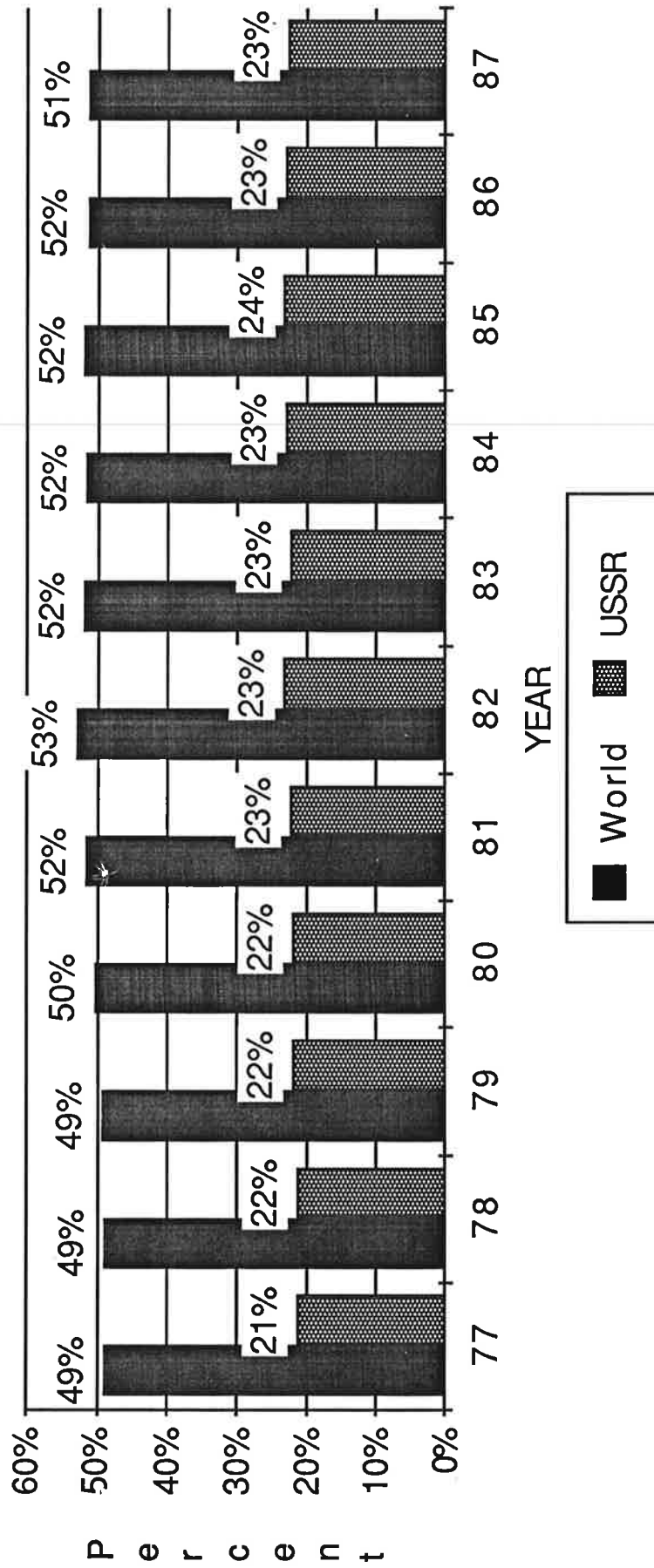
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FIGURE 3-12 * TOTAL INDUSTRIAL HARDWOOD HARVEST:
USSR and World
1977-87



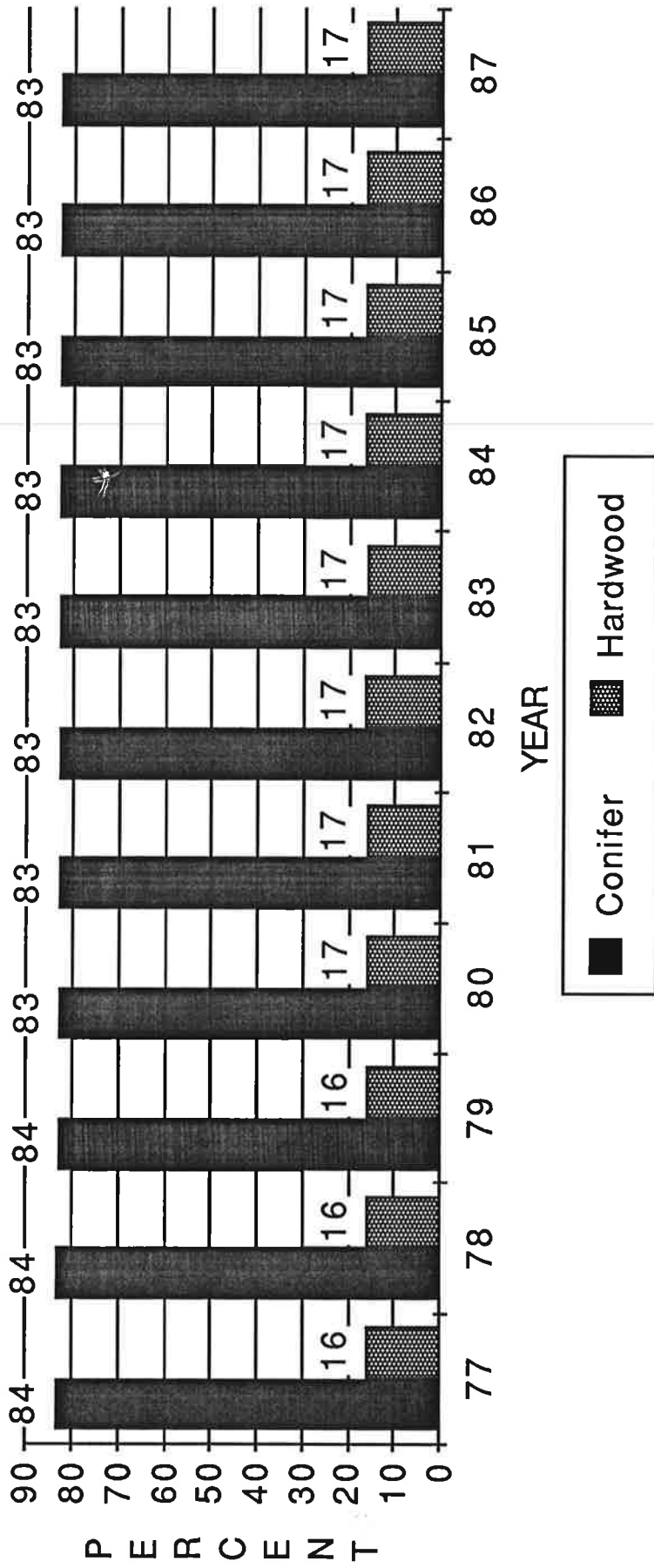
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-13 * FUELWOOD AND TOTAL ROUNDWOOD HARVEST:
USSR and World (Percent)
1977-87



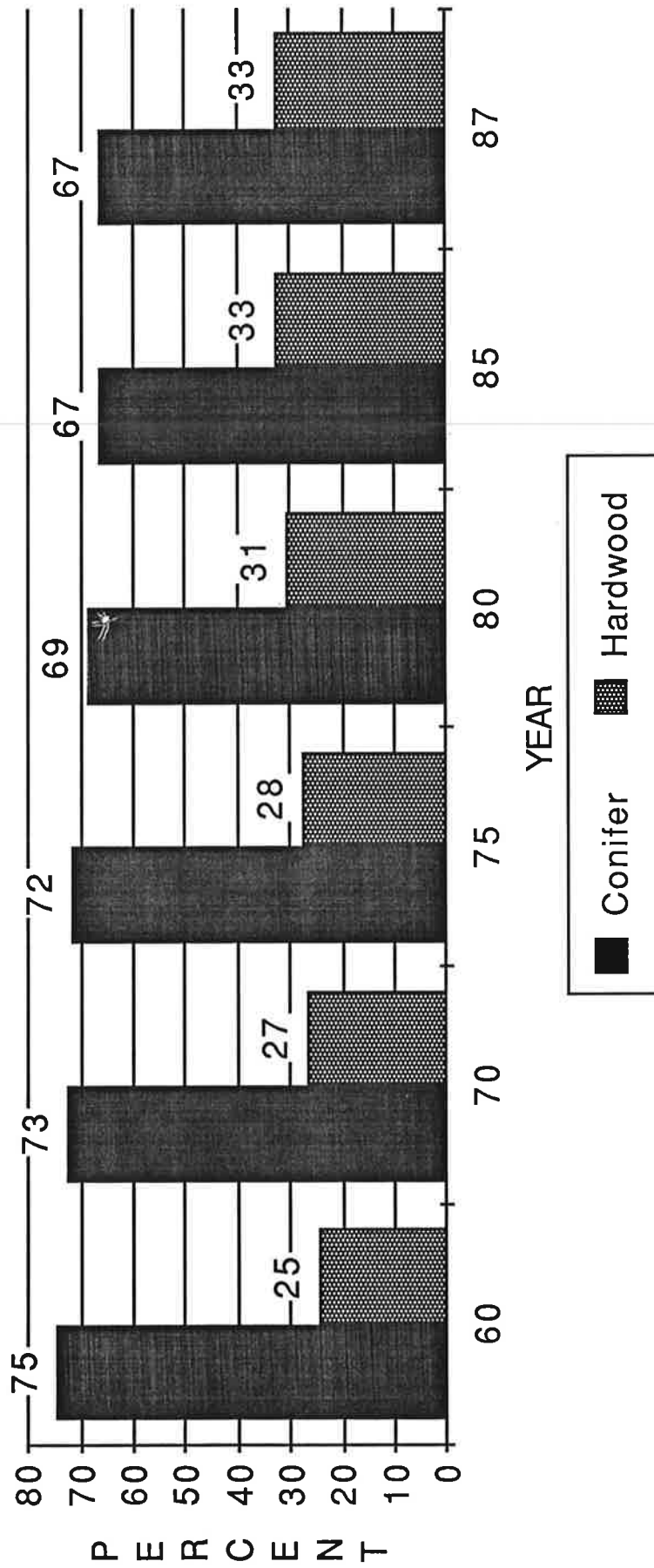
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-14 * USSR TOTAL ROUNDWOOD HARVEST:
 CONIFER AND HARDWOOD (Percent)
 1977-87



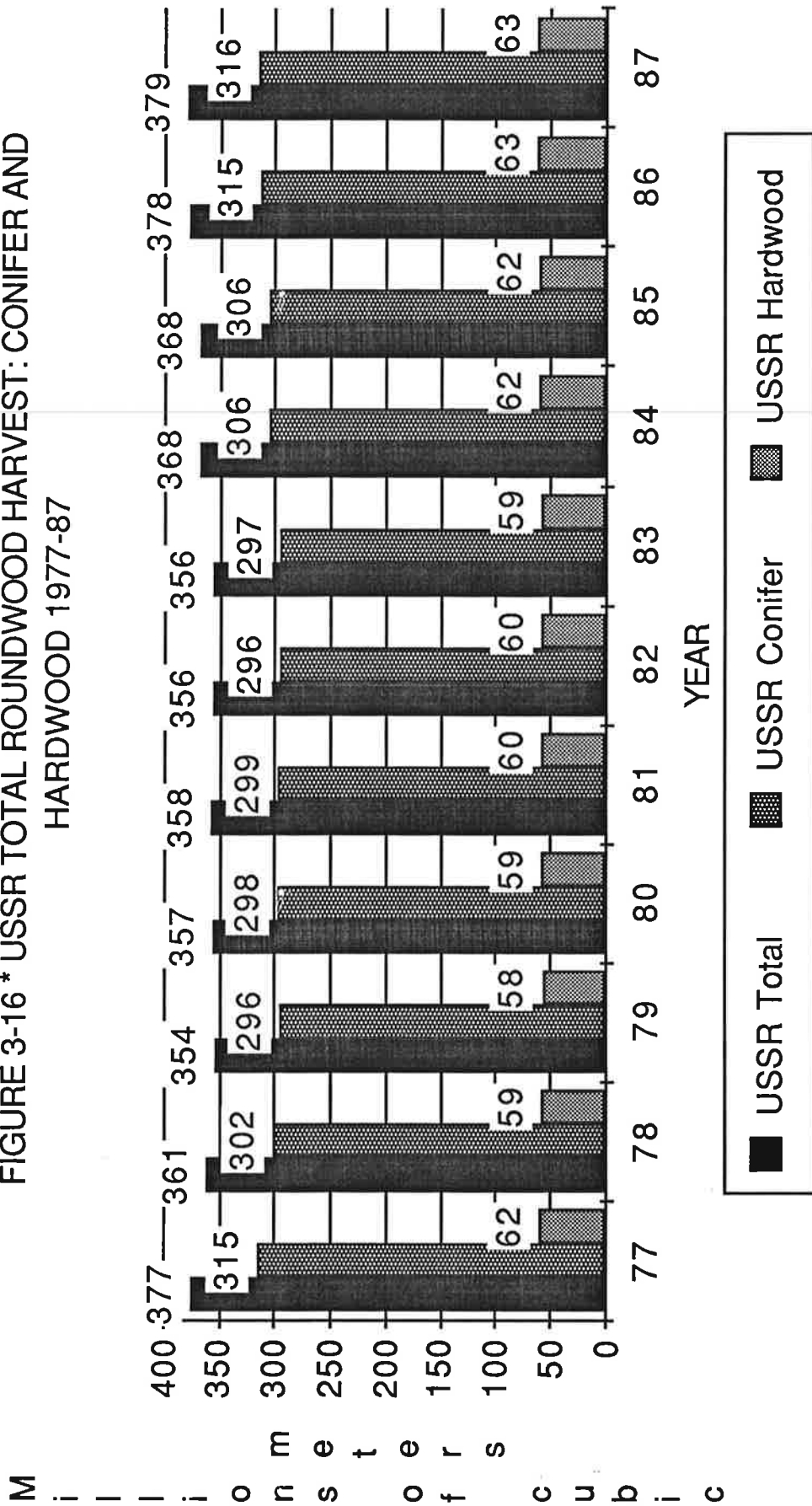
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-15 * ESTIMATED USSR TOTAL ROUNDWOOD HARVEST:
 CONIFER AND HARDWOOD (Percent)
 1960-87



SOURCE: Outlook for the forest and forest products sector of the USSR, UN, 1989

FIGURE 3-16 * USSR TOTAL ROUNDWOOD HARVEST: CONIFER AND HARDWOOD 1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

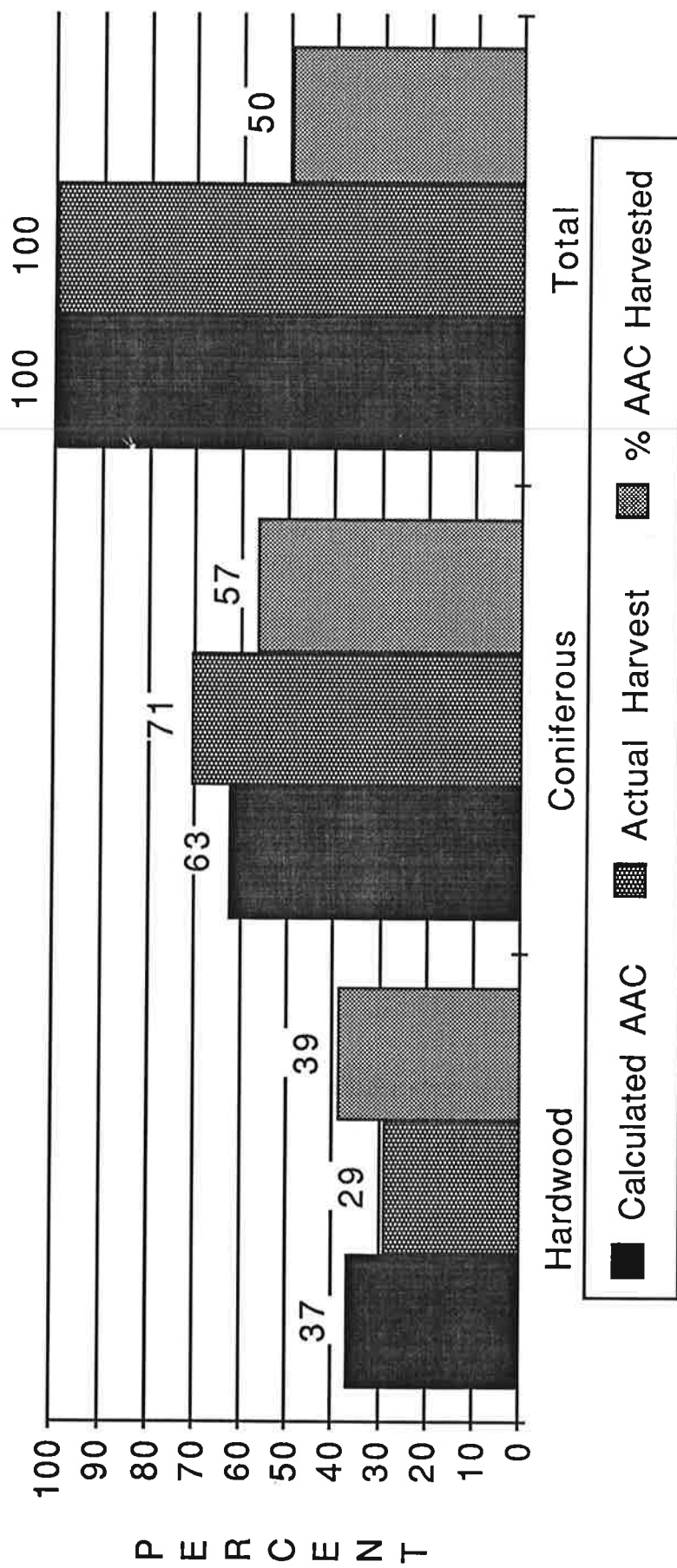
potential as defined by the annual allowable cut (AAC). As Figure 3.17 shows, in 1982, when hardwood and softwood deciduous species contributed 29 percent of the total actual harvest, this figure (hardwood harvest) represented only 39 percent of the hardwood allowable annual cut. In the same year, the conifer component contributed 71 percent of the total actual harvest, representing 57 percent of the conifer AAC.

The distribution of harvest by end use of roundwood is of critical importance. According to UN data, the log harvest is segregated into four categories of logs. These categories are fuelwood, other industrial uses, pulpwood, and saw and veneer logs. The proportion of each to the total roundwood harvest has remained relatively constant over the last ten years. Saw and veneer logs have contributed 43 percent of the harvest, plywood 10 percent, other industrial uses 25 percent, and fuelwood 22 percent.

The sawlog and veneer log proportion and the pulpwood proportion correspond closely to figures recently released in the study by Burdin. However, the fuelwood component is significantly smaller as reported in the UN data when compared to the Soviet data mentioned above. The UN data shows approximately 22 percent of total roundwood harvest going to fuelwood use versus 29 percent noted by Burdin.

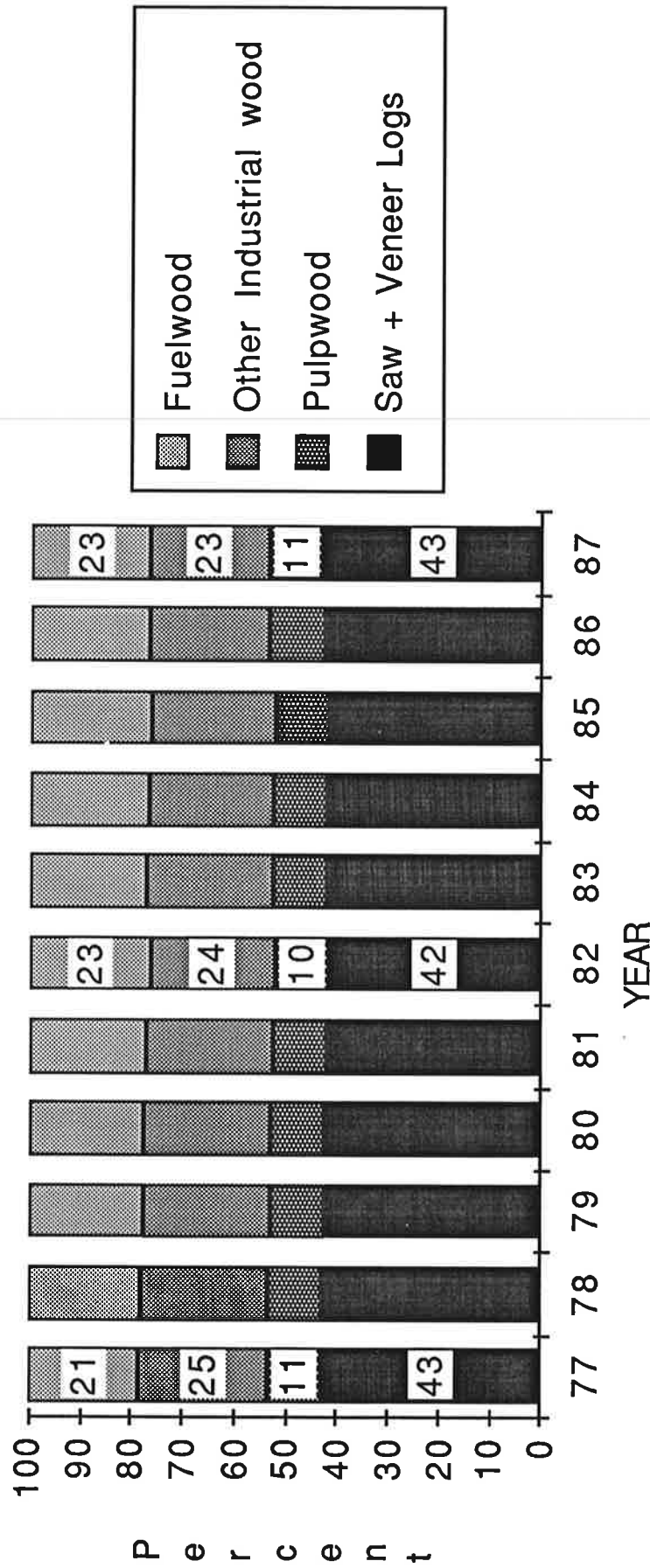
Figure 3.18 shows the relative proportion of harvest by log grades based on UN sources. Figure 3.19 shows the volume contribution to total harvest corresponding to Figure 3.18.

FIGURE 3-17 * ANNUAL ALLOWABLE CUT, ACTUAL CUT, AND ACTUAL HARVEST BY CONIFER AND HARDWOOD COMPONENT (Percent)
1982



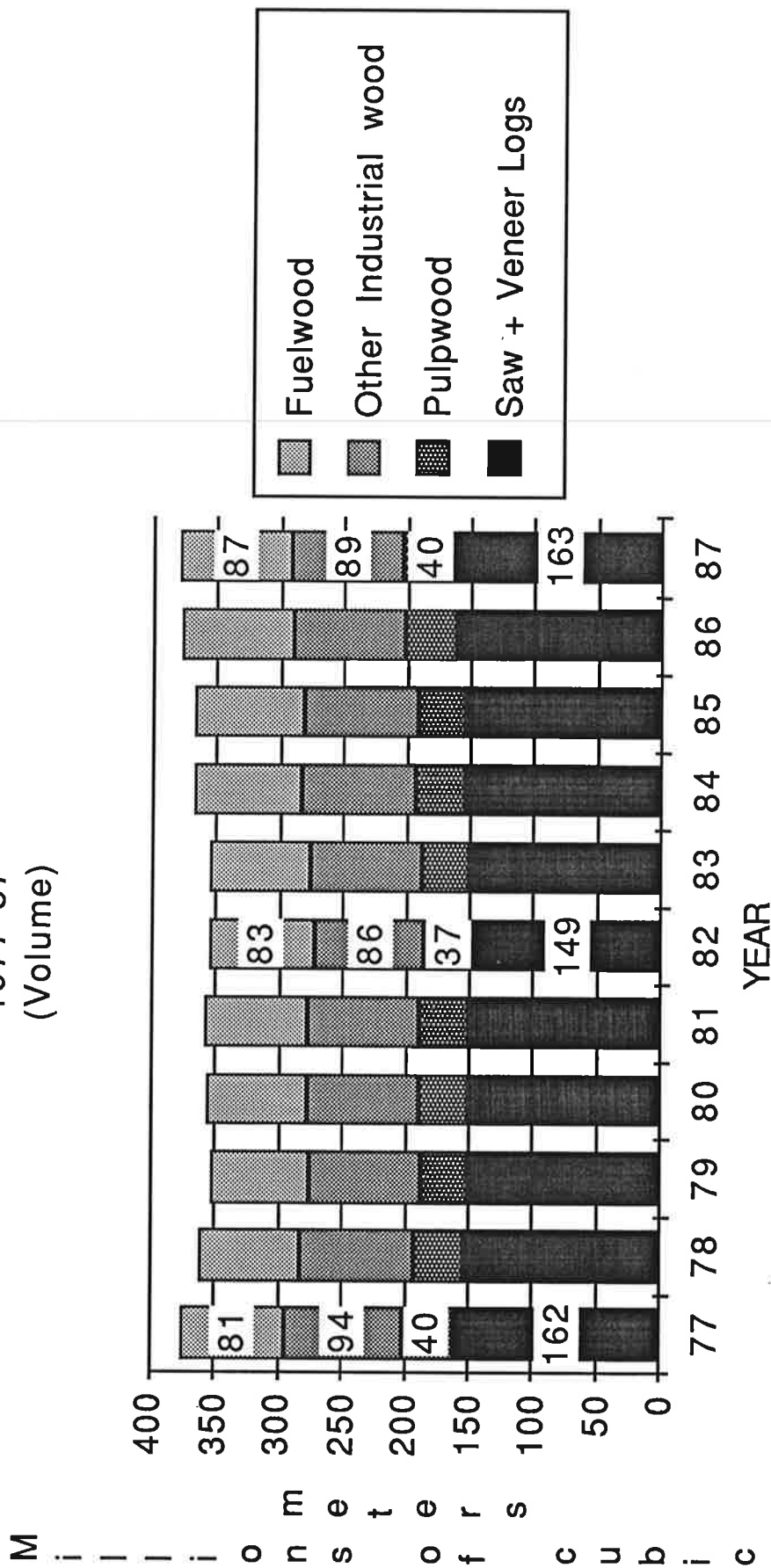
SOURCE: Lesnaya Entsiklopediya V. II, page 404

FIGURE 3-18 * USSR ROUNDWOOD HARVEST
BY LOG GRADE (Percent)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-19 * USSR TOTAL ROUNDWOOD HARVEST BY LOG GRADE
1977-87
(Volume)



SOURCE: FAO Forest Products Annual Year Book for 1987

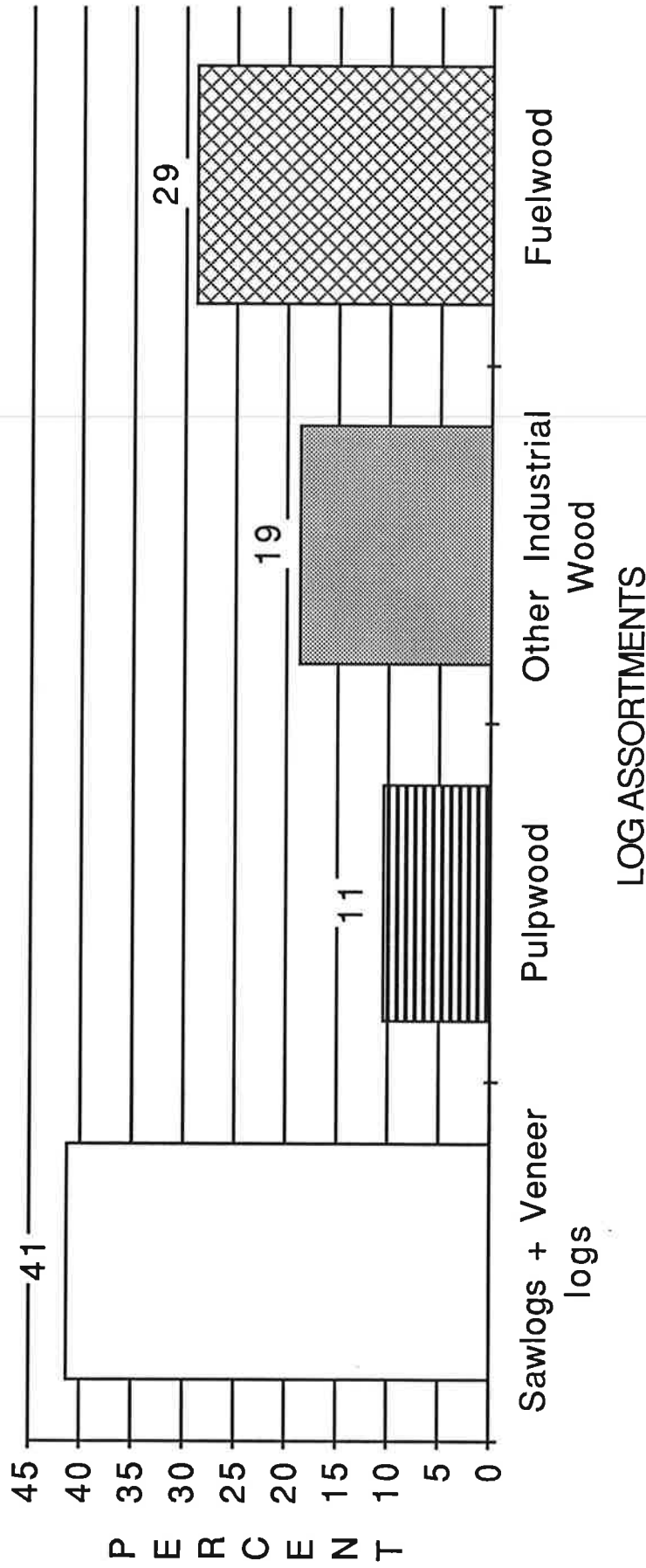
Figure 3.20 shows the relative percentage values for log grades reported in the Soviet source.

The UN data provides a breakdown of the conifer and hardwood components by the four previously mentioned log grades. As can be readily seen from Figures 3.21 through 3.24, large differences exist in the distribution of grades separated by species group. For the conifer component, fuelwood is less than 20 percent while sawlogs represent more than 40 percent. Other industrial wood, on the other hand, accounts for slightly more than 20 percent. The balance is made up of pulpwood. In the case of deciduous harvest, fuelwood accounts for almost 45 percent of harvest, and sawlogs nearly 40 percent, with the balance consisting of pulpwood. Other industrial uses are not indicated.

Figures 3.25 and 3.26 show the volume contribution of each grade to total volume by conifer and hardwood harvest.

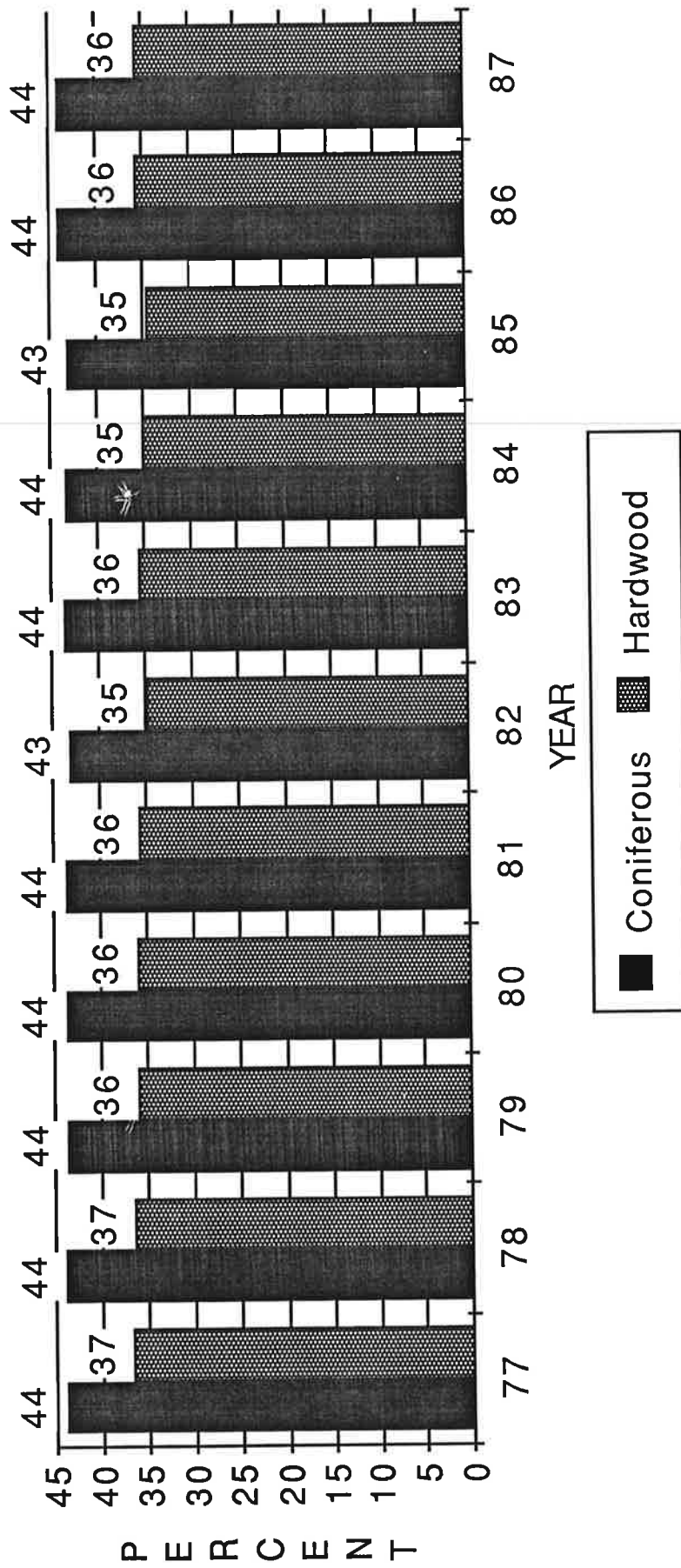
The Soviet harvest volume has shown significant increase during the last forty years, rising from 247 million cubic meters in 1940 to nearly 389 million cubic meters in 1987. Large increases in harvest occurred between 1940 and 1970 when total output increased from 247 million to 385 million cubic meters. This increase has continued in recent years, although at a somewhat more attenuated rate. Between 1970 and 1987 harvest increased by 4 million cubic meters, or by just one percent. Figure 3.27 shows total harvest and industrial wood harvest for the USSR, the RSFSR, and the rest of the USSR.

FIGURE 3-20 * USSR: DISTRIBUTION OF HARVEST
 BY LOG GRADE (Percent)
 Circa 1987



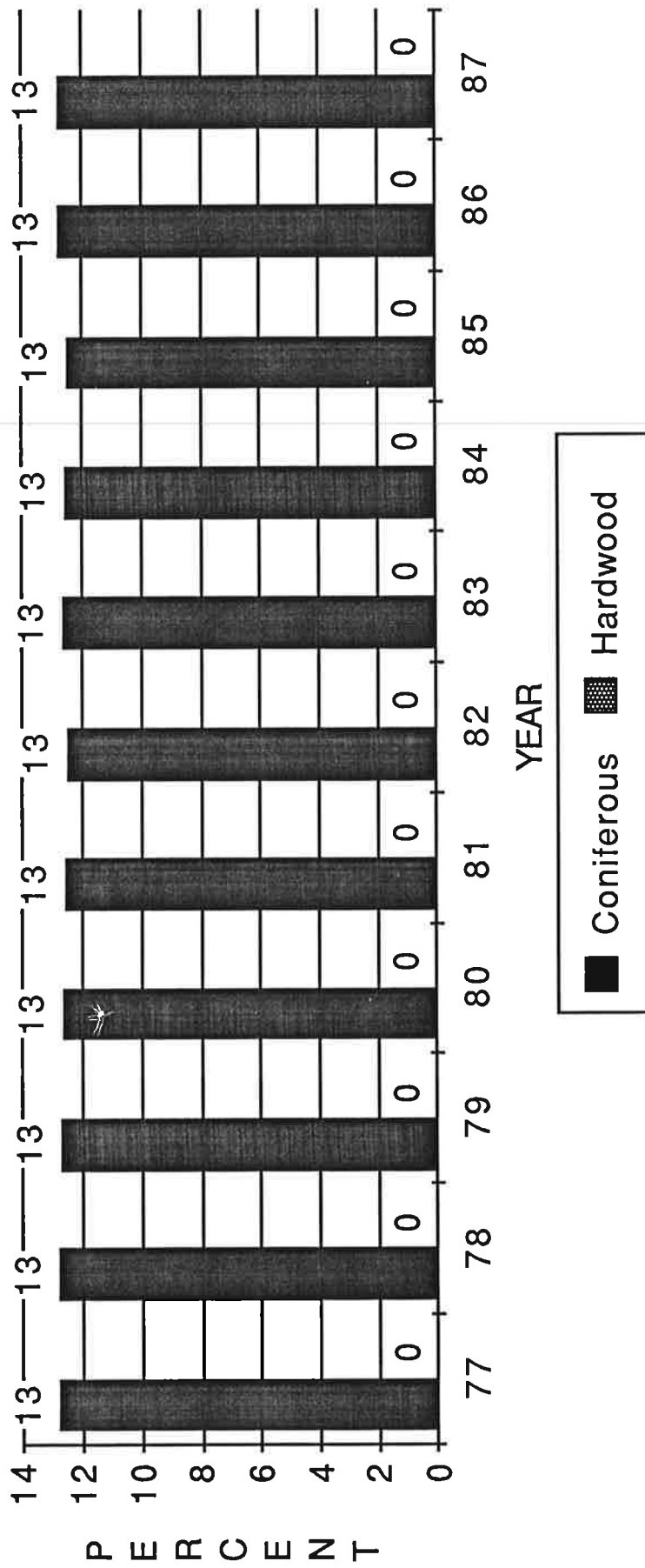
SOURCE: Outlook for the forest and forest products sector of the USSR, UN, 1989, page 44

FIGURE 3-21 * USSR: SHARE OF SAW AND VENEER LOG HARVEST
(CONIFER AND HARDWOOD) (Percent)
1977-87



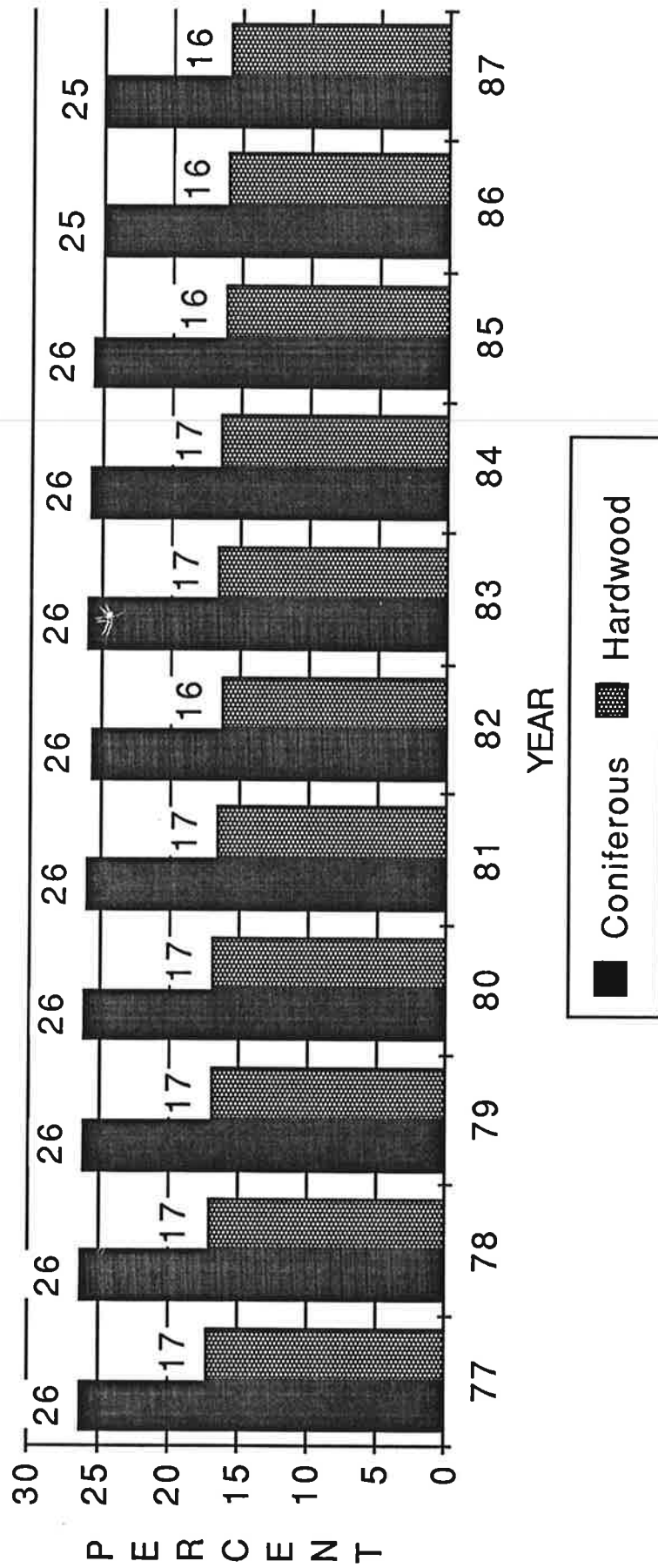
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-22 * USSR PULP LOG HARVEST
(CONIFER AND HARDWOOD) (Percent)
1977-87



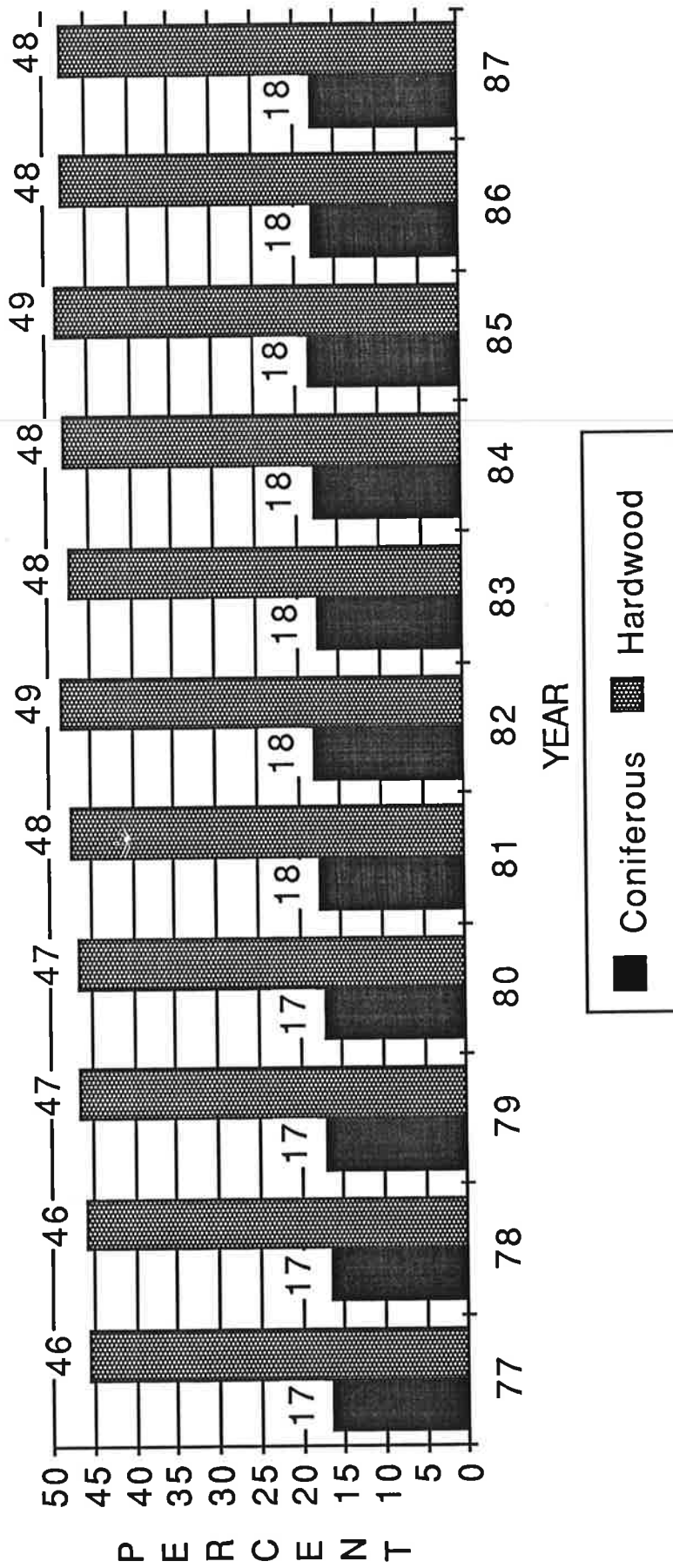
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-23 * USSR: OTHER INDUSTRIAL LOG HARVEST
(CONIFER AND HARDWOOD) (Percent)
1977-87



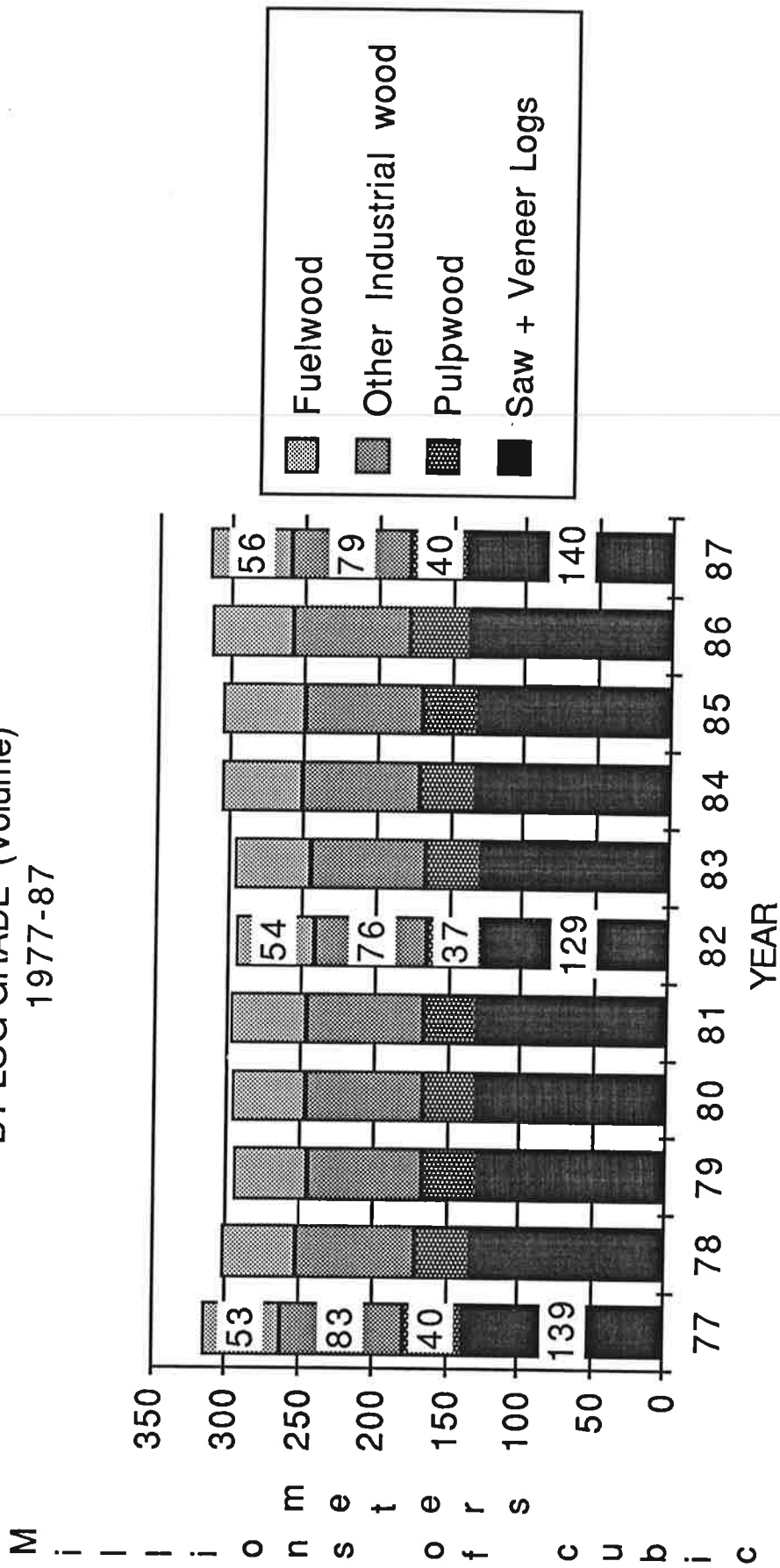
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-24 * USSR: FUELWOOD HARVEST
(CONIFER AND HARDWOOD) (Percent)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

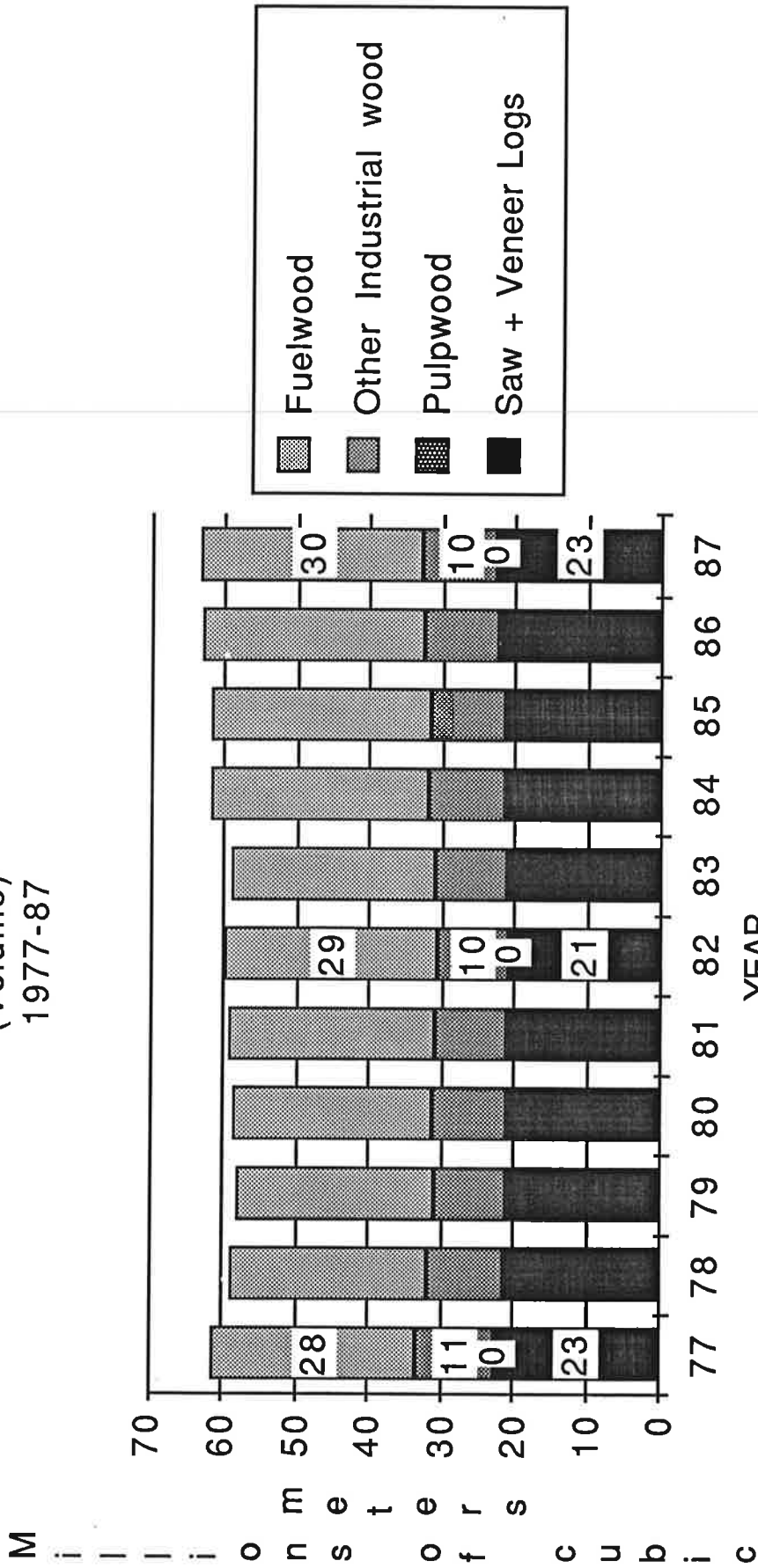
FIGURE 3-25 * USSR CONIFER ROUNDWOOD HARVEST
BY LOG GRADE (Volume)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

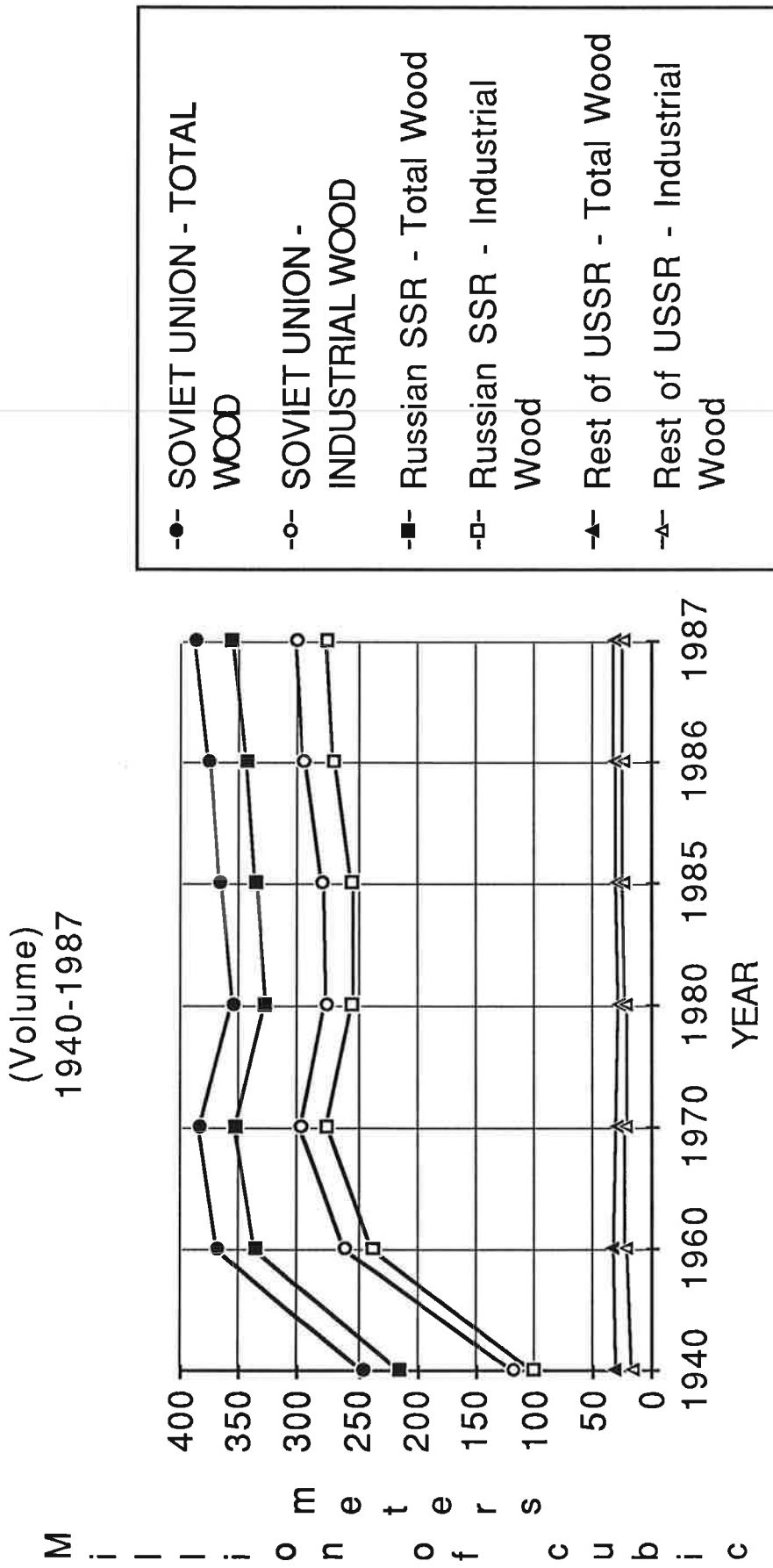
FIGURE 3-26 * USSR HARDWOOD ROUNDWOOD HARVEST BY LOG GRADE

(Volume)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-27 * DISTRIBUTION OF TOTAL AND INDUSTRIAL WOOD HARVEST BY MAJOR REPUBLIC OF ORIGIN



SOURCE: SSSR Narodnoye Khozaystvo v 1987 g, RSFSR Narodnoye Khozaystvo v 1987 g

As figure 3.27 shows, harvesting has been unevenly distributed throughout the country with the majority of the harvest concentrated in the RSFSR. Clearly, the RSFSR has been the dominant supplier of roundwood in the USSR, providing on average 92 percent of the harvest between 1970 and 1987. Minor amounts have been produced in the Ukrainian and Belorussian SSR.

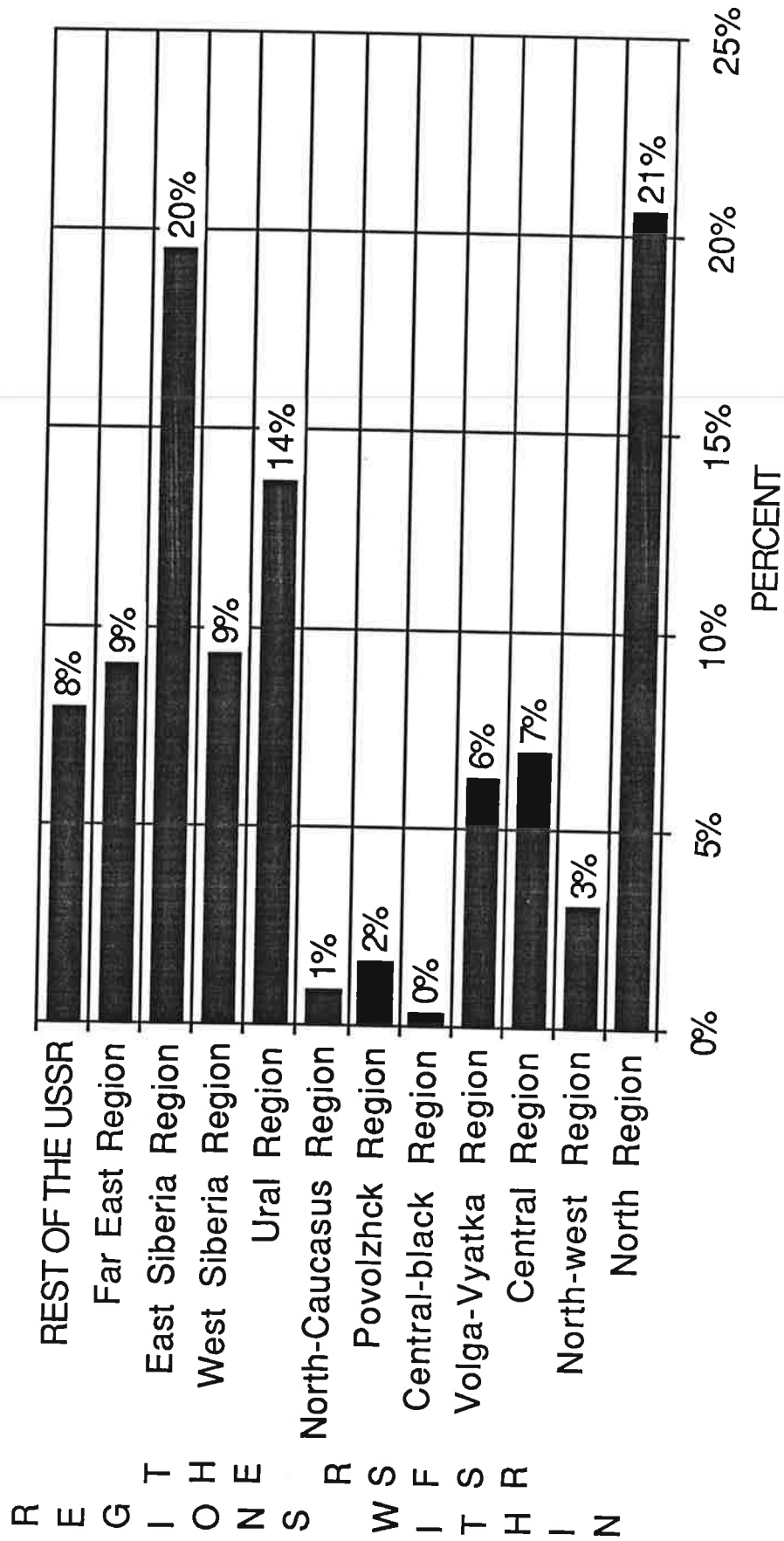
The degree to which the total harvest is unevenly distributed in the RSFSR can be seen by examining Figure 3.28.

This distribution has in part been due to:

1. historic course of economic activity;
2. availability of raw material resources and manpower;
3. location of existing enterprises and wood consumers;
4. level of transportation facilities; and
5. the degree of development of the fuel and energy base.

Three regions have dominated the harvest of roundwood within the RSFSR, collectively providing more than 50 percent of the total USSR harvest in any given year. These regions were North, Ural, and East Siberia. In 1987, these three regions provided 55 percent of the harvest. When the West Siberian and Far East regions are included, these five regions provide more than 70 percent of the total USSR harvest, with nearly 40 percent of this total originating in the regions east of the Ural mountains (West Siberia, East Siberia, Far East) in what is commonly referred to as Siberia.

FIGURE 3-28 * USSR: TOTAL HARVEST BY REGION (Percent) 1987



SOURCE: SSSR Narodnoye Khozaystvo v 1987 g, RSFSR Narodnoye Khozaystvo v 1987 g

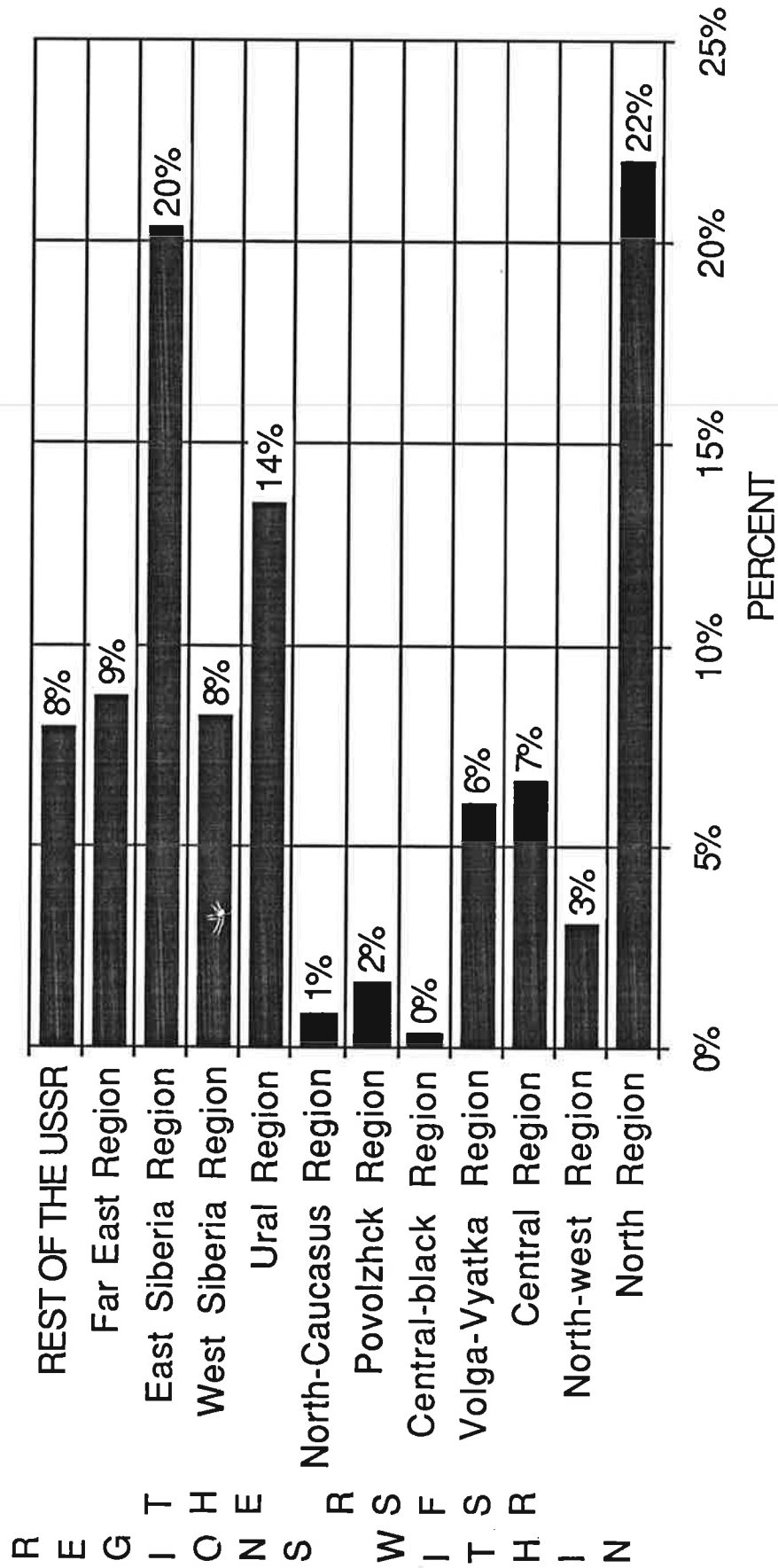
As Figure 3.29 shows, the output of industrial roundwood follows a similar pattern as total roundwood harvest.

The harvest volumes discussed above include both wood produced from clearcutting and wood produced from intermediate cuttings. This additional fiber is provided through thinning, selective cutting, and sanitary cutting, collectively called intermediate cuttings. While still a minor component of total wood supply, this source has been increasing in recent years. Intermediate fellings which are included in the harvest volumes discussed above, have increased from 36.7 million cubic meters in 1970 to 46.6 million cubic meters by 1987, or 27 percent. These intermediate cuttings comprised about 10 percent of the reported harvest. By 1987, this wood comprised about 12 percent.

The RSFSR has provided the largest share of intermediate cuttings followed by the Ukrainian SSR and Belorussian SSR. Together, these three republics provided 88 percent of the intermediate cuttings in 1987. Figure 3.30 shows the growth of intermediate fellings for the USSR and for selected republics for selected years between 1970 and 1987.

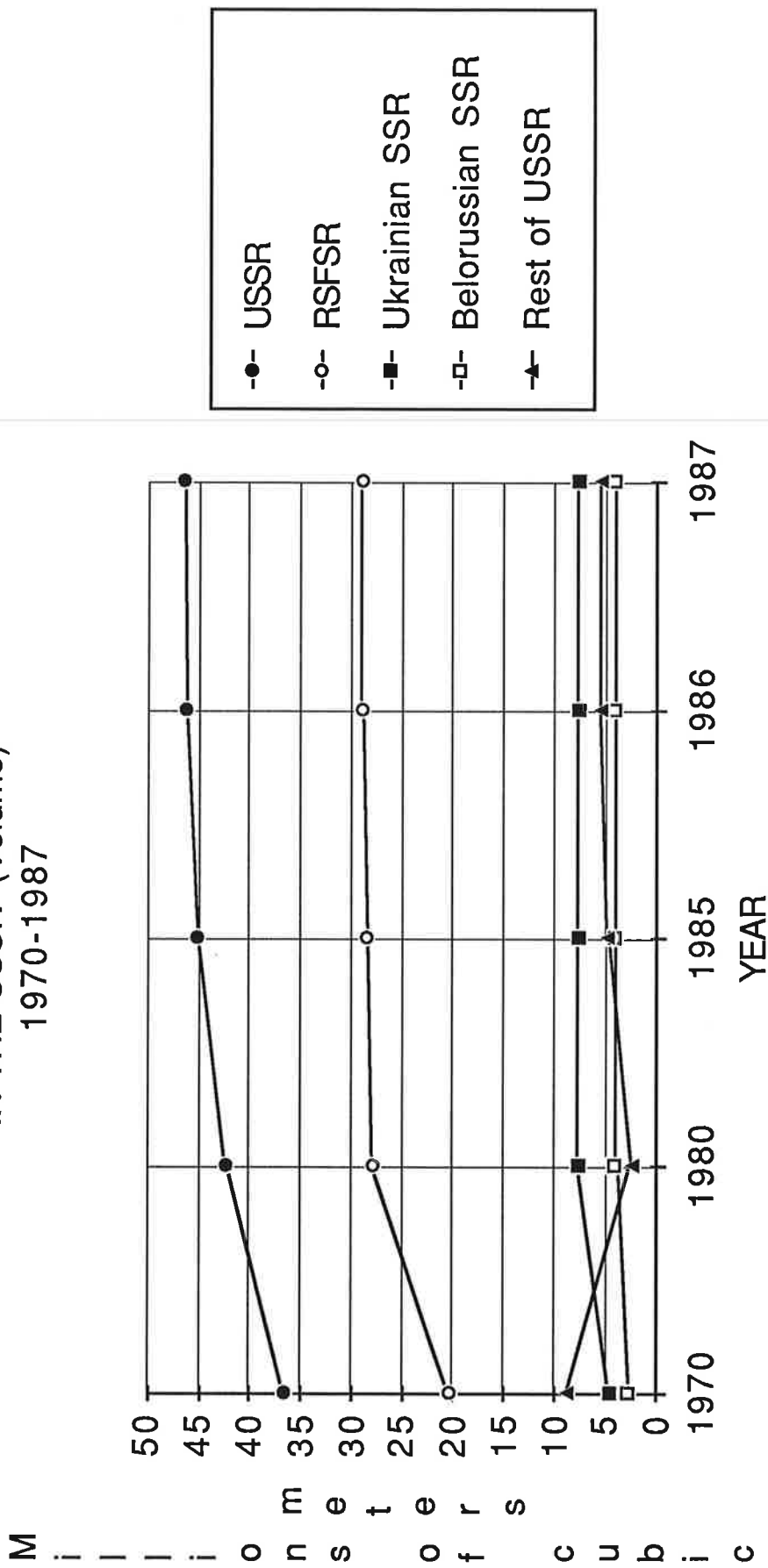
The regional distribution of thinning wood is not even, and is primarily concentrated in the RSFSR. Circa 1980-1982, this region provided 49 percent of the total harvest of intermediate fellings. However, when the contribution of thinnings to the total industrial harvest for the region is examined, a different trend emerges. For those regions,

FIGURE 3-29 * USSR: INDUSTRIAL HARVEST BY REGION (Percent) 1987



SOURCE: SSSR Narodnoye Khozaystvo v 1987 g, RSFSR Narodnoye Khozaystvo v 1987 g

FIGURE 3-30 * VOLUME OF THINNINGS AND SANITARY FELLINGS
IN THE USSR (Volume)
1970-1987



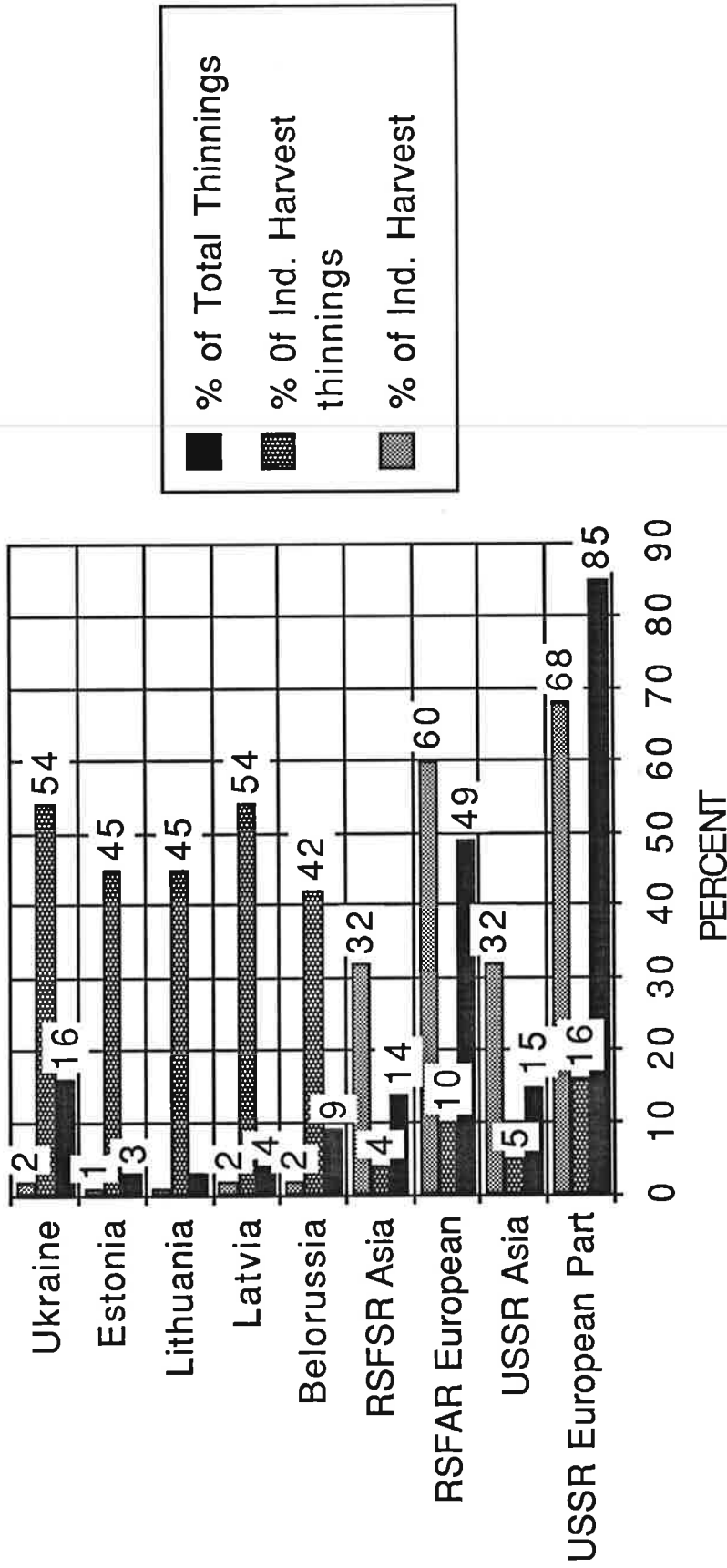
SOURCE: SSSR, RSFSR, Ukrainian, and Belorussian Narodnoye Khozaystvo v 1987 g

notably the Ukraine, Estonia, Lithuania, Latvia, and Belurussia, which provide collectively about 8 percent of the total industrial harvest, the contribution of thinning wood to total region fiber supply is quite large, ranging from 42 percent for Belurussia to 54 percent for the Ukraine. Figure 3.31 shows the geographic location of intermediate fellings, the distribution of industrial harvest, and the contribution to total regional wood supply obtained from intermediate thinning wood for circa 1980-1982.

While the output of the logging sector has increased in recent years, it has reportedly not met the needs of the economy. The pulp and paper sectors and sawmilling sectors have not been adequately supplied with raw material due to a lack of capital investment in the harvesting sector, scarcity of all weather and all season hauling roads, and the low rate of introduction of new machinery and equipment.

While the output of roundwood has been increasing in recent years, increases in output may be muted in the future because of a host of factors, not least of which is the growing concerns over impacts of industrialization on the environment. Notwithstanding this, an indication of the likely changes in harvesting patterns can be obtained by examining the degree of utilization of the AAC by region. These changes are delineated in Figures 3.32 to 3.34. These figures show the distribution of the AAC for 1982 by geographic region and by species grouping.

FIGURE 3-31 * REGIONAL SHARES OF TOTAL HARVEST, THINNING, AND INDUSTRIAL HARVEST CIRCA 1980 (Percent)



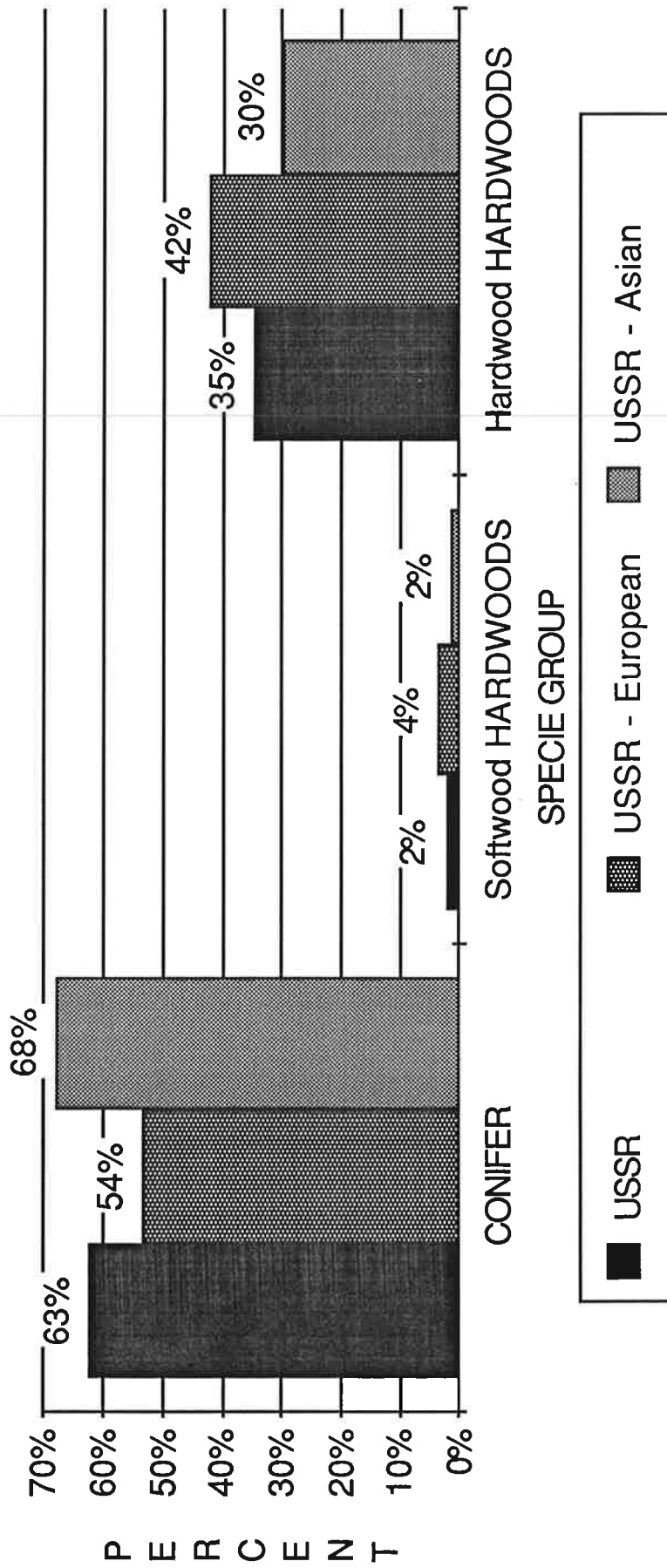
G E O G R A P H I C R E G I O N

As Figure 3.32 shows, conifers comprise more than 60 percent of the AAC while hardwoods contribute just under 40 percent. When examining the AAC within the European part of the USSR, conifers contribute 54 percent while hardwood species provide 46 percent. As can be expected, given the large volume of conifer species located in the Asian part (Eastern USSR), these species provide 68 percent of the Asian AAC with hardwoods making up the balance.

As Figure 3.33 shows, more than 60 percent of the AAC is located in the Asian portion of the country. This is even more pronounced when the conifer component is considered - 66 percent. An indication of the distribution of the hardwood resource is apparent from the hardwood AAC distribution. More than 60 percent of the hardwood AAC is located in the European (Western) part of the country, with 40 percent in the Asian part.

As Figure 3.34 shows, in the European part of the country, nearly 80 percent of the AAC is harvested versus 33 percent for the Asian part. However, when the contributions to the AAC are examined by the species groups, an interesting trend emerges. While the conifer component in the European part is nearly 90 percent utilized, the hardwood component was only about 70 percent utilized. This difference is even more pronounced when the Asian part of the USSR is examined. While the conifer component is 40 percent utilized, the hardwood component was only about 20 percent utilized.

FIGURE 3-32 * DISTRIBUTION OF THE ANNUAL ALLOWABLE CUT
 BY SPECIE GROUP AND SPECIFIED REGION (Percent)
 1982



SOURCE: Lesnaya Entsiklopediya V. II, page 404

FIGURE 3-33 * DISTRIBUTION OF THE ALLOWABLE ANNUAL CUT BY REGION
AND BY SPECIE GROUP (Percent)
1982

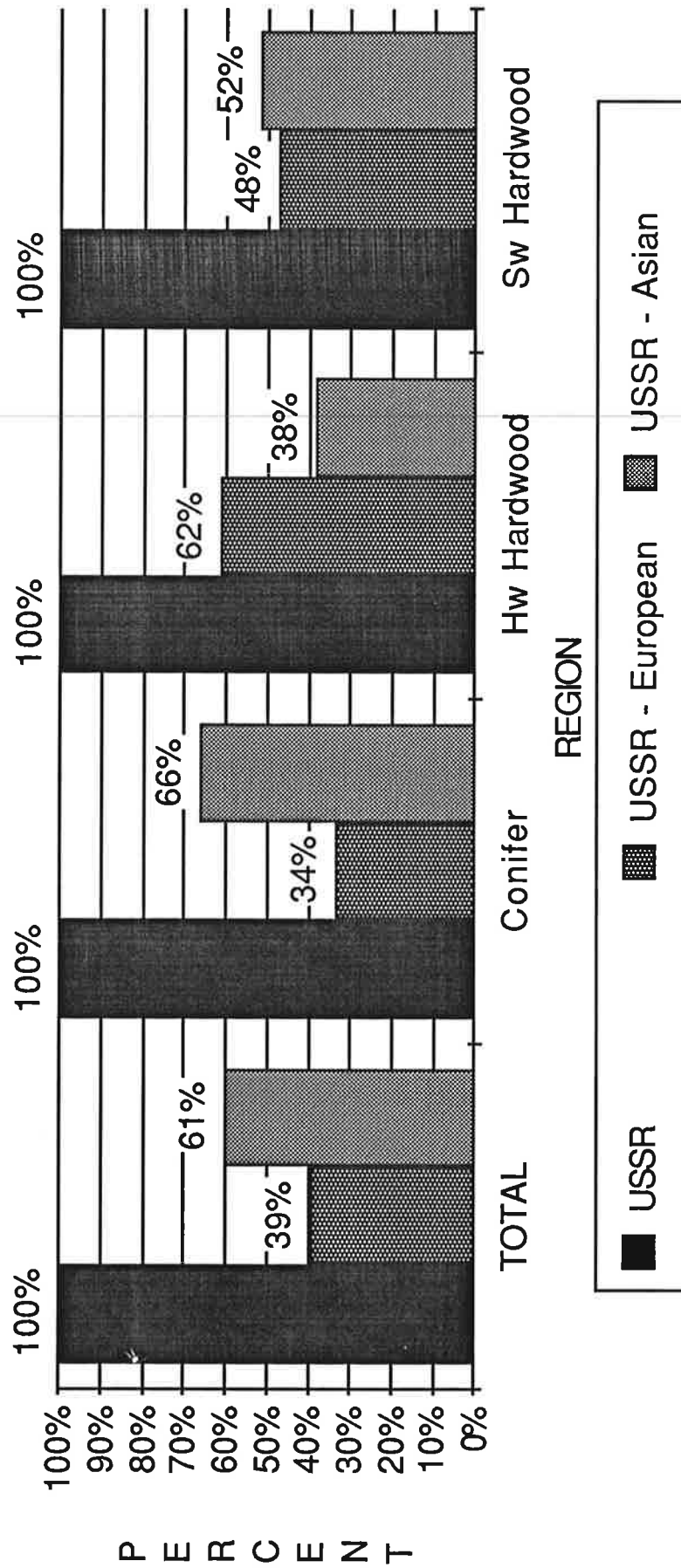
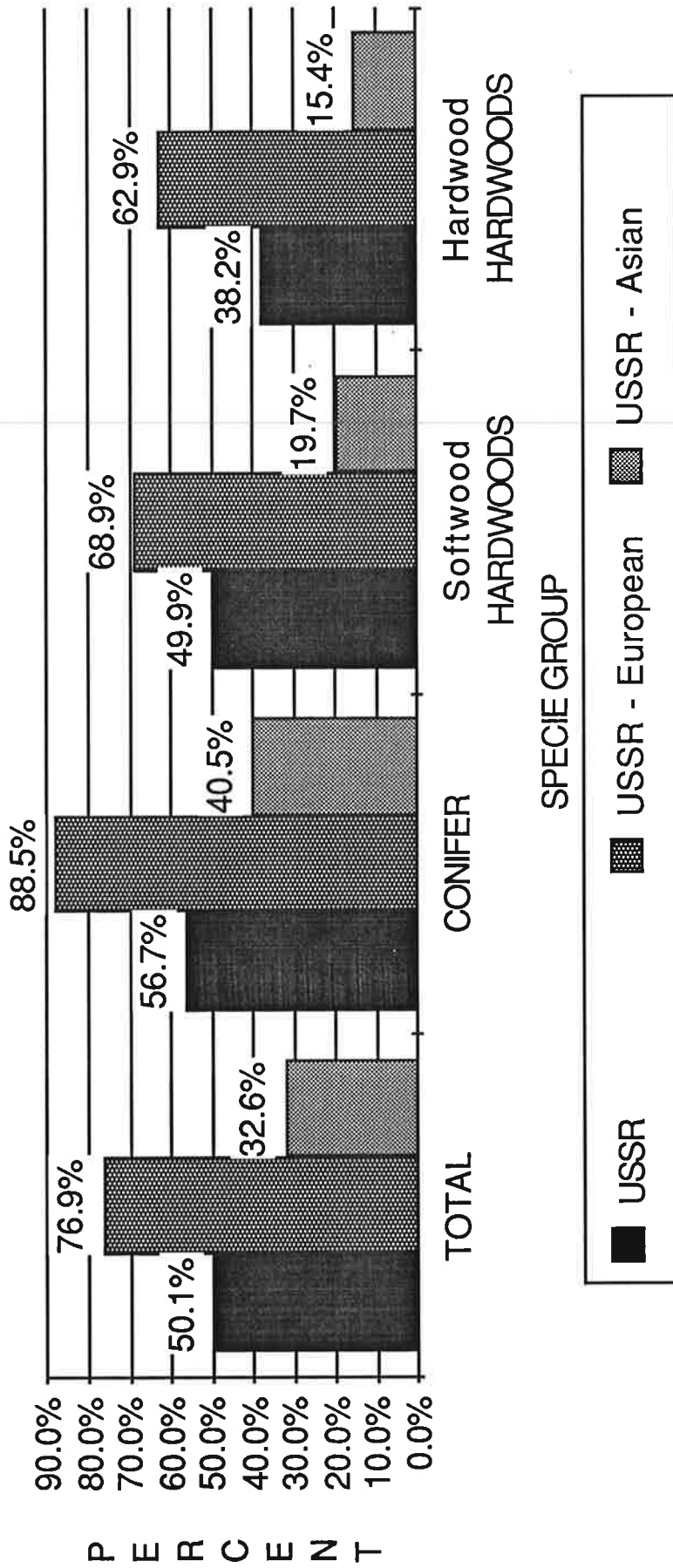


FIGURE 3-34 * PROPORTION OF THE ALLOWABLE ANNUAL CUT HARVESTED
 BY SPECIES GROUP AND REGION (Percent)
 1982



SOURCE: Lesnaya Entsiklopediya V. II, page 404

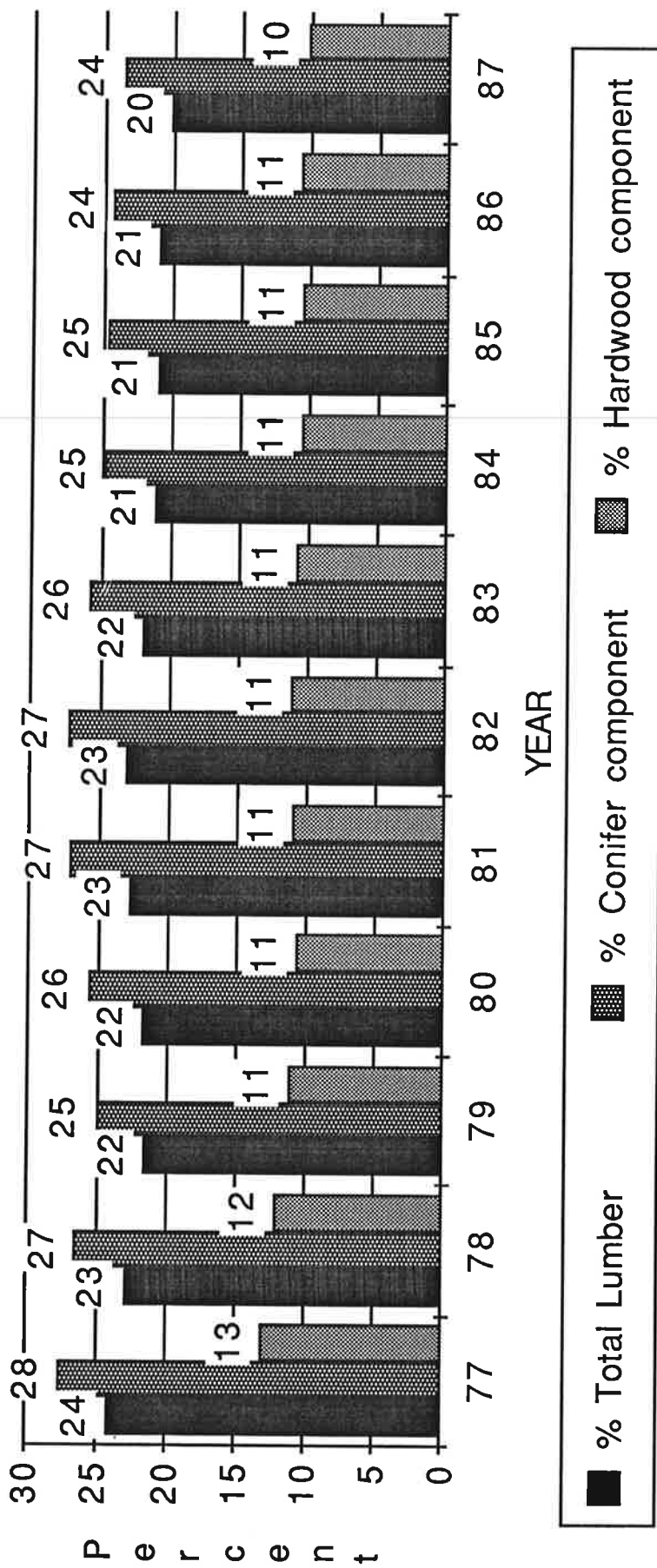
Clearly, there appears to be two opportunities present. First, is the expansion of the harvest in the Asian part of the country. Second, is the increasing utilization of the hardwood resource, particularly in the European part of the country where the major part of the consumption is located. However, the ability of the USSR to increase its overall harvest, at least in the short term, may be muted.

Sawnwood Production

The Soviet Share of world lumber production is 20 percent of the world total. As can be expected of a nation with such a large forest reserve of coniferous species, the share of conifer lumber production is higher at 24 percent of world total coniferous lumber production. The share of hardwood lumber production is 10 percent of the world total hardwood lumber production. Figure 3.35 shows the proportion of USSR lumber production to world production for total lumber production and for the conifer and hardwood components. Figures 3.36 through 3.38 show volumes of total lumber production and the conifer and hardwood components for the world and the USSR for the period 1977 through 1987.

For the USSR and the world, during the last eleven year period, the share of hardwood lumber to total lumber output has remained relatively constant. As is evident from Figure 3.39, hardwood lumber production is far more important to world production than it is for the USSR. In 1987, the hardwood component was 24 percent and 12 percent for the world

FIGURE 3-35 * USSR CONTRIBUTION TO WORLD LUMBER PRODUCTION
(CONIFER AND HARDWOOD) (Percent)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-36 * USSR AND WORLD LUMBER (Including Sleepers)
 PRODUCTION (CONIFER AND HARDWOOD) (Volume)
 1977-87

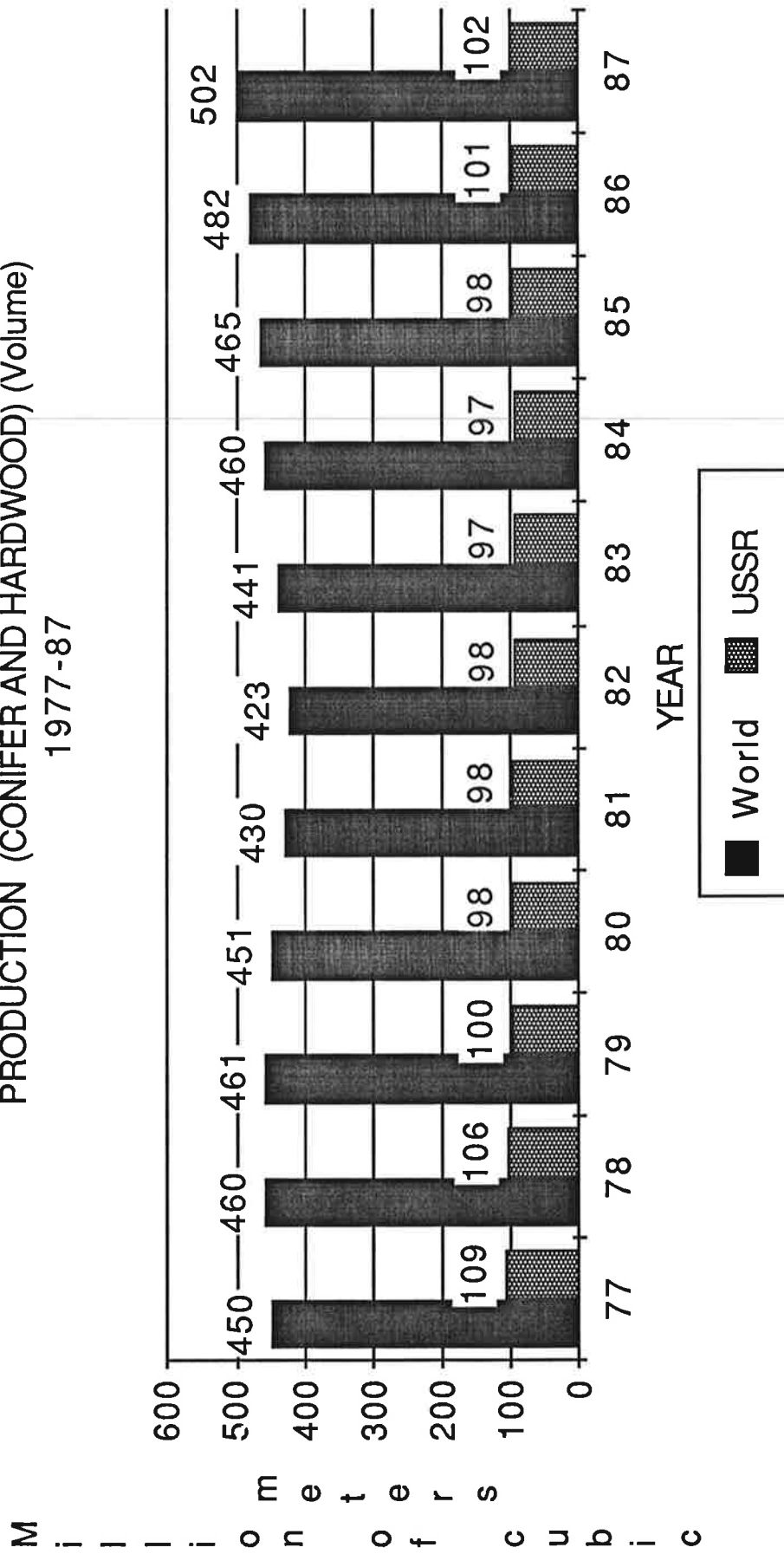
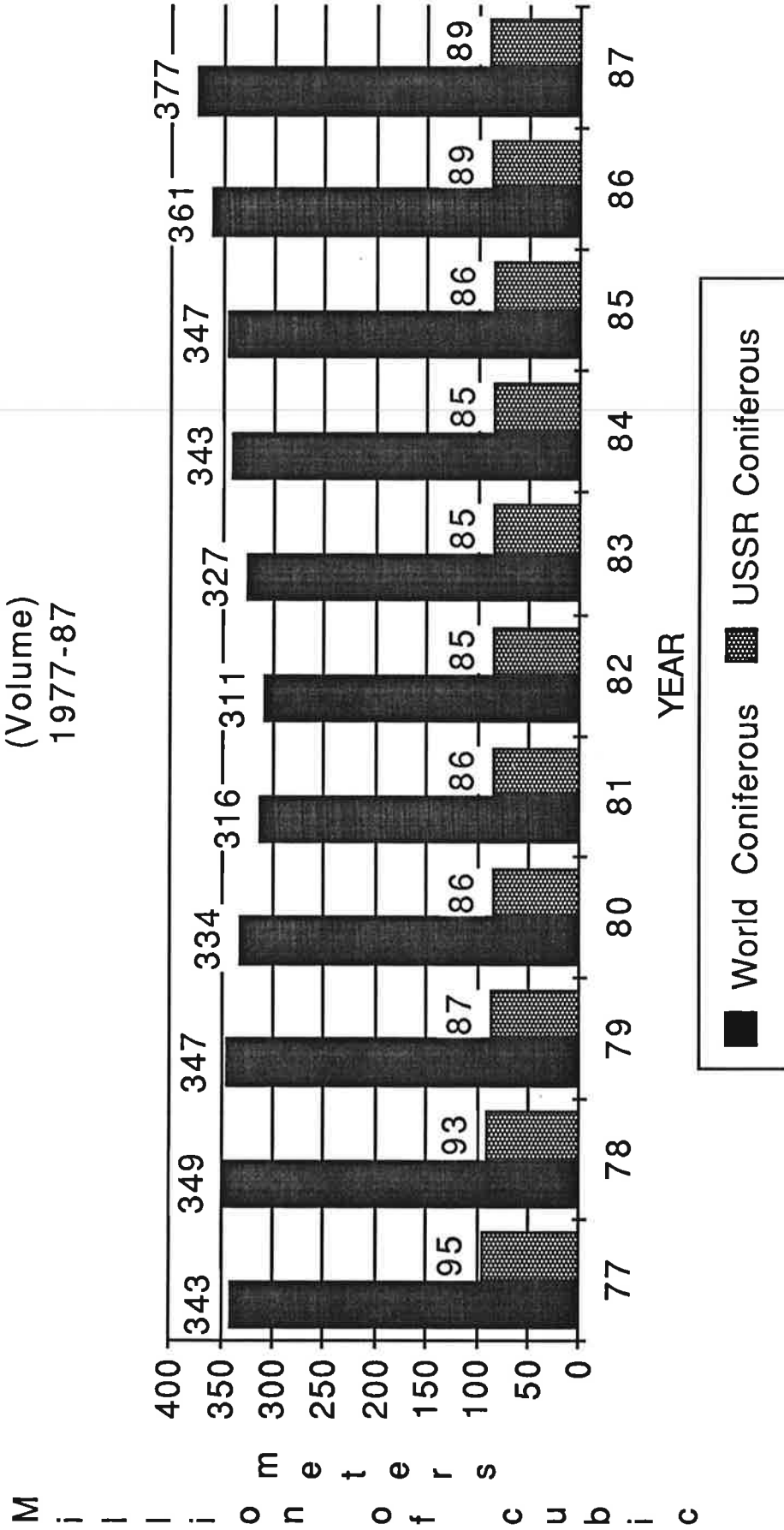
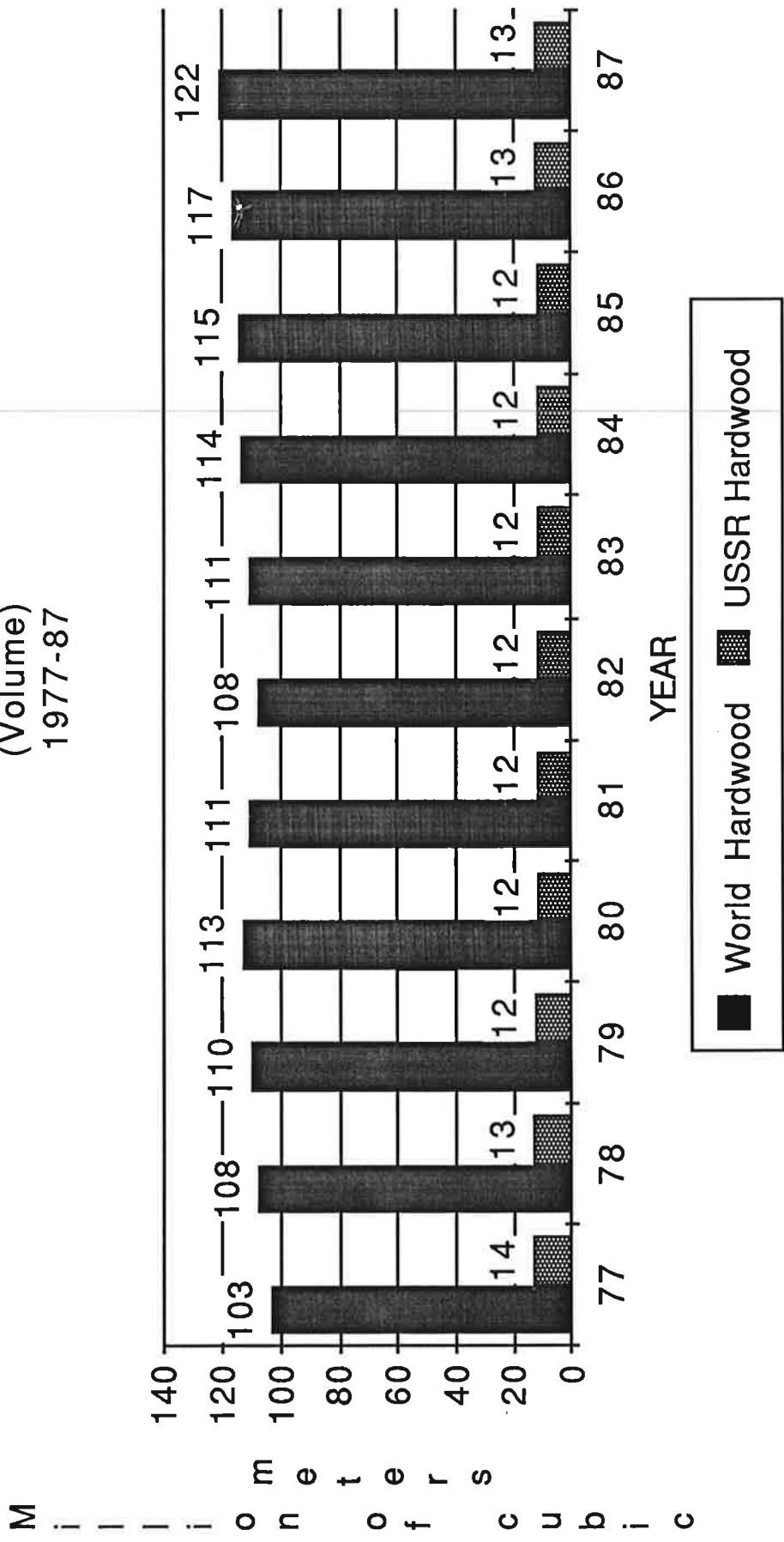


FIGURE 3-37 * USSR and WORLD CONIFER LUMBER PRODUCTION
(Volume)
1977-87



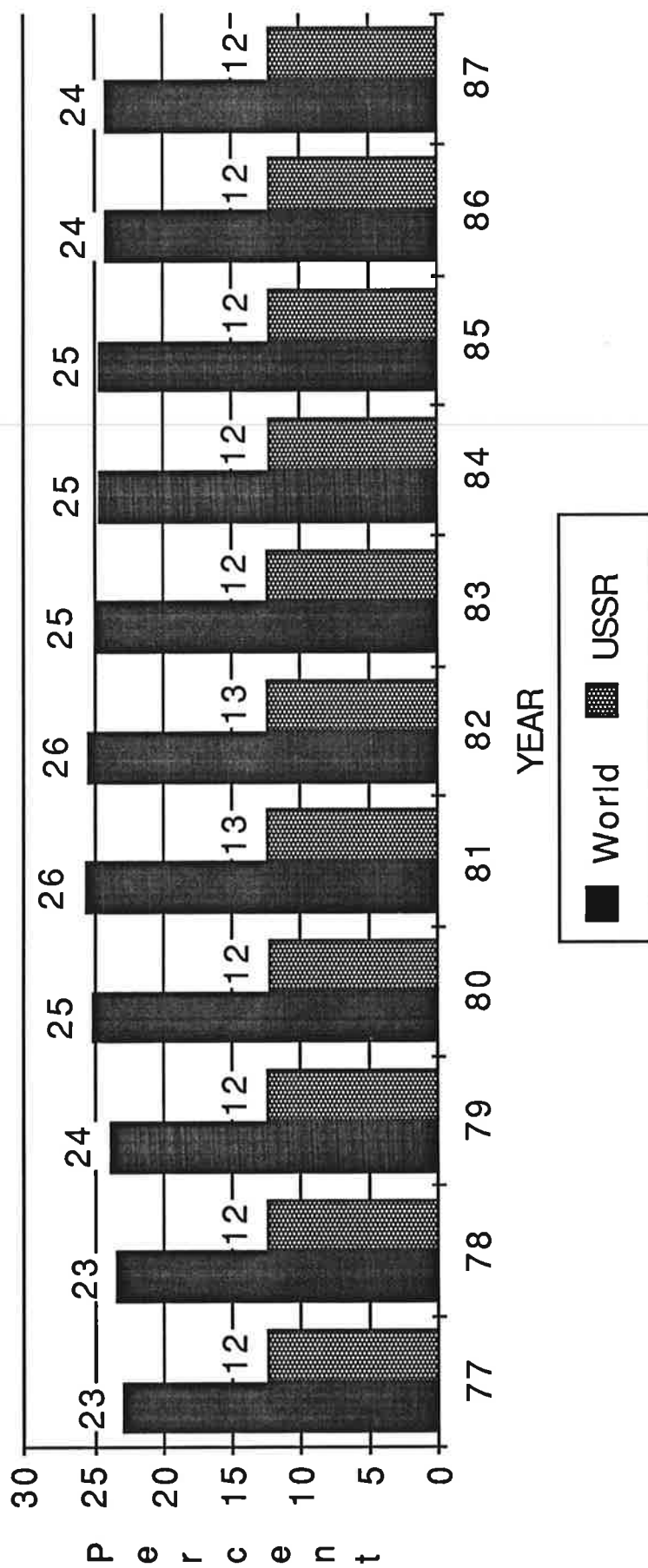
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-38 * USSR AND WORLD HARDWOOD LUMBER PRODUCTION
(Volume)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-39 * USSR AND WORLD HARDWOOD LUMBER PRODUCTION
AS SHARE OF TOTAL LUMBER PRODUCTION (Percent)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

and USSR respectively.

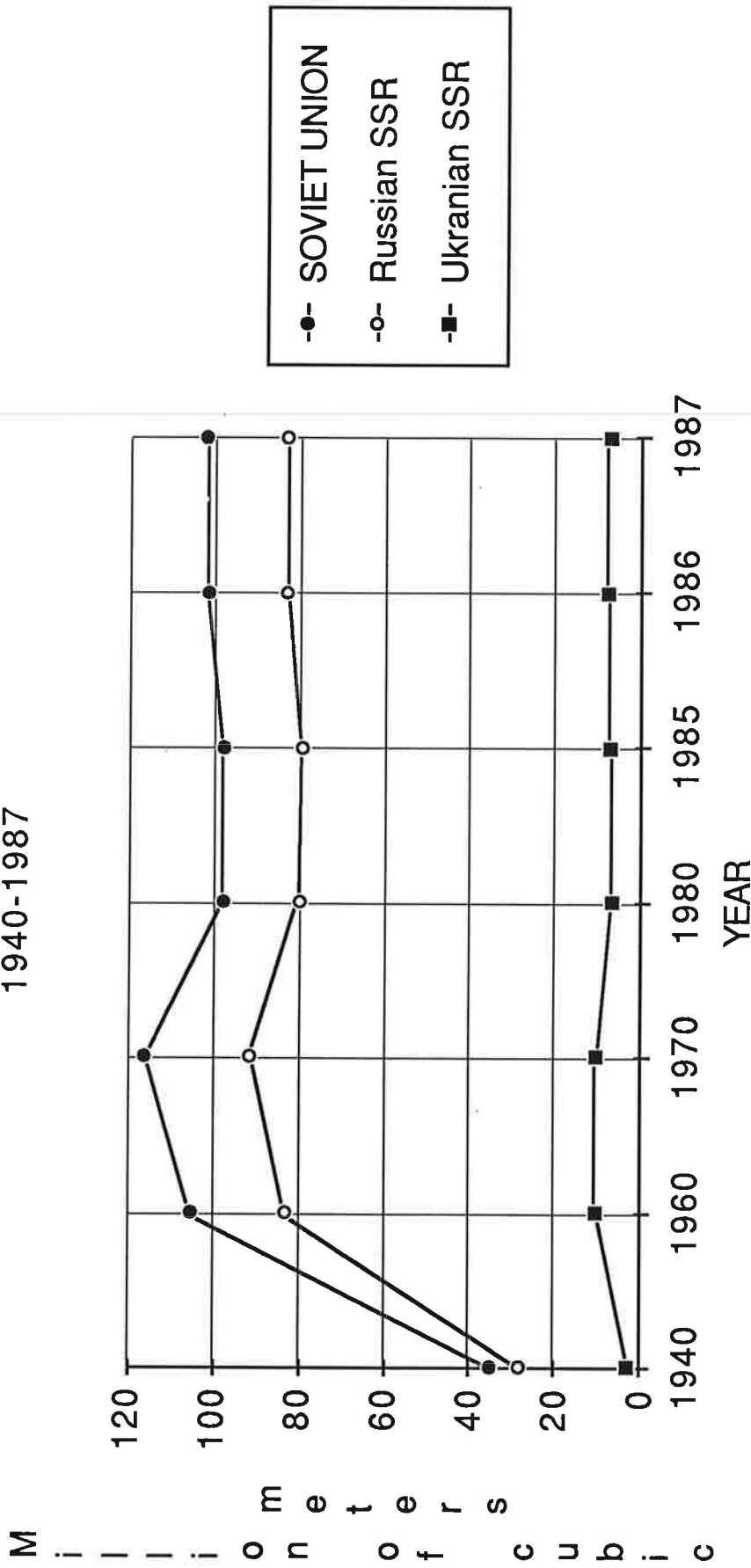
Lumber production has increased since 1940 reaching a peak of 116 million cubic meters in 1970 before falling to 98 million cubic meters in 1980. Output has remained fairly constant around the 100 million cubic meter level since then.

The production of lumber is unevenly distributed throughout the USSR. Figure 3.40 shows lumber production for the total USSR, and for the RSFSR and the Ukrainian SSR for selected years over the period 1940 to 1987. Clearly the RSFSR, the dominant republic, has consistently produced about 80 percent of the total USSR output. Minor amounts have been produced by the Ukrainian, Belorussian and Kazakhstan SSR. Together, these three republics produced only 12 percent of the Soviet lumber in 1987.

The degree to which the lumber production is distributed throughout the RSFSR can be seen by examining Figure 3.41. Three regions have dominated the production of lumber during the last ten years and in 1987 produced 43 percent of the USSR's output. These three regions are the North, Ural, and the East Siberian Region. When the West Siberian and Far East region are included, these five regions produce 58 percent of the USSR's output, with 33 percent occurring east of the Ural mountains in the West Siberian, East Siberian, and the Far East region.

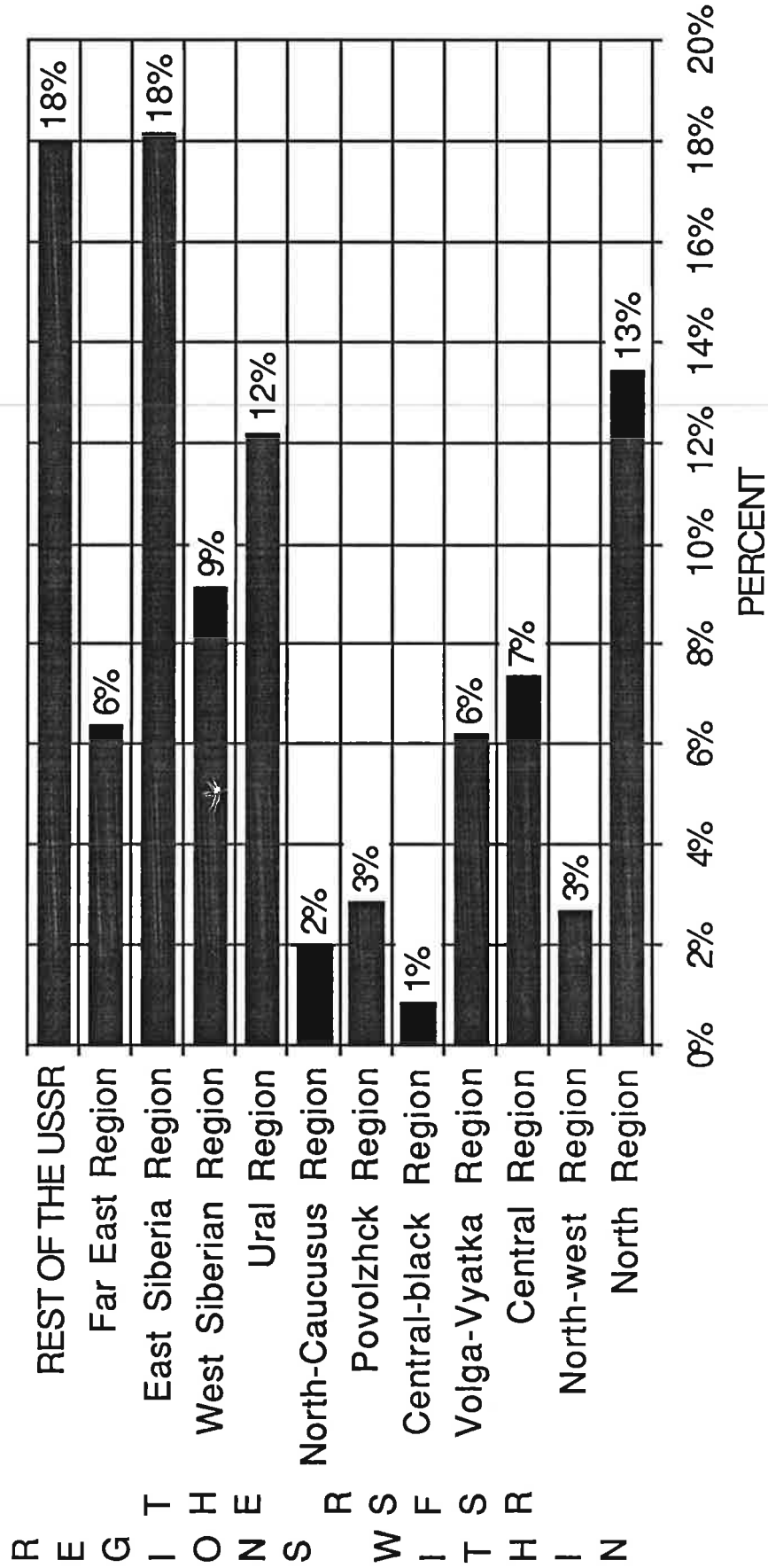
Declining quality of wood resource compensated for by the locational rationalization of, and improved technology for, production facilities should lead in the future to minor

FIGURE 3-40 * USSR LUMBER PRODUCTION BY MAJOR REPUBLIC OF ORIGIN (Volume) 1940-1987



SOURCE: SSSR Narodnoye Khozaystvo v 1987 g

FIGURE 3-41 * USSR: LUMBER PRODUCTION BY REGION (Percent) 1987



SOURCE: RSFSR Narodnoye Khozystvo v 1987 g

increases in production. However, in the long-term, it is unlikely that production of lumber will change significantly from the current level of 100 million cubic meters per annum.

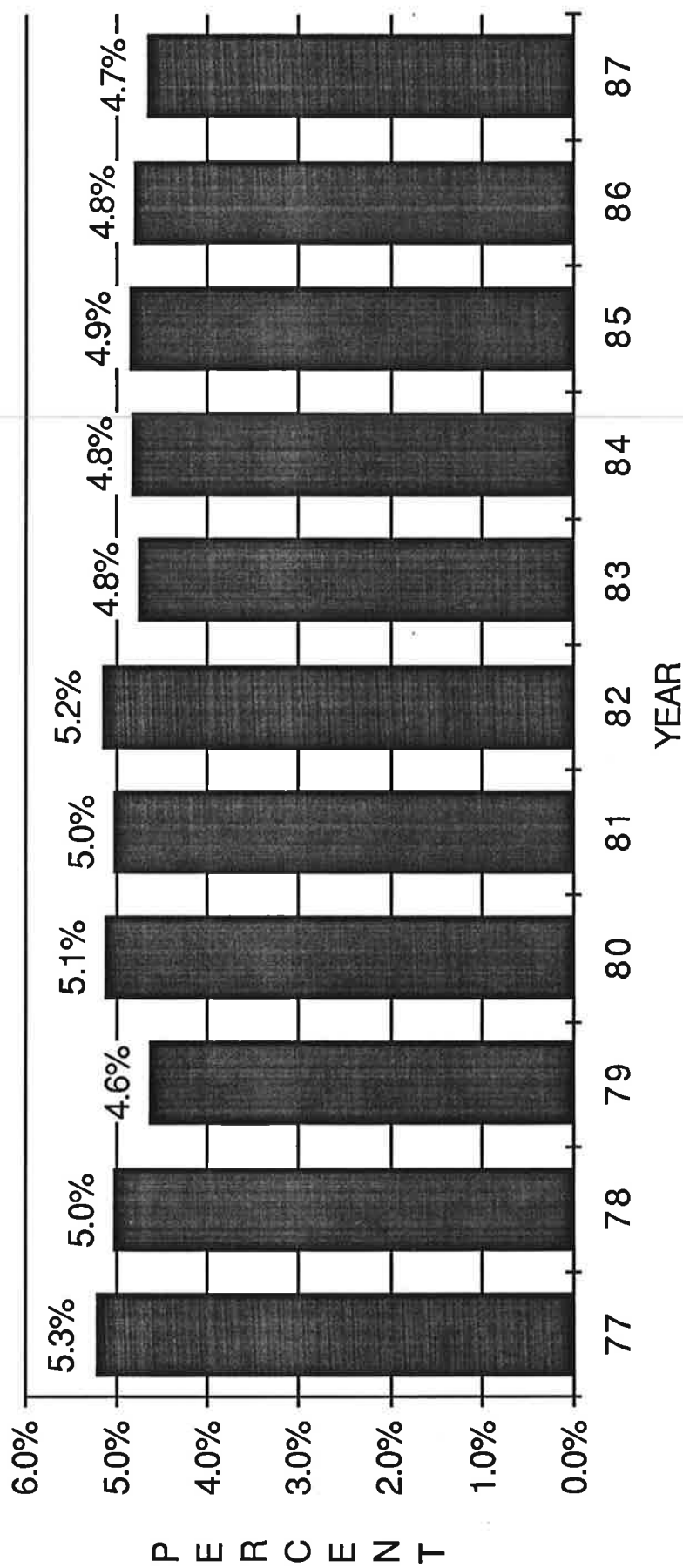
Plywood Production

In 1987 the Soviet Union produced 5 percent of the world total plywood production. As Figure 3.42 shows, this percentage has remained relatively constant during the period between 1977 and 1987. Figure 3.43 shows actual volume of plywood production for the USSR and for the world for the period 1977-87.

The production of plywood has increased more than three-fold since 1940, but by only 15 percent since 1980, and only 5 percent since 1985. The rate of increase in plywood production has been low in recent years, largely due to technical and organizational factors. From a base of 732 million cubic meters in 1940, output increased to 2,022 thousand cubic meters in 1980 and 2,304 thousand cubic meters in 1987. Figure 3.44 shows production of plywood for the USSR and for selected republics of the USSR for selected years in the period between 1940 and 1987.

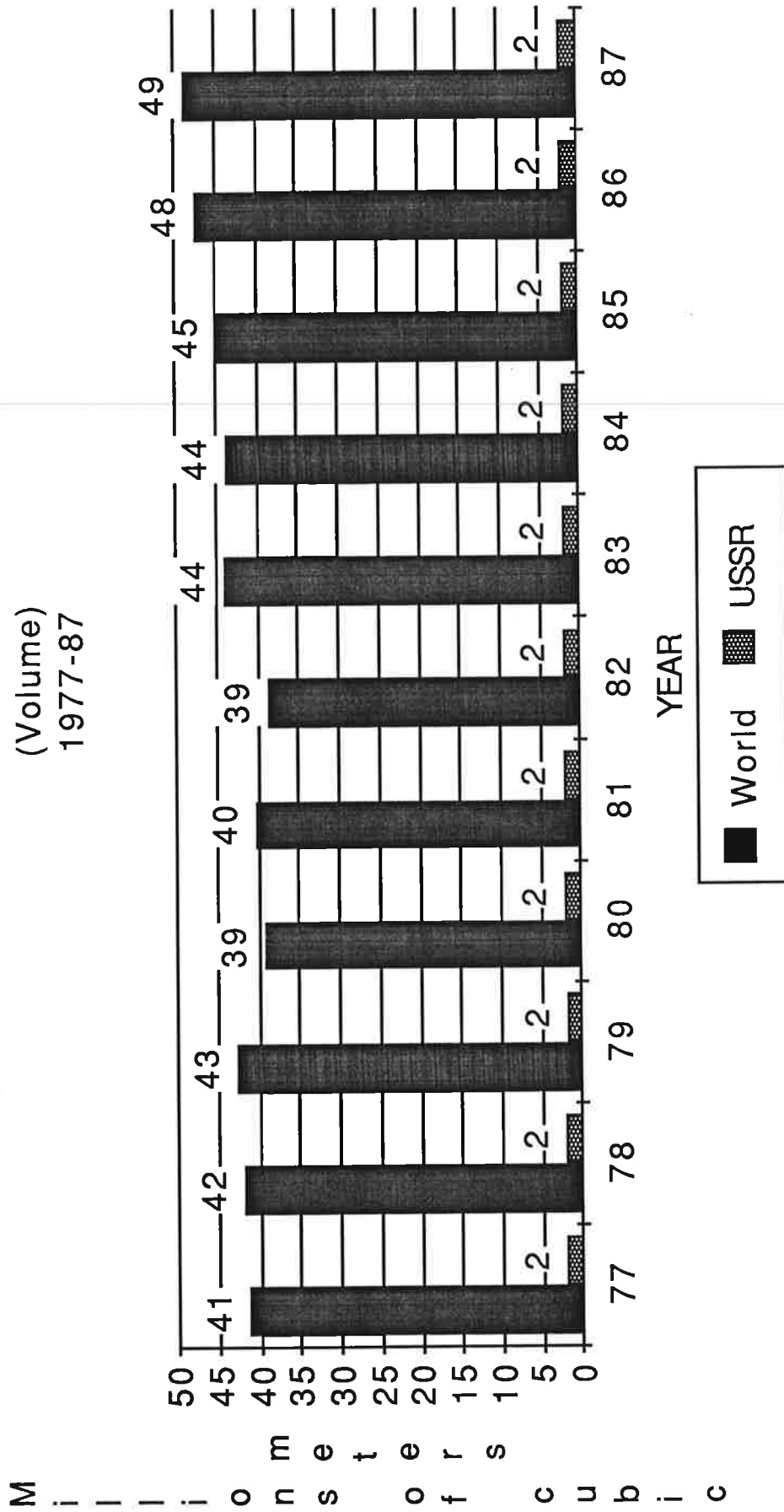
Plywood production is concentrated in the RSFSR which has consistently produced slightly more than 70 percent of the total USSR production of this product. Other major producers of plywood include the Ukrainian and Belorussian SSR which have between them produced about 20 percent of the total output of the USSR.

FIGURE 3-42 * USSR PERCENT OF WORLD PLYWOOD PRODUCTION
1977-87



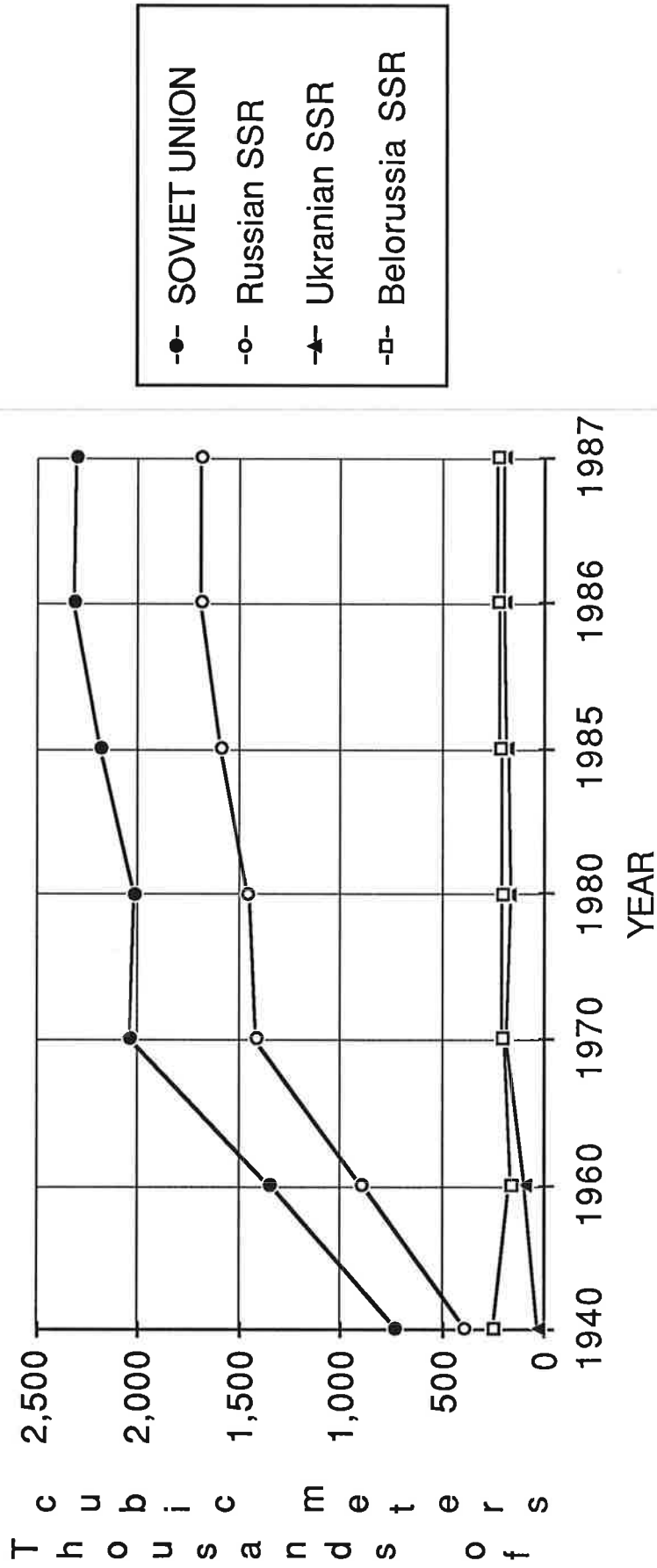
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-43 * USSR AND WORLD PLYWOOD PRODUCTION
(Volume)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-44 * USSR PLYWOOD PRODUCTION BY MAJOR REPUBLIC OF ORIGIN
(Volume)
1940-1987



SOURCE: SSSR Narodnoye Khozaystvo v 1987 g

As Figure 3.45 shows, the production of plywood is not evenly distributed throughout the RSFSR. Four regions account for 51 percent of the USSR production or 70 percent of the RSFSR production. These four regions are the Ural, Central, North, and East Siberian region. Production east of the Urals accounts for only 15 percent of the total USSR production, considerably less than either the volume of standing timber (77 percent), log harvest (37 percent) or production of lumber (33 percent).

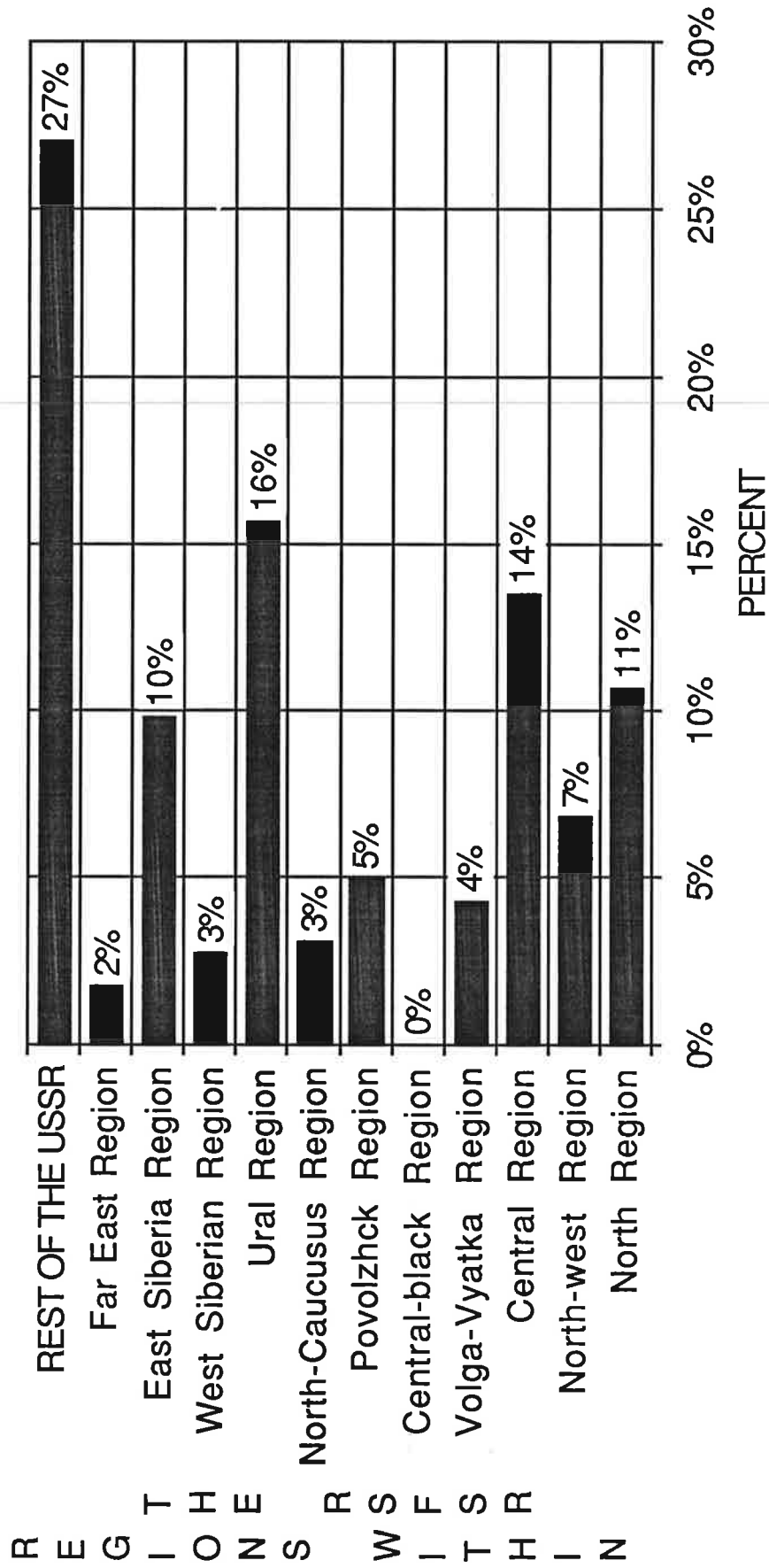
While recent trends in plywood production would suggest a constant or declining output, recent developments in the technology to produce plywood from larch species would suggest that with the proper financial incentives, output could be increased utilizing the larch resource in Siberia.

Particleboard Production

In 1987, the USSR produced 15 percent of the world production of particleboard. As Figure 3.46 shows, the Soviet share has been increasing in recent years reflecting a growing emphasis on fuller utilization of the wood resource and improving technology as Soviet output has kept pace with the expanding world output. Figure 3.47 shows volume production for the world and USSR for the period 1977 through 1987.

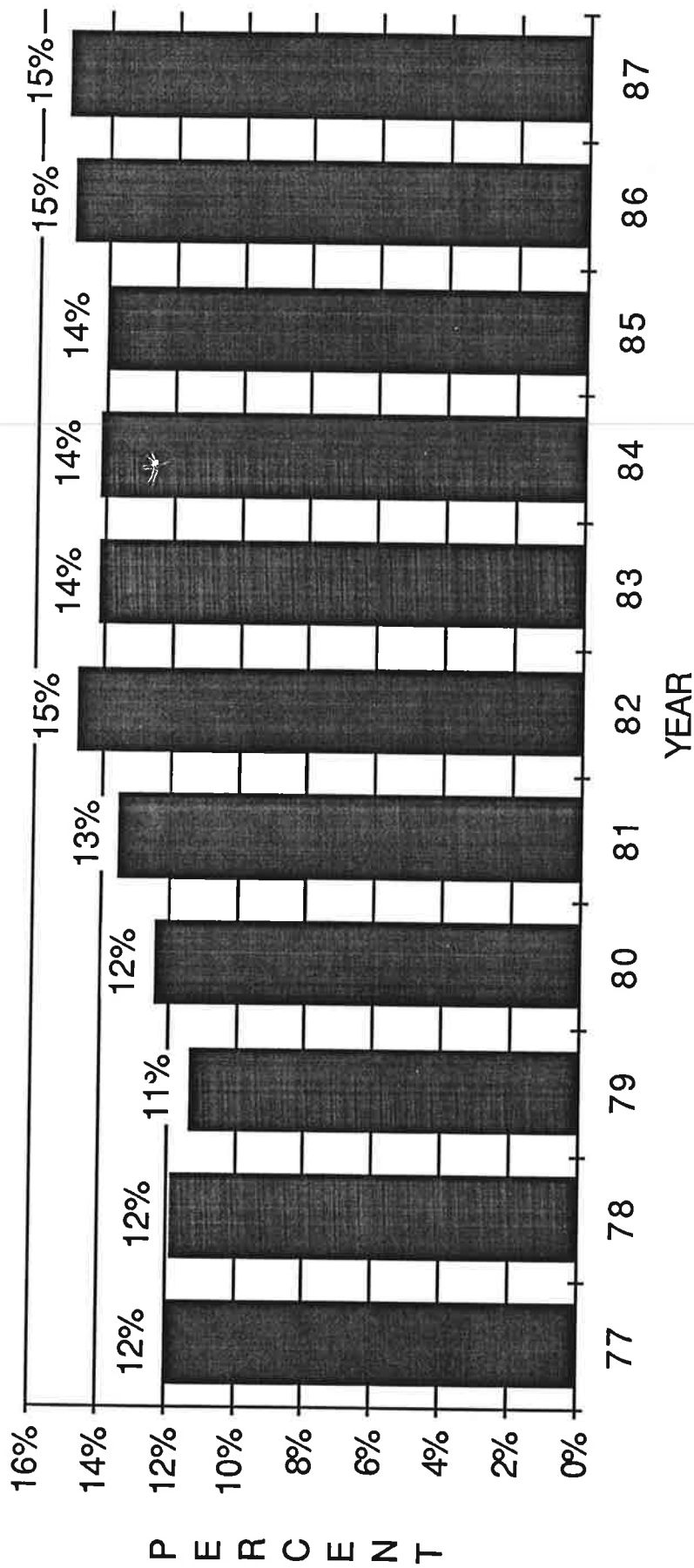
Starting from a small installed capacity in 1960 of 161 thousand cubic meters, by 1987, capacity had grown to 7,689 thousand cubic meters, an increase of over 4,700 percent. Figure 3.48 shows the trends in USSR production for selected years in the period 1960 through 1987. As can be expected,

FIGURE 3-45 * USSR PLYWOOD PRODUCTION BY REGION (%)1987



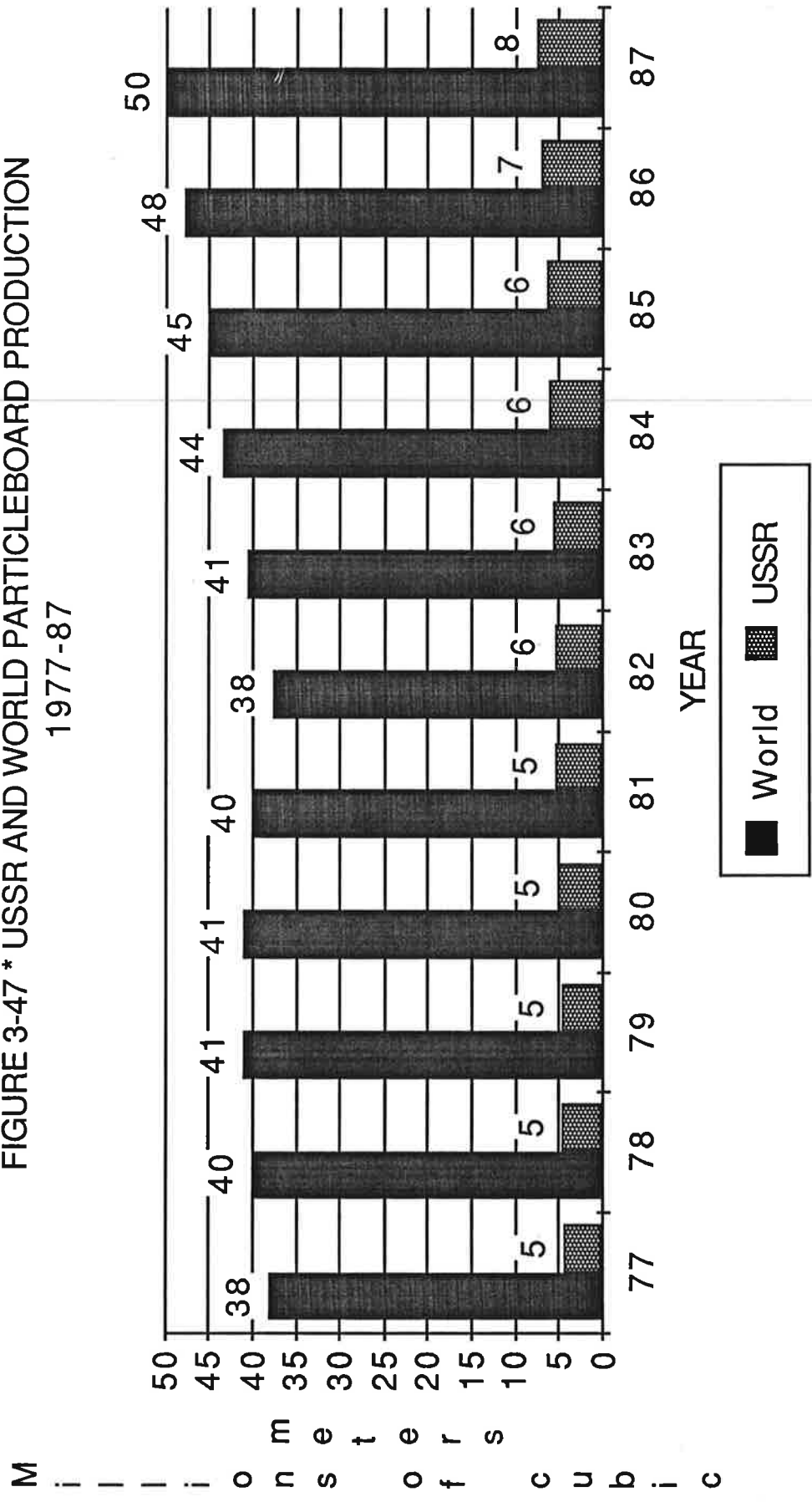
SOURCE: RSFSR Narodnoye Khozaystvo v 1987 g

FIGURE 3-46 * USSR PERCENT OF WORLD PARTICLEBOARD PRODUCTION
1977-87



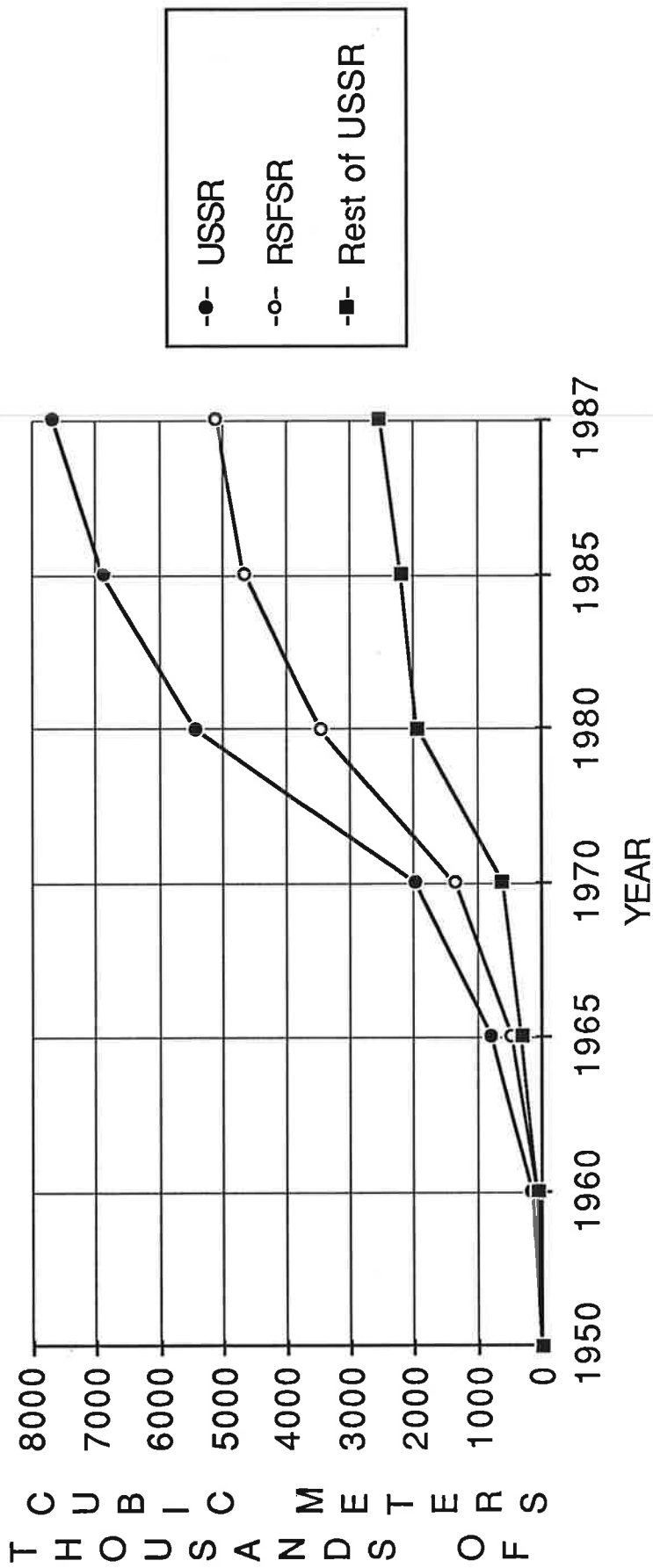
SOURCE: SSSR Narodnoye Khozaystvo v 1987 g

FIGURE 3-47 * USSR AND WORLD PARTICLEBOARD PRODUCTION
1977-87



SOURCE: SSSR Narodnoye Khozaystvo v 1987 g

FIGURE 3-48 * USSR: PRODUCTION OF PARTICLE BOARD
 BY MAJOR REPUBLIC OF ORIGIN (Volume)
 1950-87



SOURCE: SSSR Narodnoye Khozaystvo, 1987 g

the dominant producer is the RSFSR with nearly two-thirds of the USSR output. Other major producing republics are the Ukrainian SSR and the Belorussian SSR. In 1987 Belorussia produced 5 percent of the USSR output. Data showing the distribution of particleboard production throughout the RSFSR is currently not available. Thus, it is not possible to show regional distribution of production within the RSFSR.

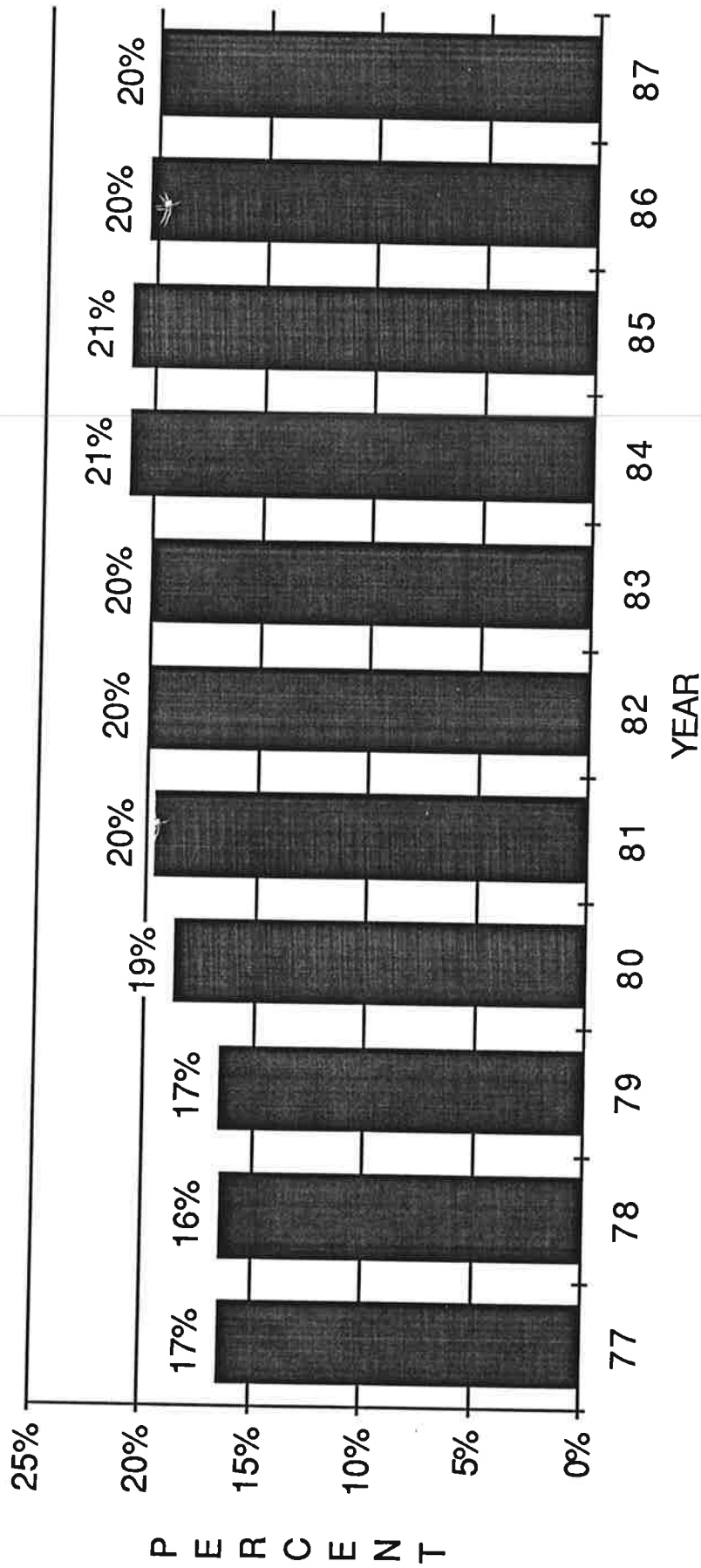
As the focus on better utilization of its wood resource increases, the capacity of particleboard should increase. The basic raw material for particleboard manufacture are low grade industrial wood, fuelwood, and softwood and hardwood residues which have been hitherto poorly utilized components of the wood resource and which appear to be available within the USSR. With greater emphasis on utilization of the existing resource, particleboard production should directly benefit.

Fiberboard Production

In 1987, the USSR produced 20 percent of the world production of fiberboard. As Figure 3.49 shows, this share has been marginally increasing but at a slower rate than for particleboard. Figure 3.50 shows volume production of fiberboard for the world and USSR for the period 1977 to 1987.

Starting from a small installed capacity in 1950 of 6.2 million square meters, by 1987 capacity had grown to 634 million square meters. Figure 3.51 shows growth in USSR output for the period 1950 through 1987. As can be expected, the dominant producer is the RSFSR with nearly 80 percent of the total output during the 1980s. Other major producing

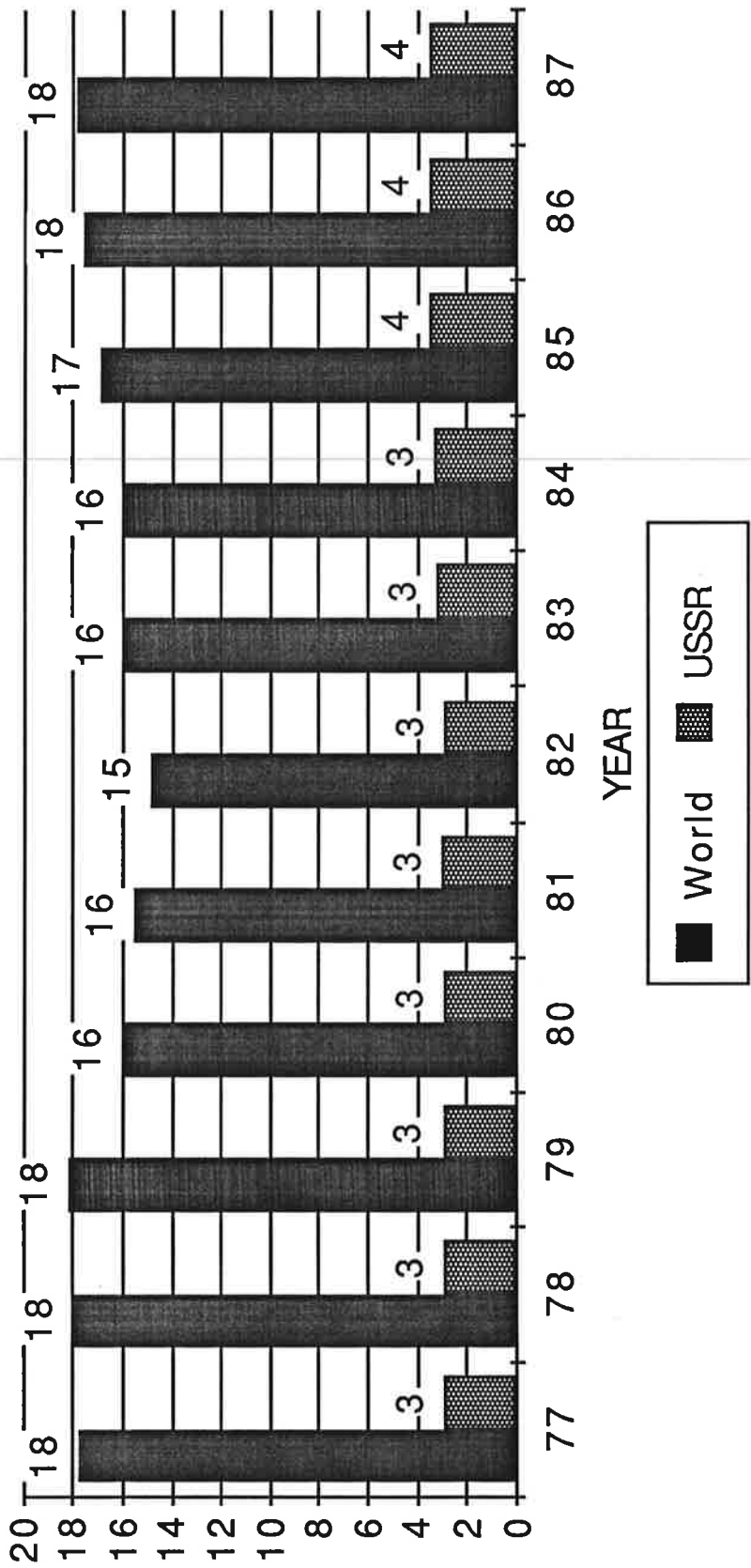
FIGURE 3-49 * USSR PERCENT OF WORLD FIBER BOARD PRODUCTION
1977-87



SOURCE: SSSR Narodnoye Khozaystvo v 1987 g

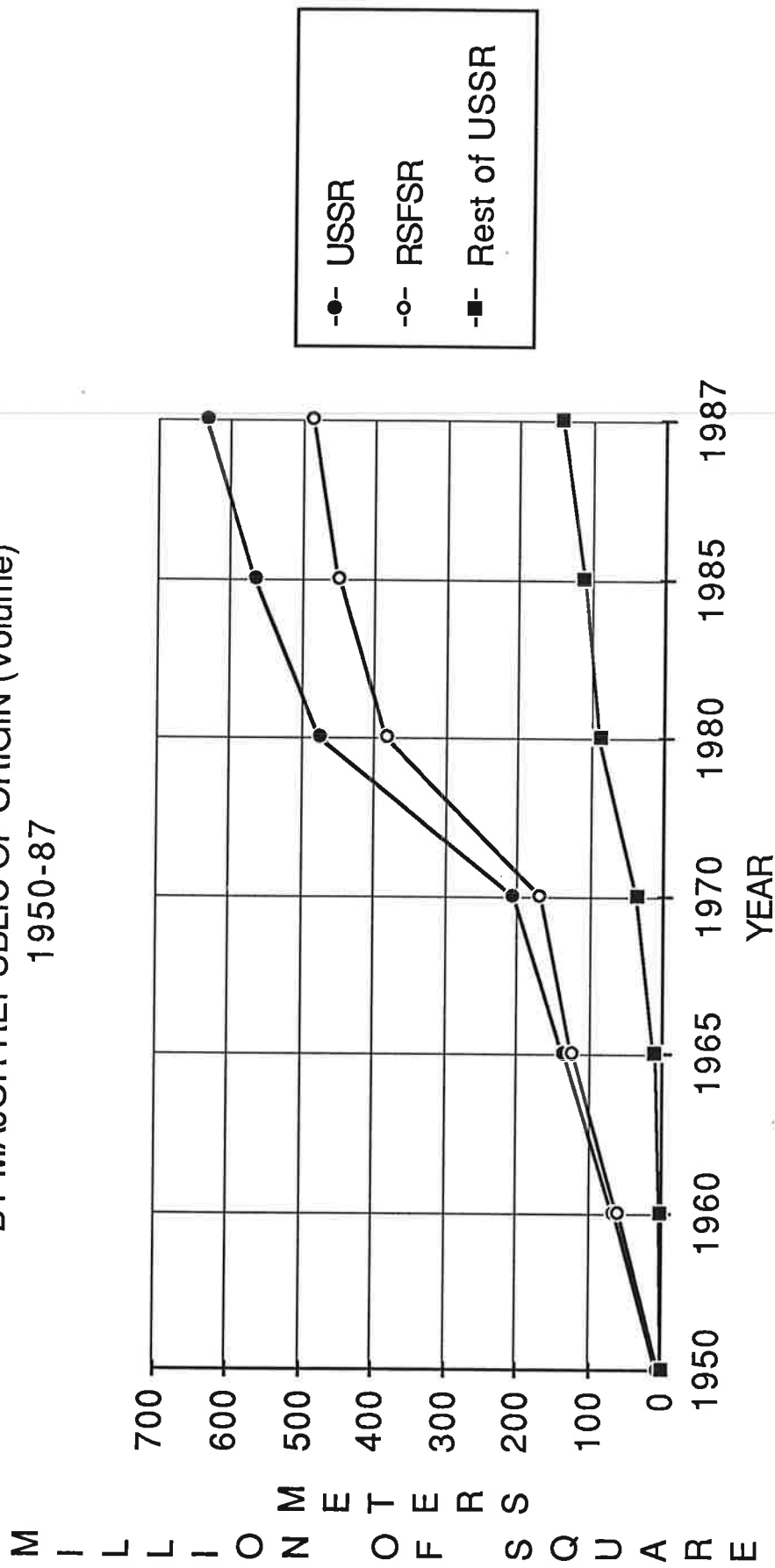
FIGURE 3-50 * USSR AND WORLD FIBERBOARD PRODUCTION
1977-87

M i l l i o n s o f c u b i c



SOURCE: SSSR Narodnoye Khozaystvo v 1987

FIGURE 3-51 * USSR: PRODUCTION OF FIBREBOARD
 BY MAJOR REPUBLIC OF ORIGIN (Volume)
 1950-87



SOURCE: SSSR Narodnoye Khozaustvo, 1987 g; RSFSR Narodnoye Khozaustvo b 1987 g

Republics include the Belorussian and Baltic Republics which together produced approximately 10 percent of the fibreboard during the 1980s.

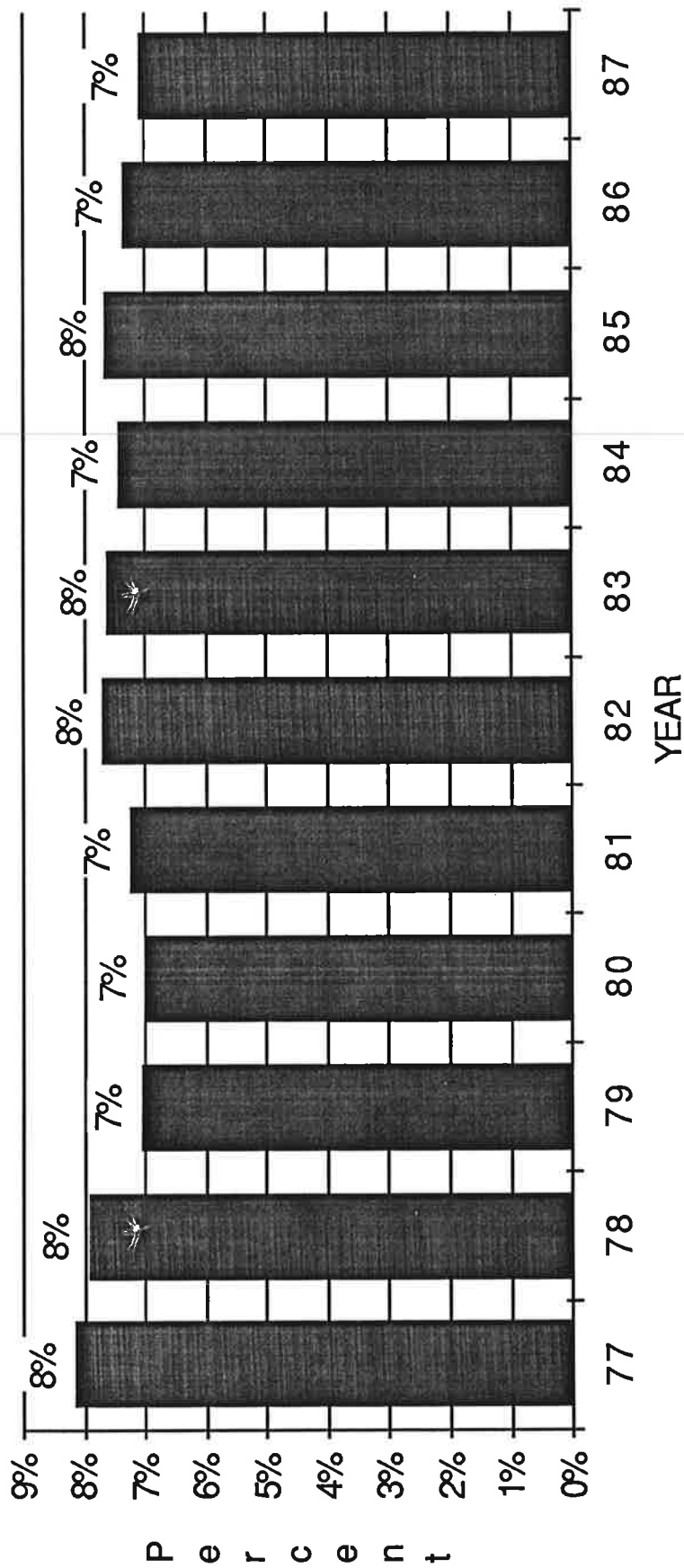
Data showing the distribution of fiberboard production within the RSFSR is not currently available. Thus it is not possible to show regional distribution of production within the RSFSR.

As with particleboard, the capacity of fiberboard should increase over time as the Soviets focus their attention on a more rational and efficient use of their wood resource. Fiber board is manufactured from wastewood and low grade wood, material which hitherto has either been left in the woods or burned as fuelwood and which appear to be available within the USSR.

Pulp Production

In 1987, the Soviet Union produced 7 percent of the world pulp production. However, the share varies depending on the type of pulp produced. The USSR produces 6 percent of mechanical wood pulp, 5 percent of semi-chemical wood pulp, 7 percent of chemical wood pulp, 55 percent of unbleached sulphite pulp, no bleached sulphite production, 12 percent of unbleached sulfate pulp production, no bleached sulfate pulp, and 20 percent of dissolving wood pulp. Figures 3.52 through 3.65 show total wood pulp production and production of individual varieties of pulp for the world and for the USSR for the period 1977 through 1987.

FIGURE 3-52 * USSR: PERCENT OF WORLD PULP PRODUCTION
1977-87



SOURCE: FAO Forest Statistics Annual Year Book for 1987

FIGURE 3-53 * USSR AND WORLD PULP PRODUCTION
(Volume)
1977-87

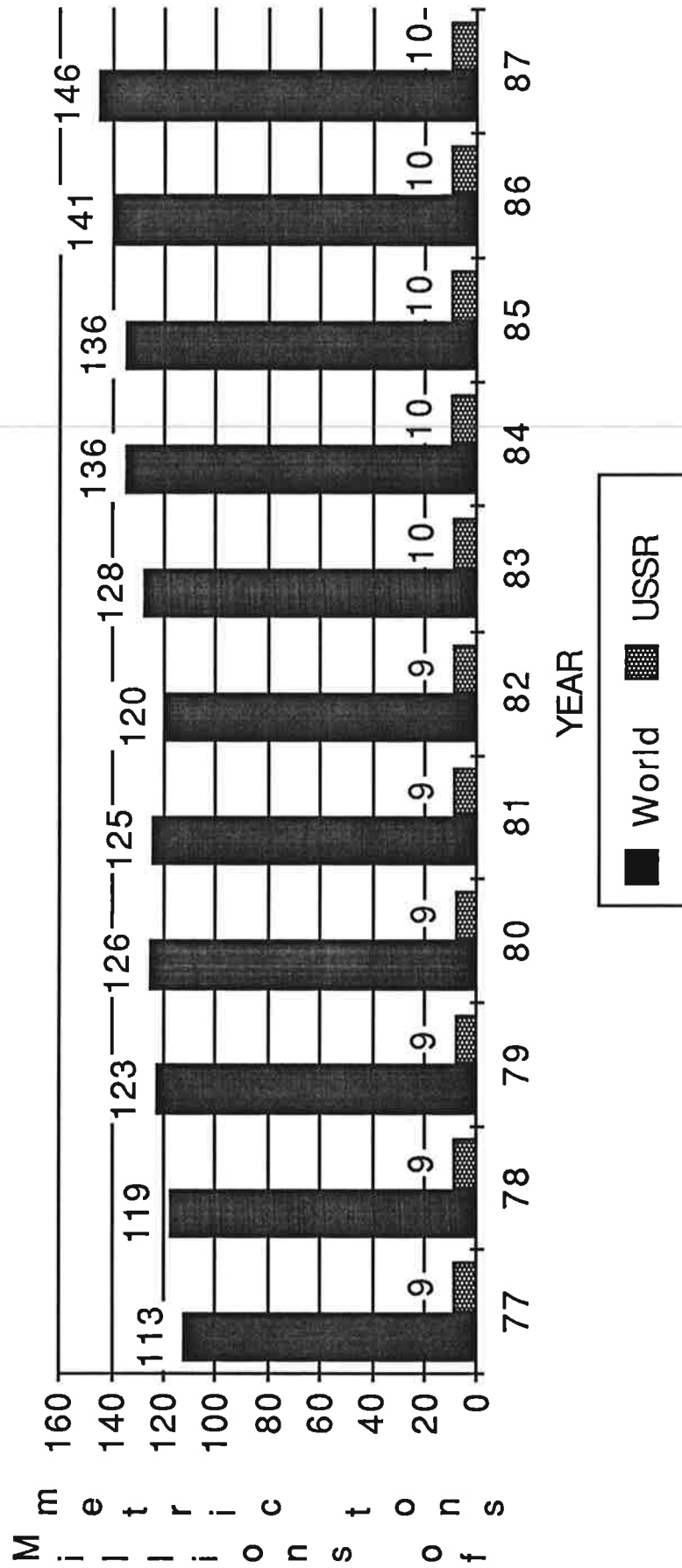
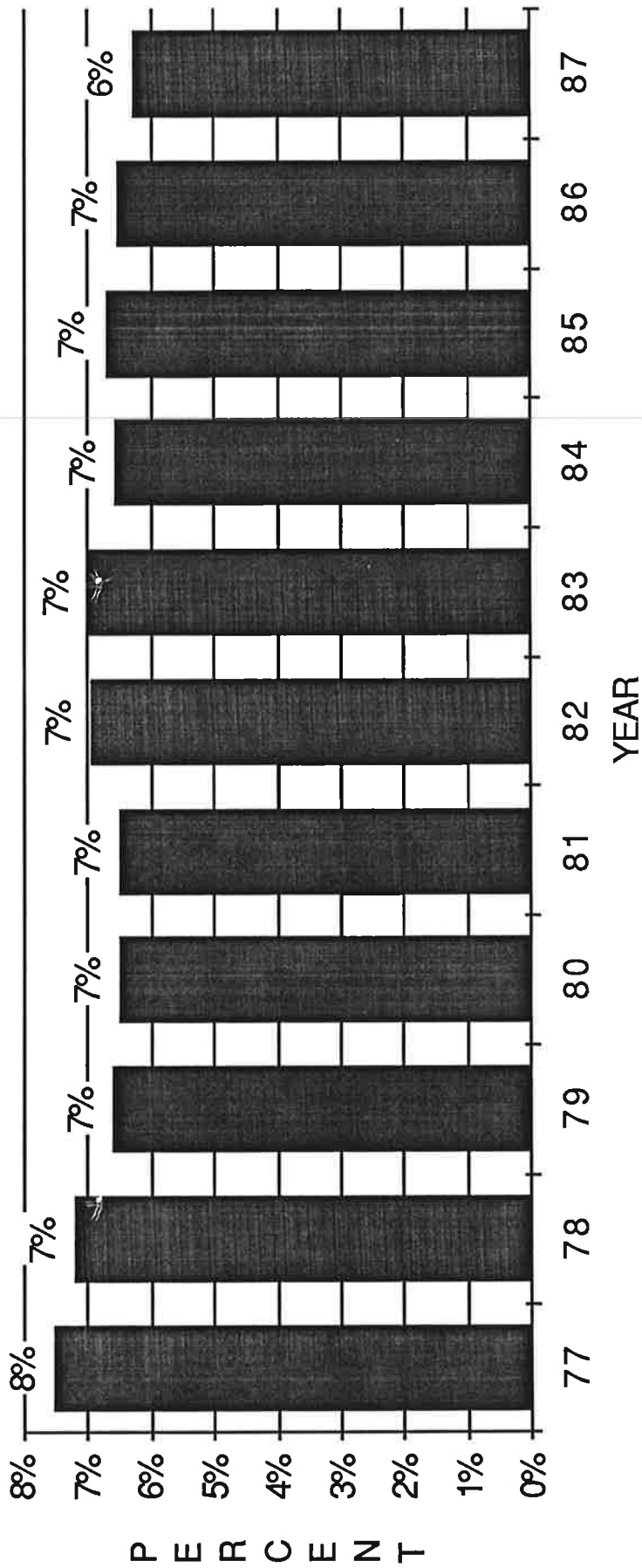


FIGURE 3-54 * USSR: PERCENT OF WORLD MECHANICAL PULP PRODUCTION 1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-55 * USSR AND WORLD MECHANICAL PULP PRODUCTION (Volume) 1977-87

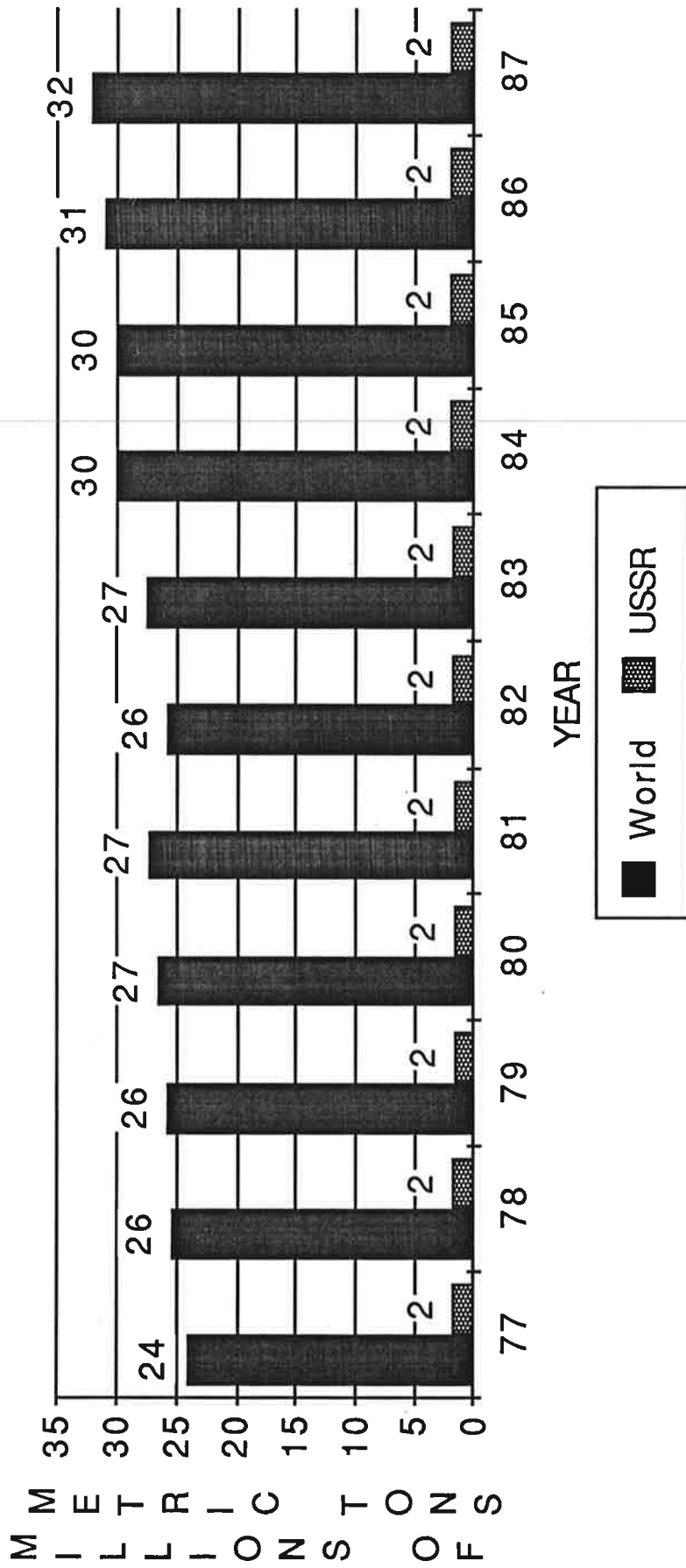
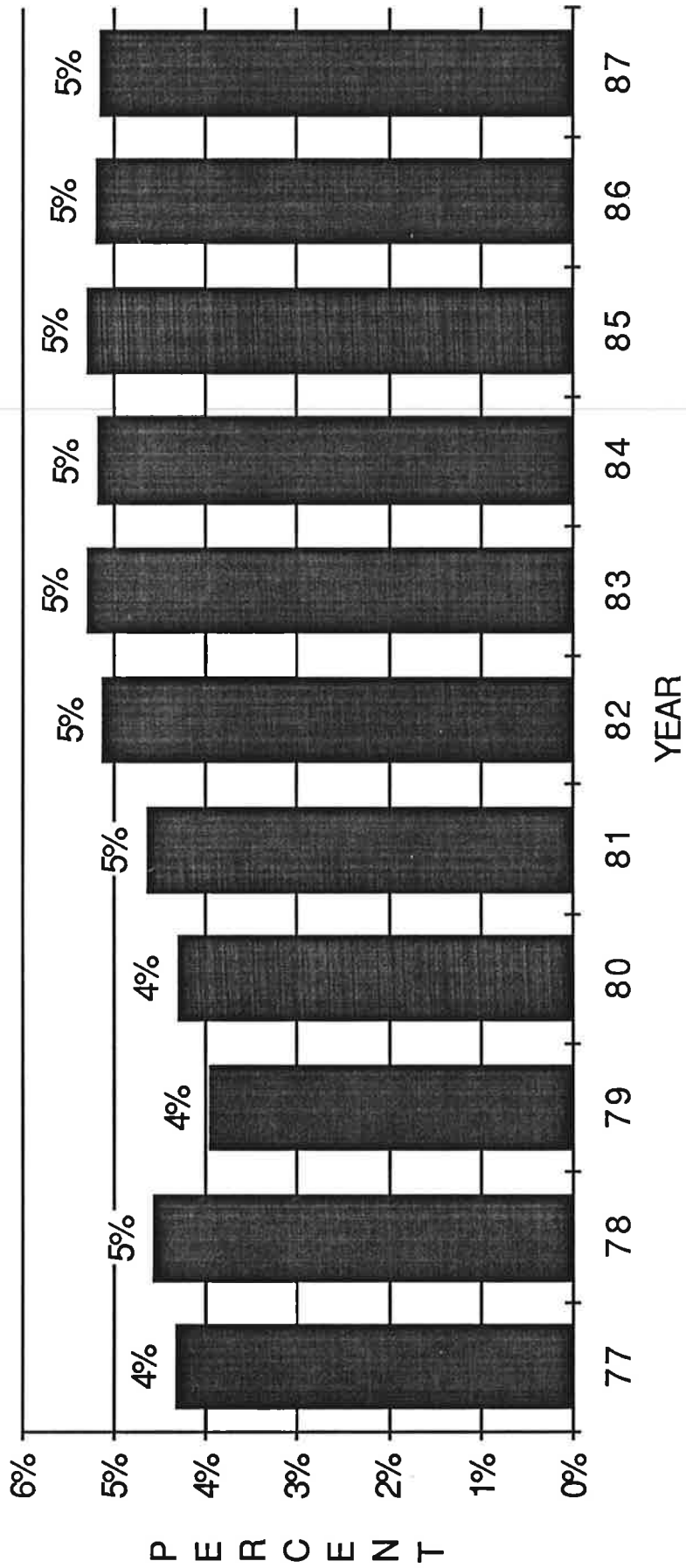
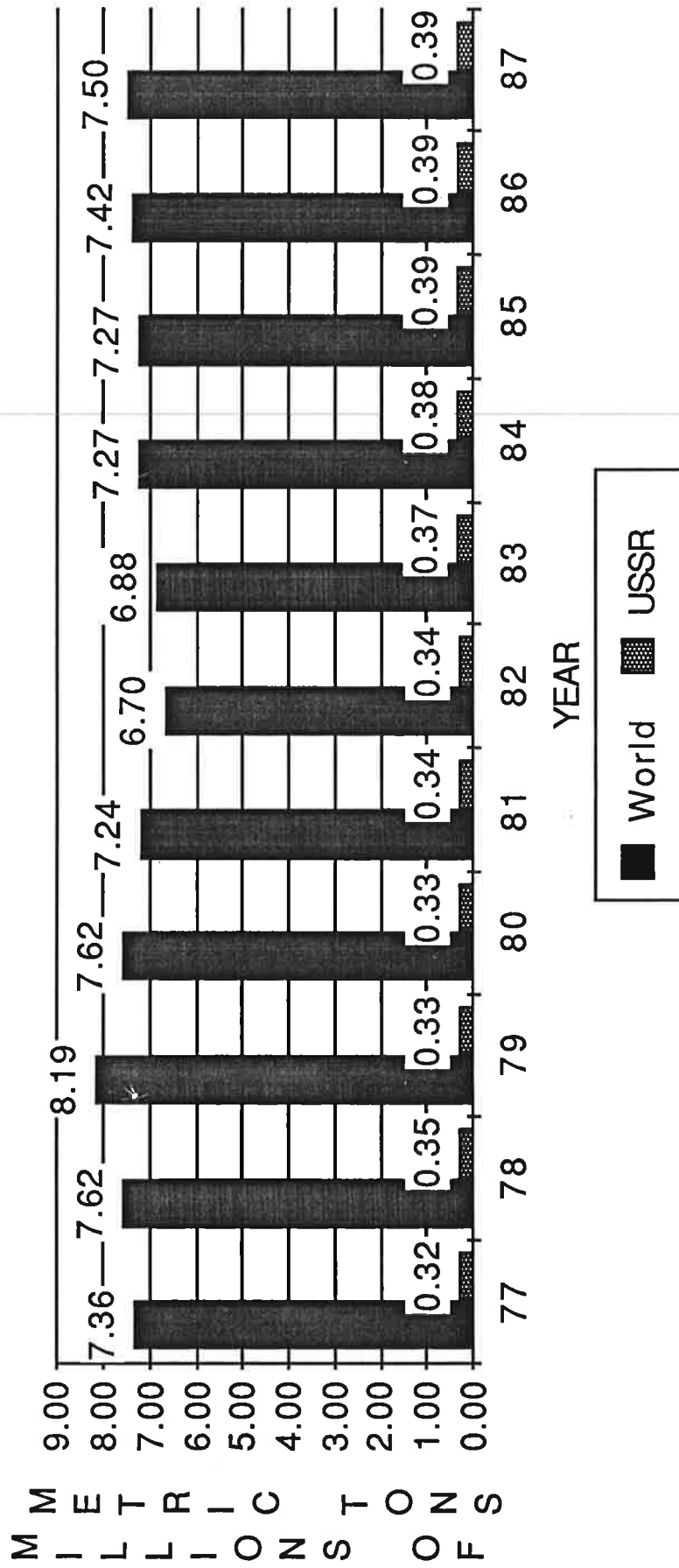


FIGURE 3-56 * USSR PERCENT OF WORLD PRODUCTION OF SEMI-CHEMICAL PULP 1977-87



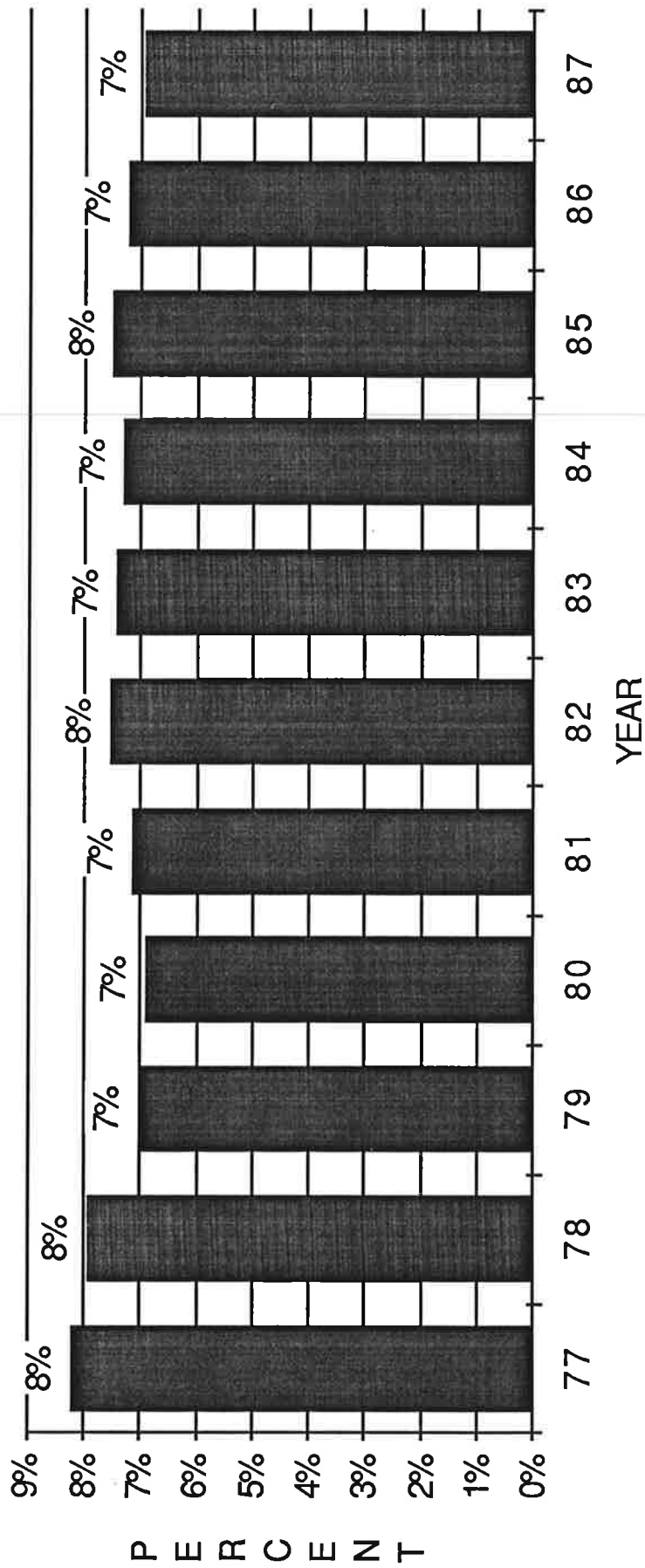
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-57 * USSR AND WORLD SEMI-CHEMICAL PULP PRODUCTION (Volume) 1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-58 * USSR PERCENT OF WORLD CHEMICAL
PULP PRODUCTION OF WORLD
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-59 * USSR AND WORLD CHEMICAL PULP
PRODUCTION (Volume)
1977-87

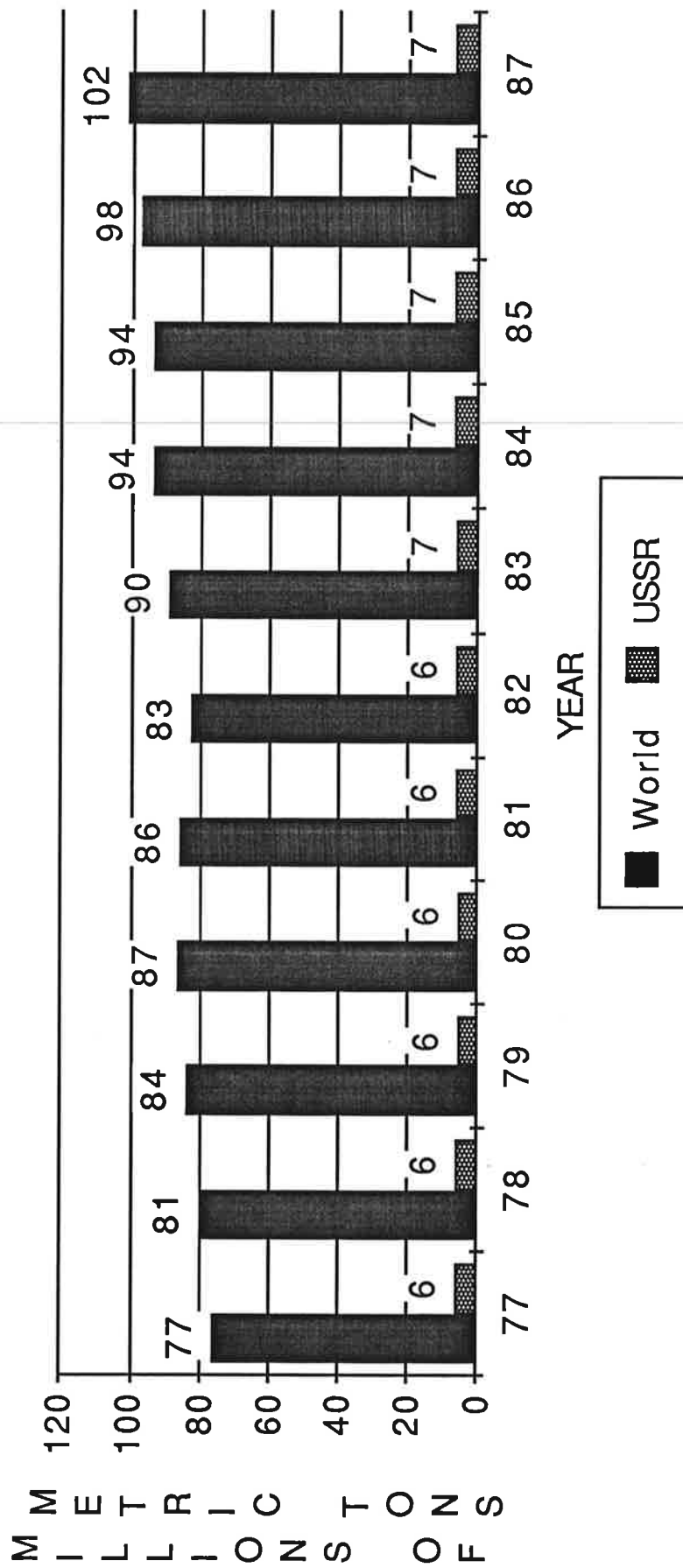
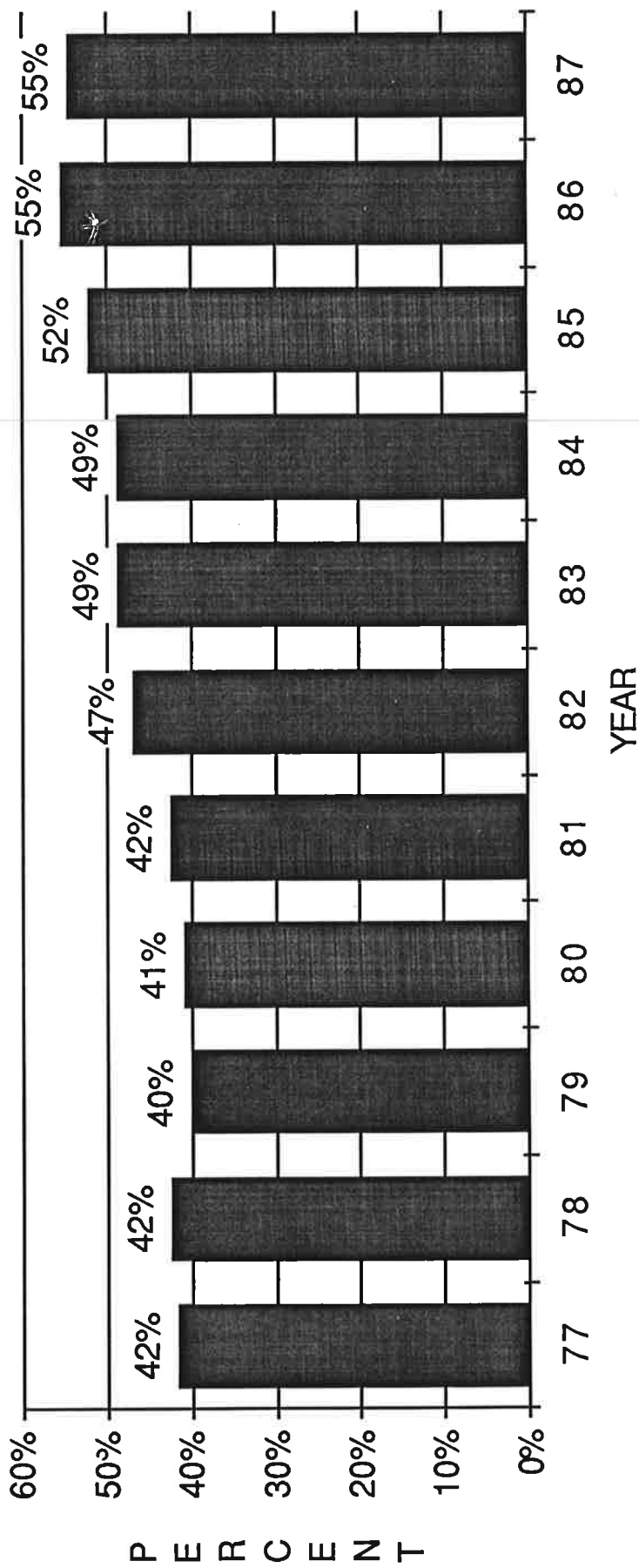
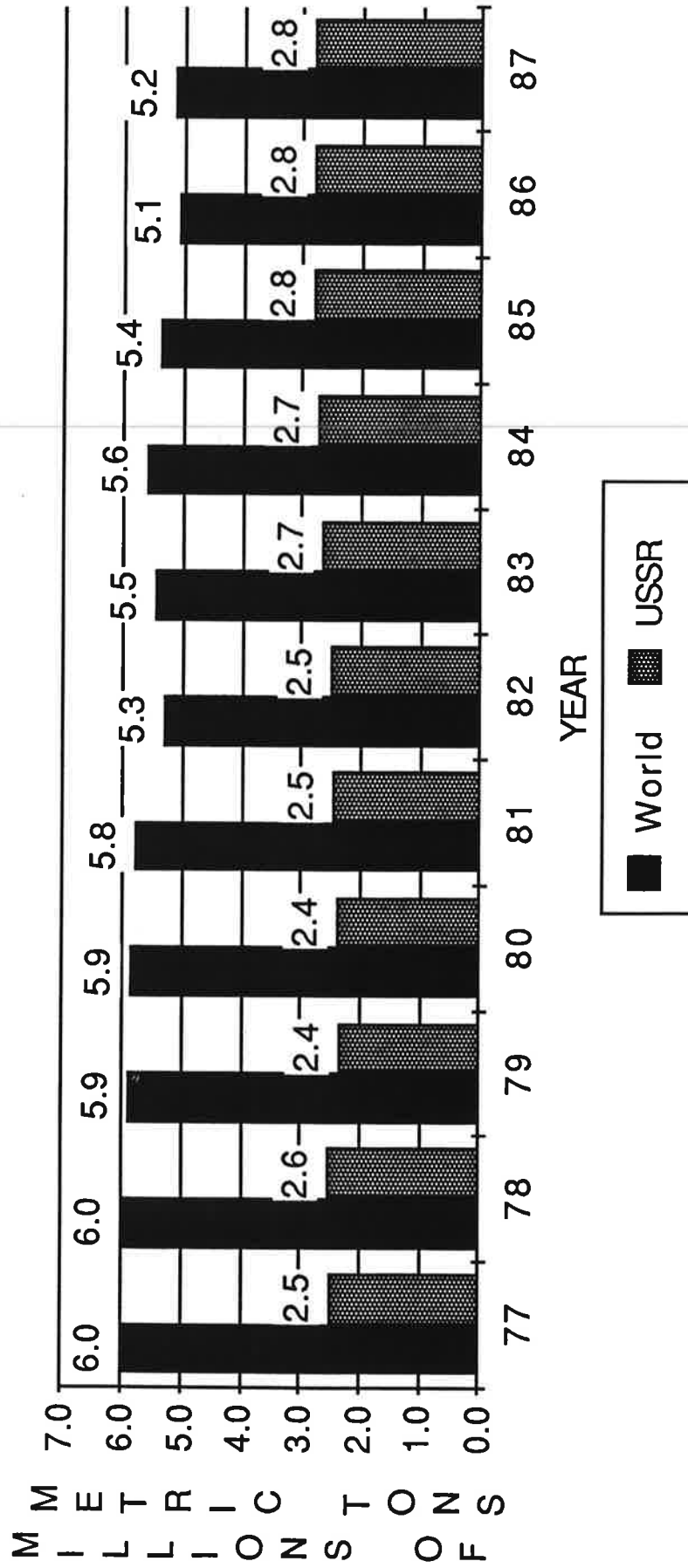


FIGURE 3-60 * USSR PERCENT OF WORLD UNBLEACHED
SULFITE PULP PRODUCTION
1977-87



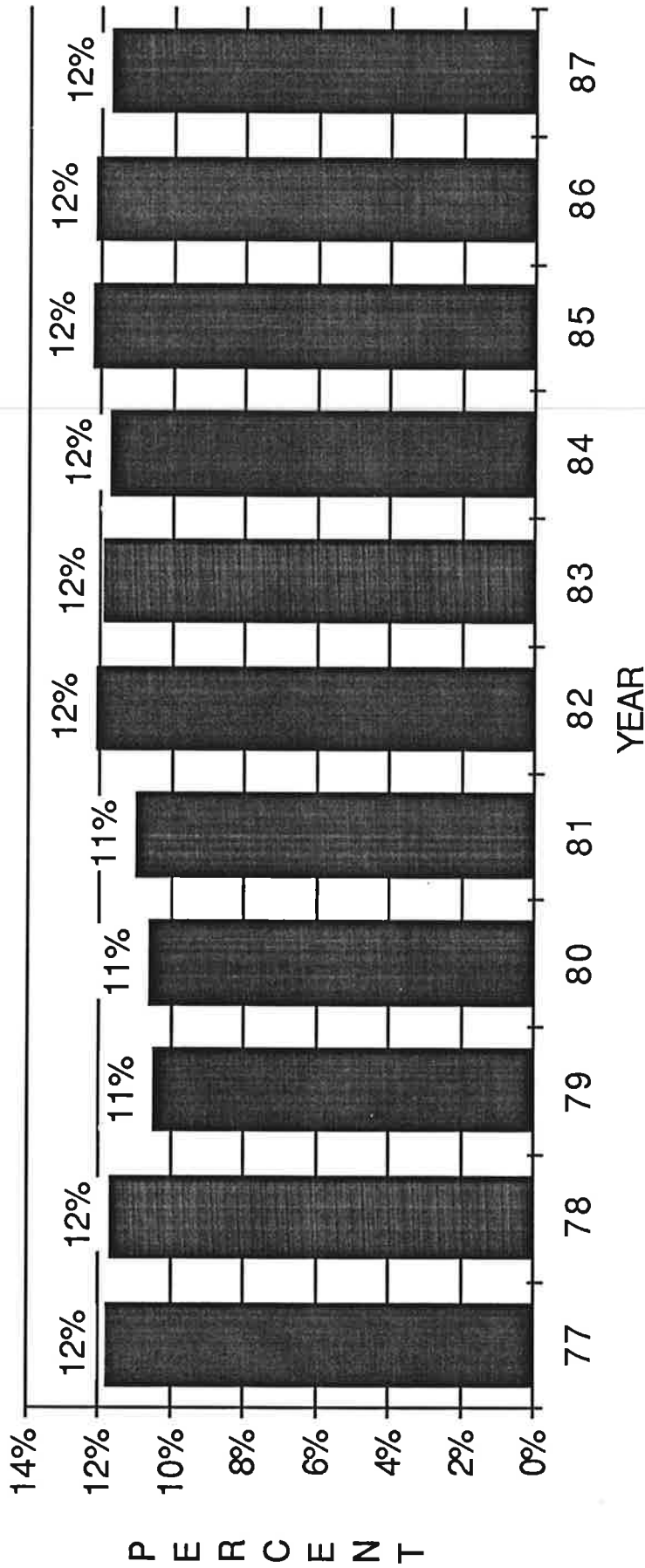
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-61 * USSR AND WORLD UNBLEACHED SULFITE
PULP PRODUCTION (Volume)
1977-87



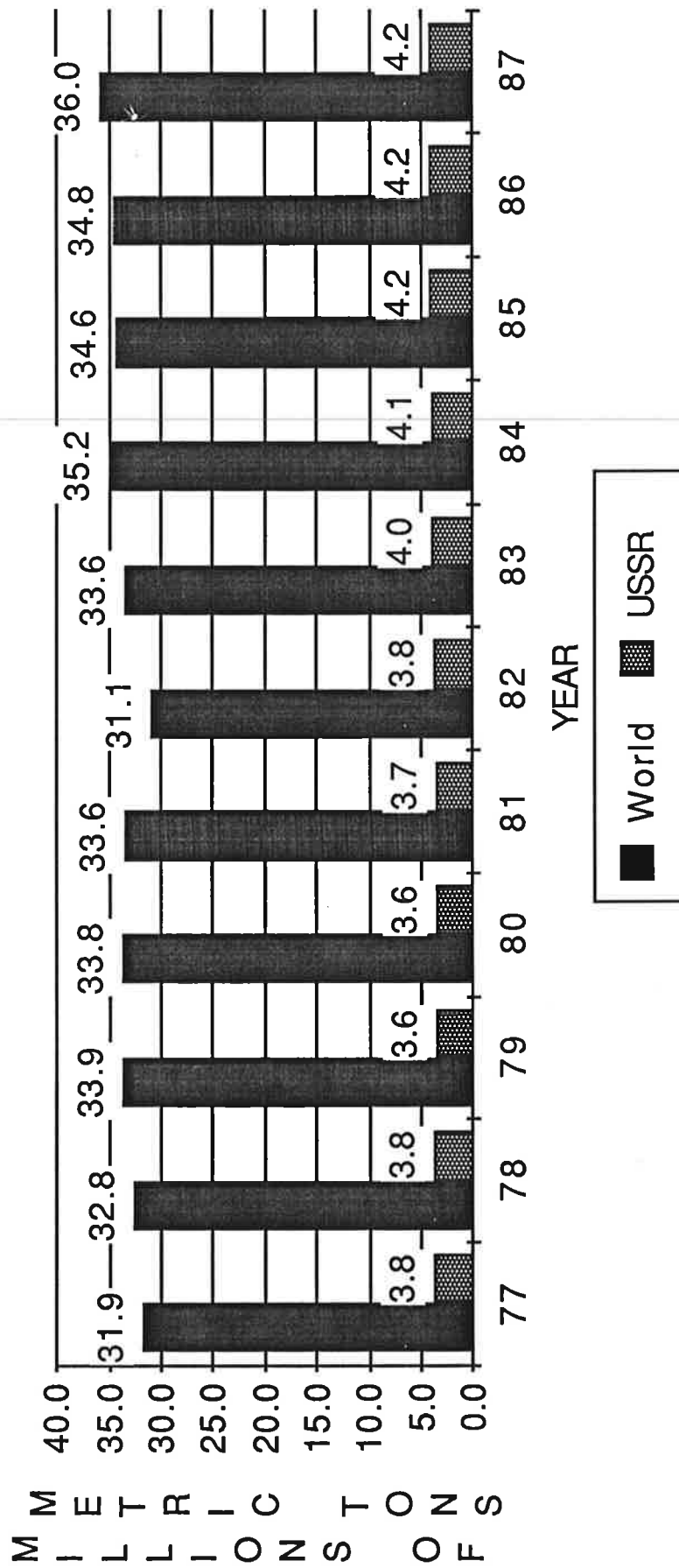
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-62 * USSR: PERCENT OF WORLD
UNBLEACHED SULFATE PULP PRODUCTION
1977-87



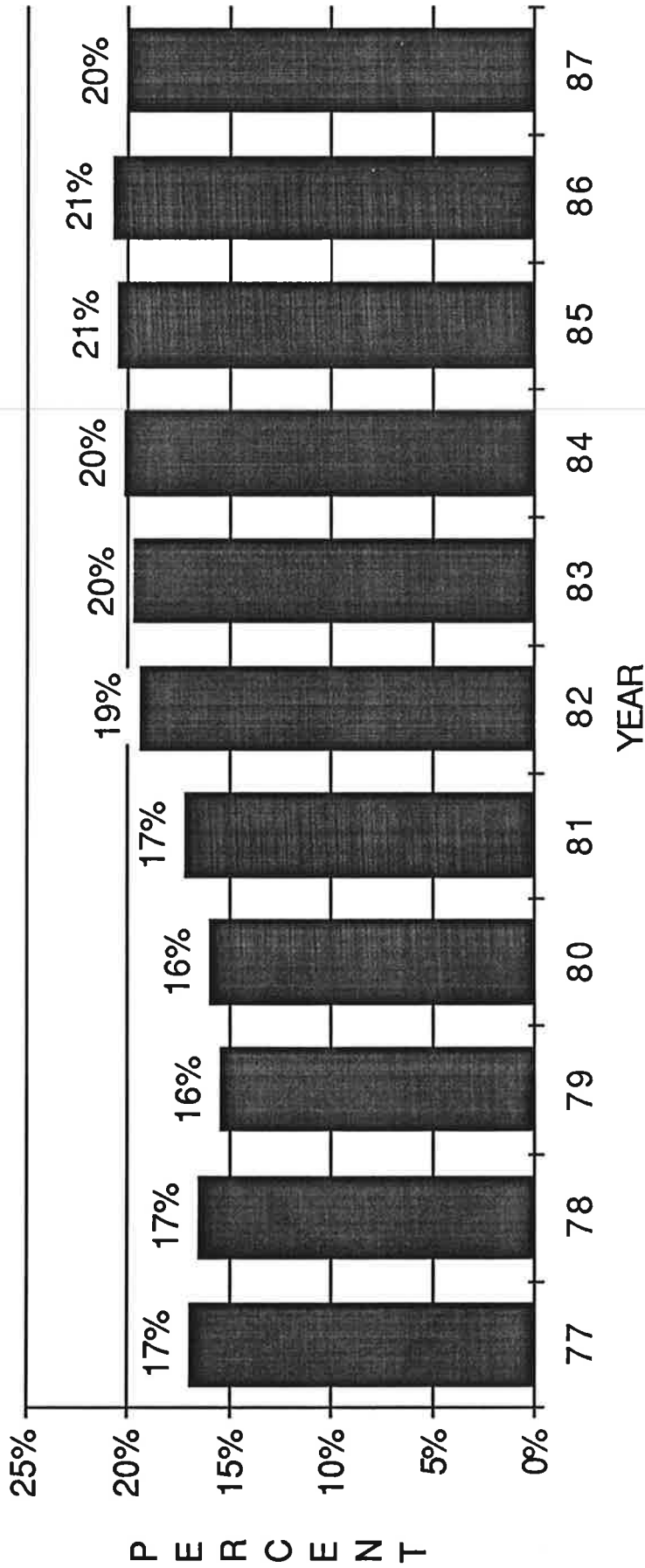
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-63 * USSR AND WORLD UNBLEACHED SULFATE
PULP PRODUCTION (Volume)
1977-87



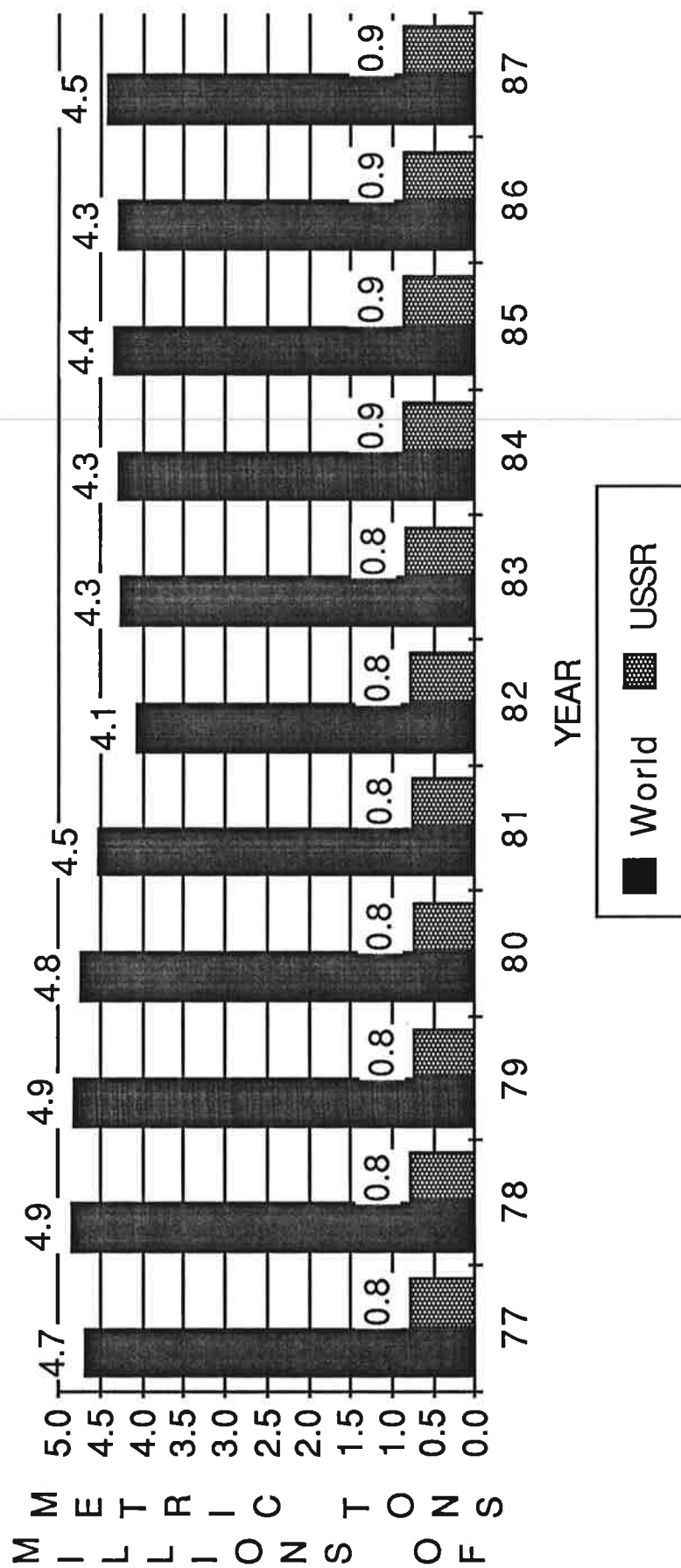
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-64 * USSR: PERCENT OF WORLD DISSOLVING
WOOD PULP PRODUCTION
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-65 * USSR AND WORLD DISSOLVING WOOD
PULP PRODUCTION (Volume)
1977-87

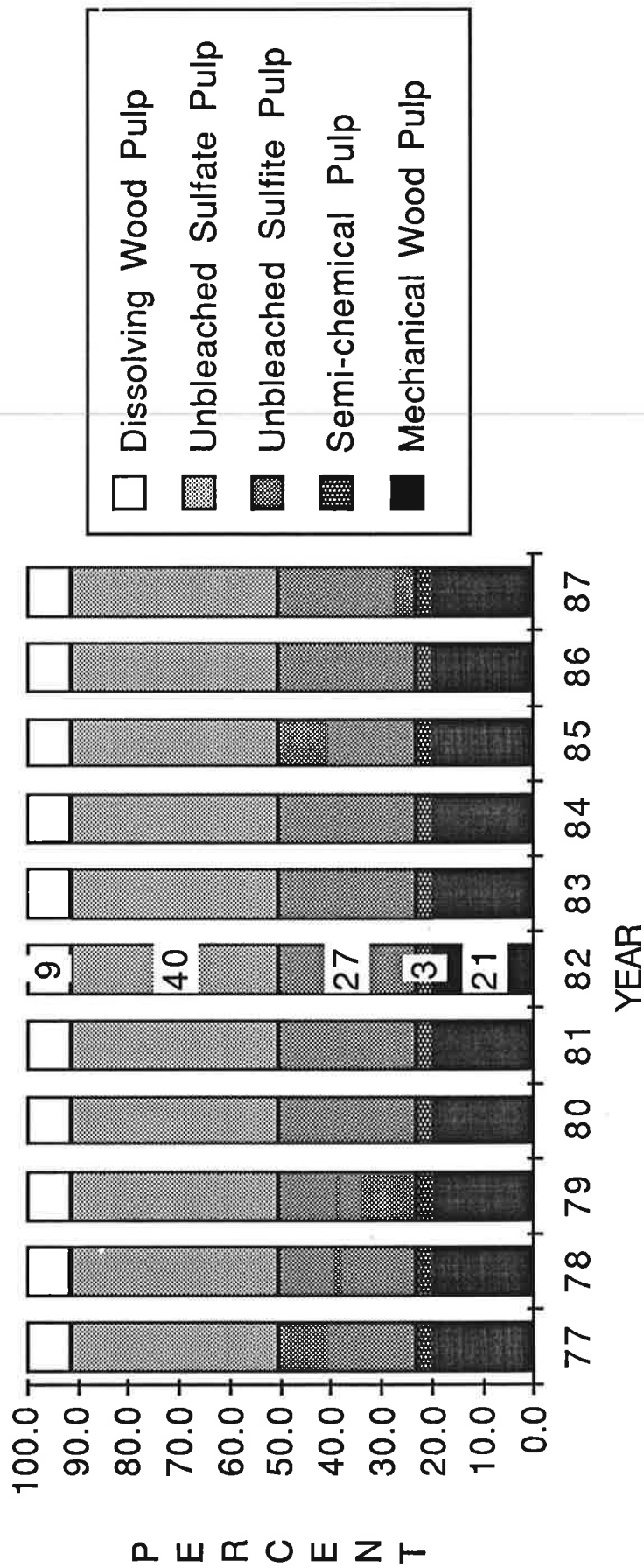


Soviet wood pulp production has shown modest growth during the last eleven years. Output grew from 9.2 million metric tons in 1977 to 10.3 million metric tons in 1987. This increase has come almost entirely in the production of chemical pulps, which grew from 7.4 million metric tons in 1977 to 8.3 million metric tons in 1987. As Figure 3.66 shows, however, the proportional makeup of wood pulp production has not changed greatly during this period. Figure 3.67 shows the USSR volume outputs for the various pulp grades for the period 1977 through 1987.

Output of pulp has increased continuously since 1940, increasing from 3.2 million metric tons to 10.8 million metric tons by 1987. Output of mechanical and chemical pulp have followed different growth patterns, increasing respectively from 0.9 million metric tons and 2.3 million metric tons to 2.2 and 8.6 million tons. Figure 3.68 shows output of wood pulp for the USSR for selected years between 1950 and 1987.

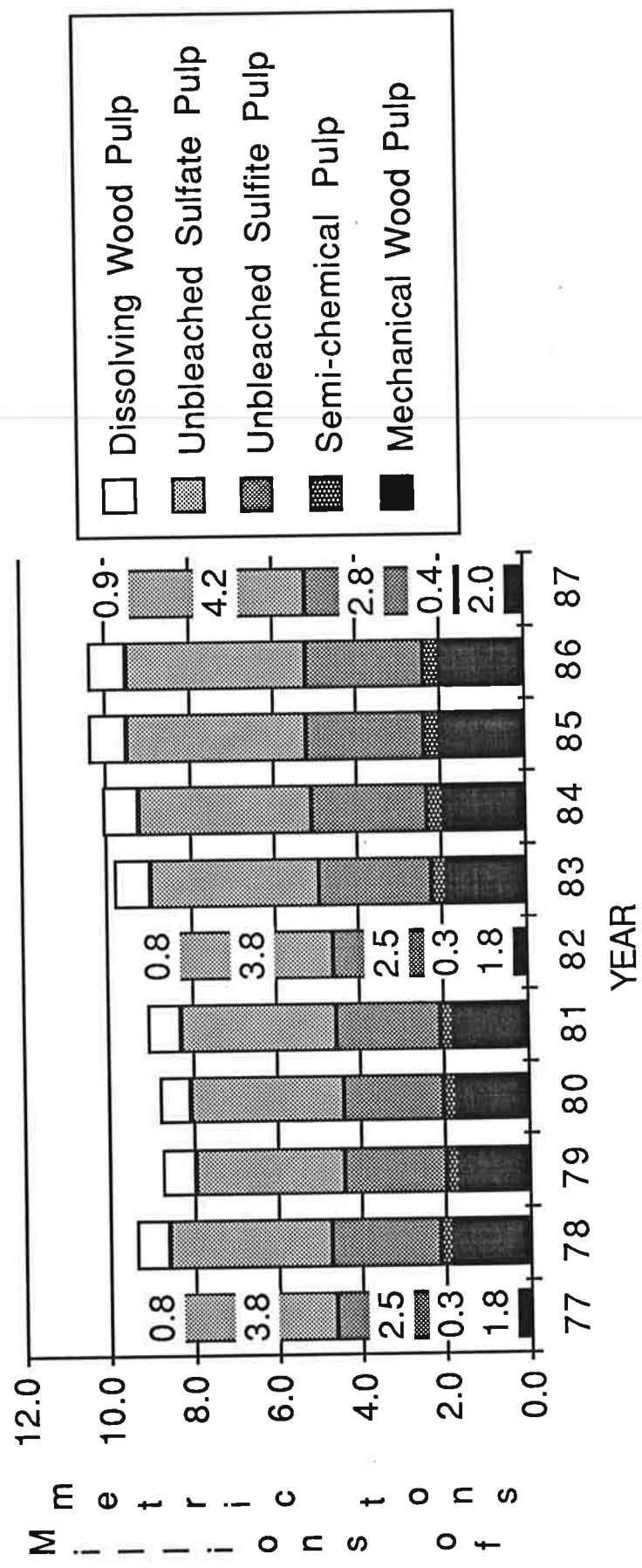
As with other forest products, the production of pulp is not evenly distributed throughout the Soviet Union. The dominant republic is the RSFSR which appears to have produced approximately 80 percent of the total USSR output. Regional distribution of production is not available, but it is reasonable to conclude that the pulp production would follow that of paper and paperboard production. Emphasis on more complete utilization of the Soviet forest resource should lead to future expanded capacity and output. However, given the lack of capital and current unsettled state of the economy, it

FIGURE 3-66 * USSR PRODUCTION OF PULP BY TYPE
(Percent)
1977-87



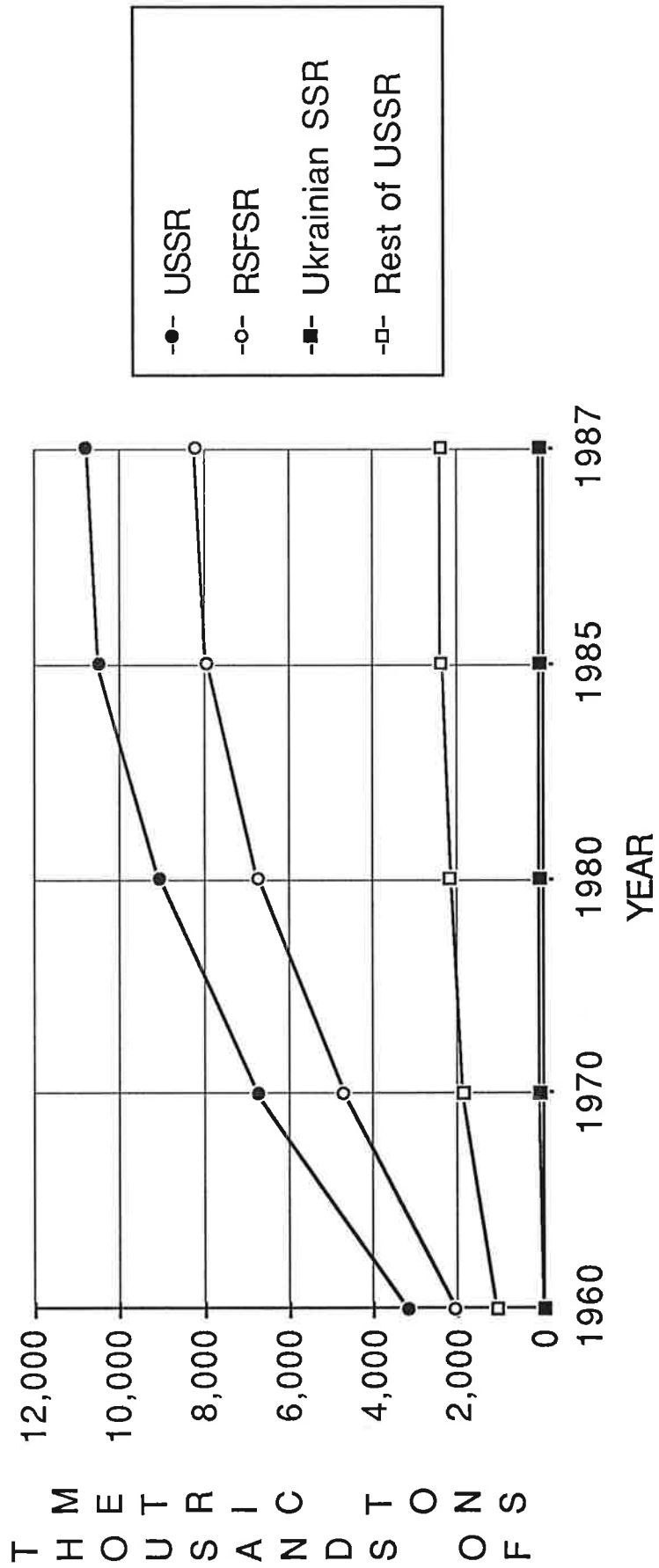
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-67 * USSR PRODUCTION OF PULP BY TYPE
(Volume)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-68 * USSR: PULP PRODUCTION
 BY MAJOR REPUBLIC OF ORIGIN (Volume)
 1960-1987



SOURCE: SSSR, RSFSR, USSR Narodnoye Khozaystvo v1987 g

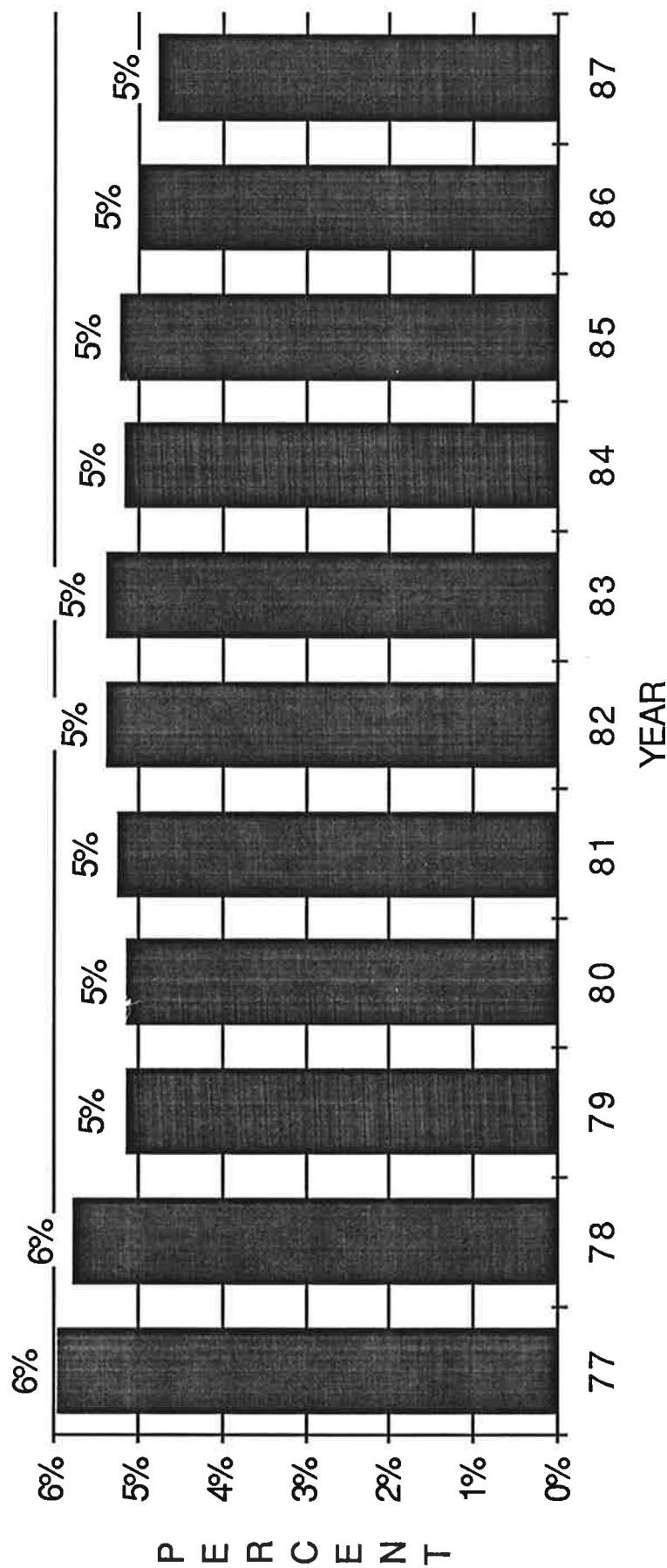
is far from certain when this would likely take place.

Paper Production

Paper and paperboard production mirror that of pulp. The Soviet Union only produces 5 percent of the world paper and paperboard production. However, this percentage varies depending on the type of paper product produced. For 1987, the Soviet Union produced 6 percent of the world's total newsprint, 2 percent of printing and writing paper, and 6 percent of other paper and paper board. Figures 3.69 through 3.76 show world paper and paperboard production and for the USSR for the three categories mentioned above and the proportion of total world production which is contributed by the USSR for the period 1977-1987. What is interesting from these figures is the general decline in the share of USSR output vis-a-vis the world. The decline can be explained in part by difficulties experienced in wood delivery. The major component of Soviet paper production is other papers which has consistently represented about 50 percent of total paper and paperboard production and in 1987 contributed 48 percent. Printing and writing paper contributed 23 percent in 1987 while newsprint represented 29 percent. Figure 3.77 shows the proportional makeup of paper production in the USSR.

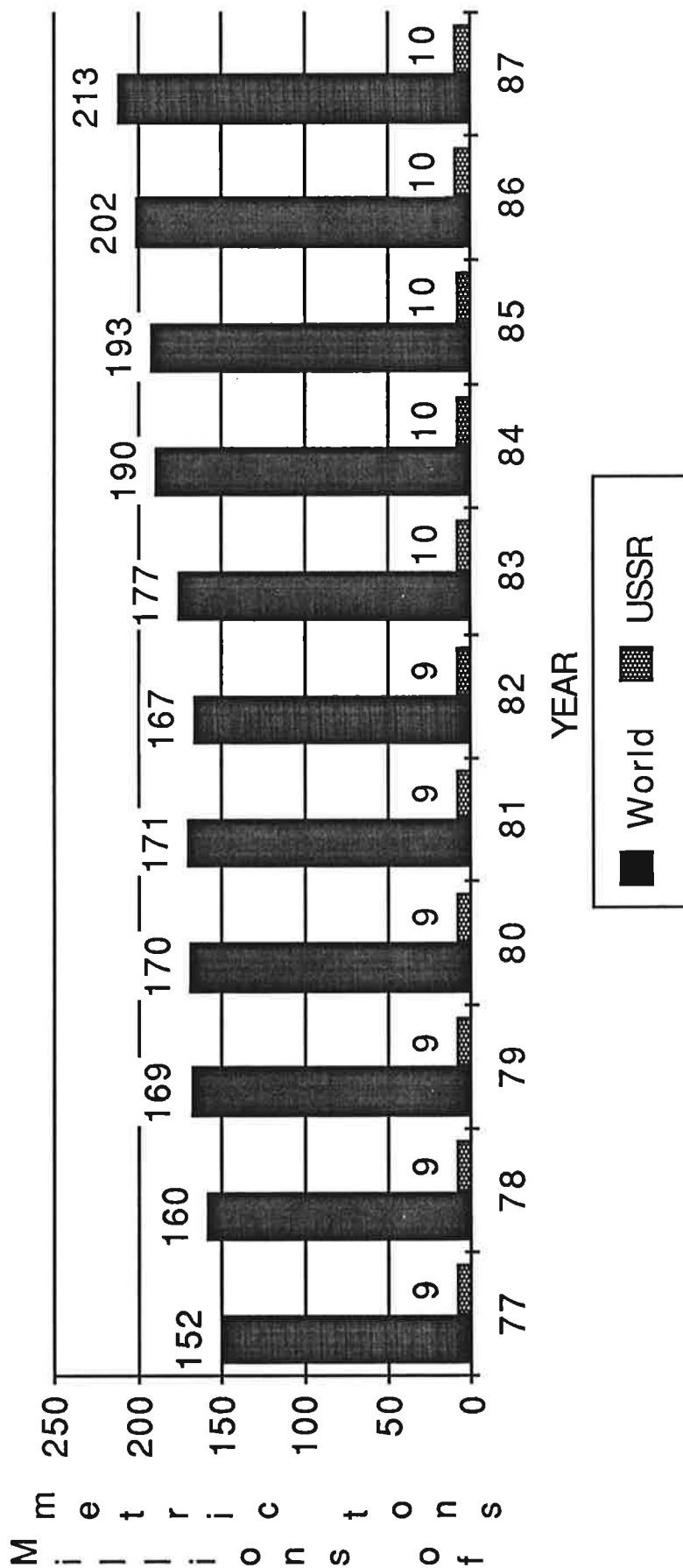
Soviet paper production (excluding paperboard) has increased from 838 thousand tons in 1940 to 6.2 million tons

FIGURE 3-69 * USSR: PERCENT OF WORLD PAPER AND
 PAPERBOARD PRODUCTION
 1977-87



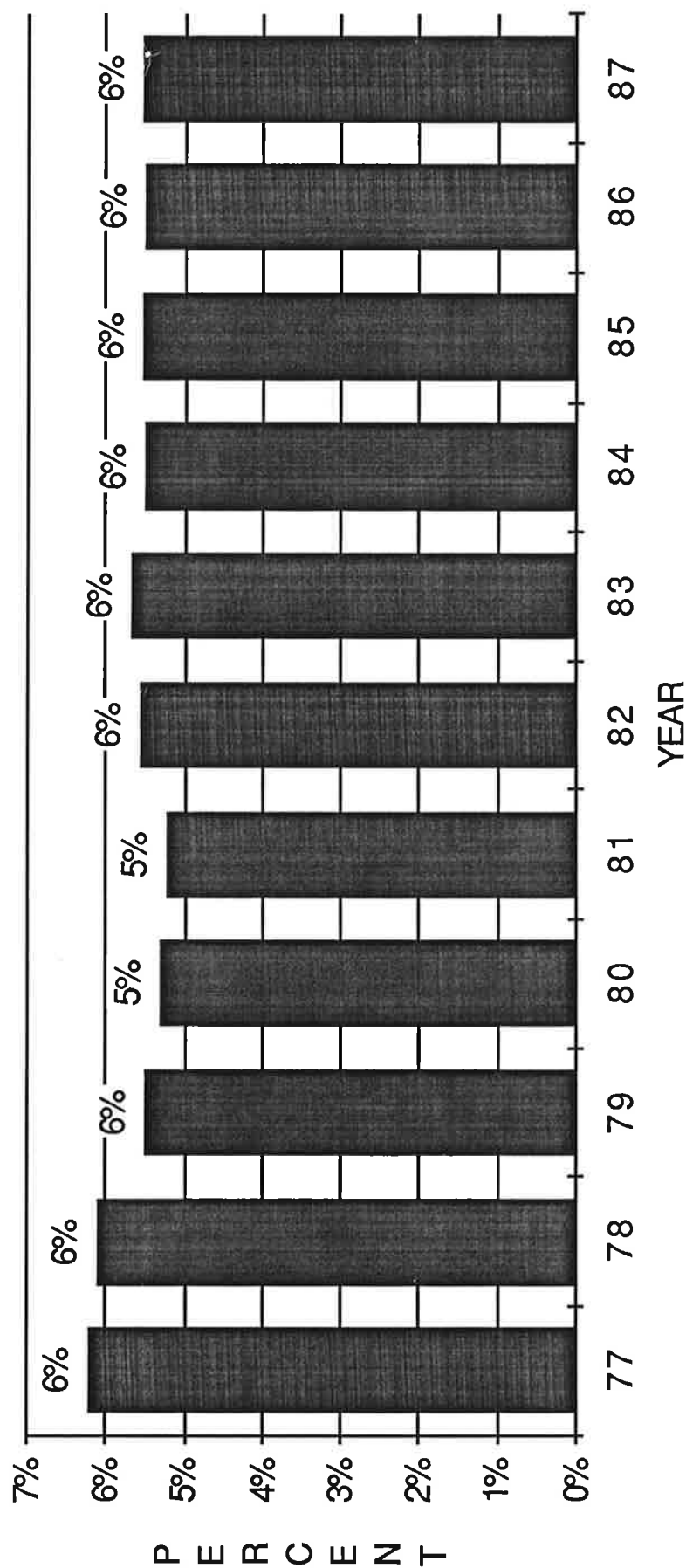
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-70 * USSR AND WORLD PRODUCTION OF PAPER
AND PAPERBOARD (Volume)
1977-87



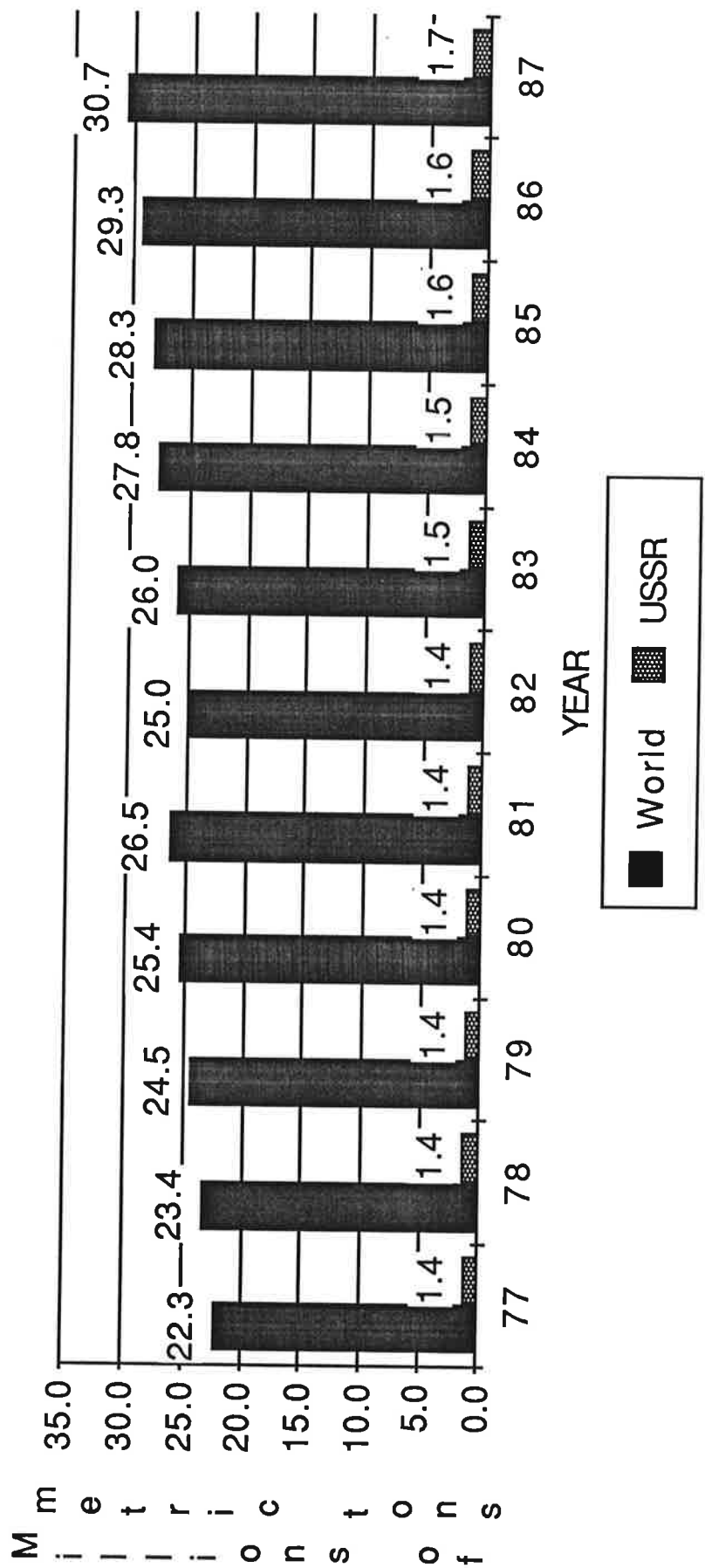
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-71 * USSR: PERCENT OF WORLD NEWSPRINT PRODUCTION
1977-87



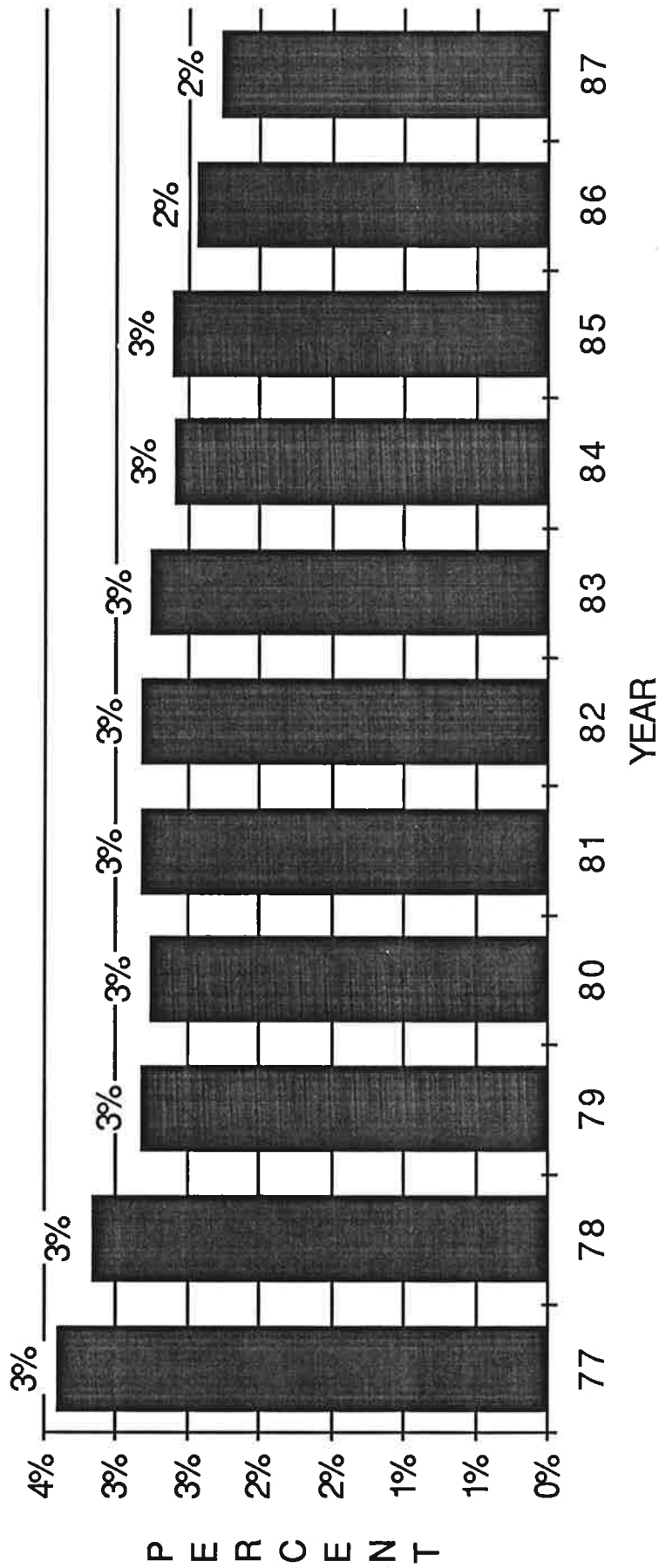
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-72 * USSR AND WORLD PRODUCTION OF NEWSPRINT
 (Volume)
 1977-87



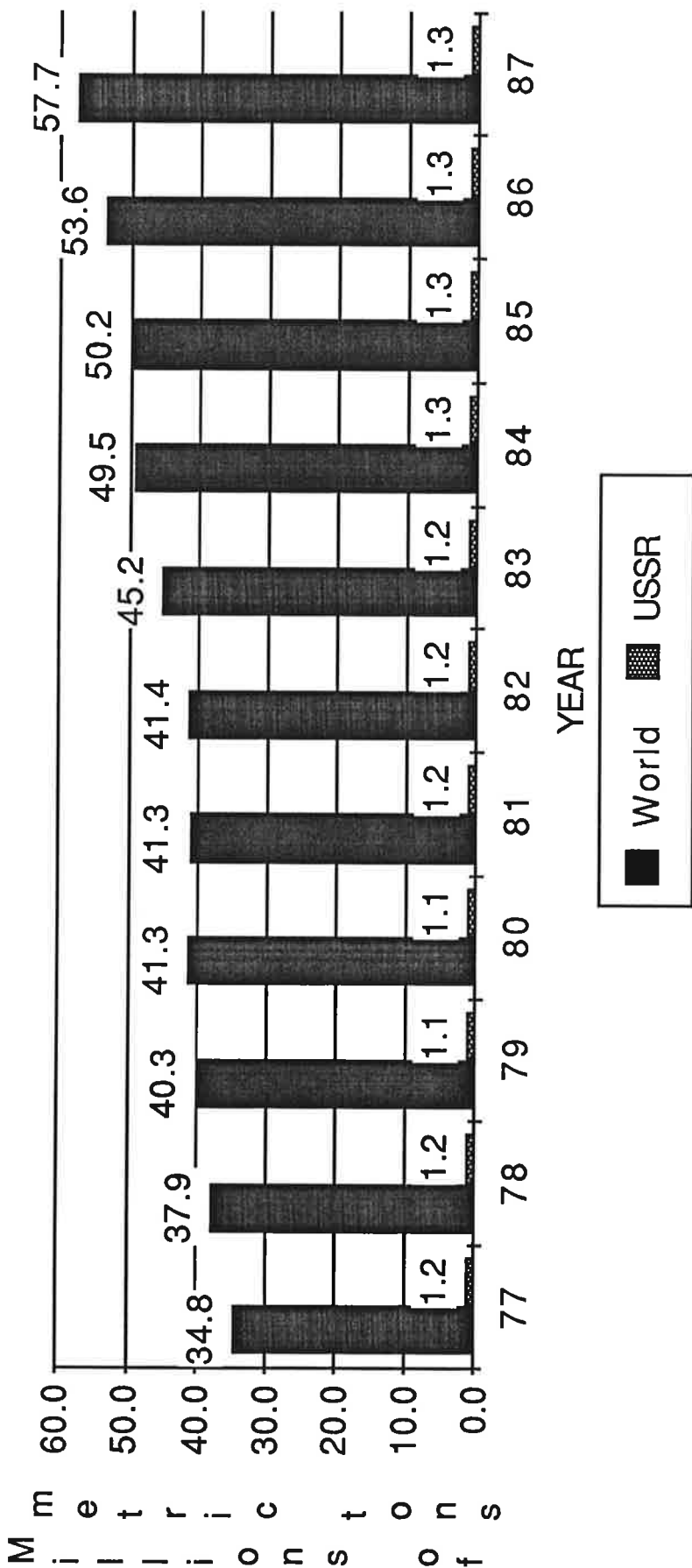
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-73 * USSR: PERCENT OF WORLD PRINTING
AND WRITING PAPER PRODUCTION
1977-87



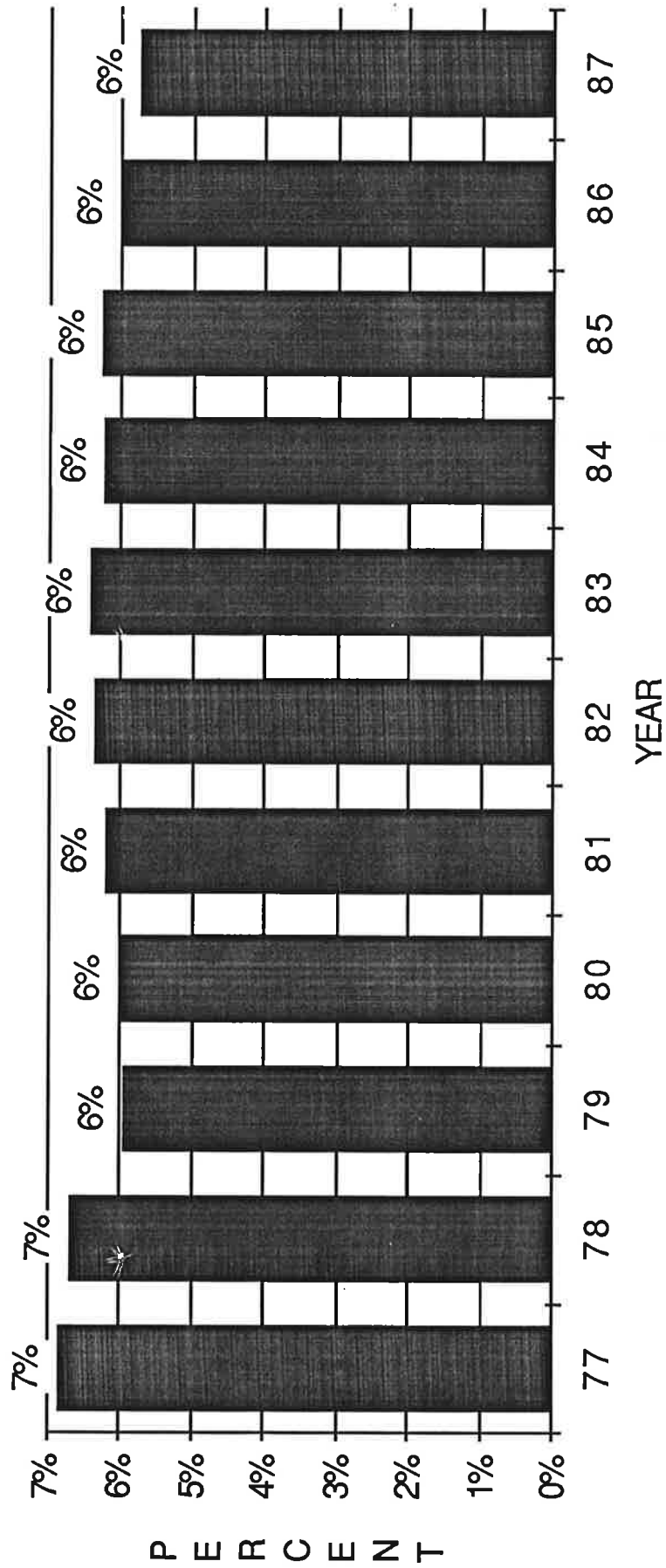
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-74 * USSR AND WORLD PRODUCTION OF PRINTING
AND WRITING PAPER (Volume)
1977-87



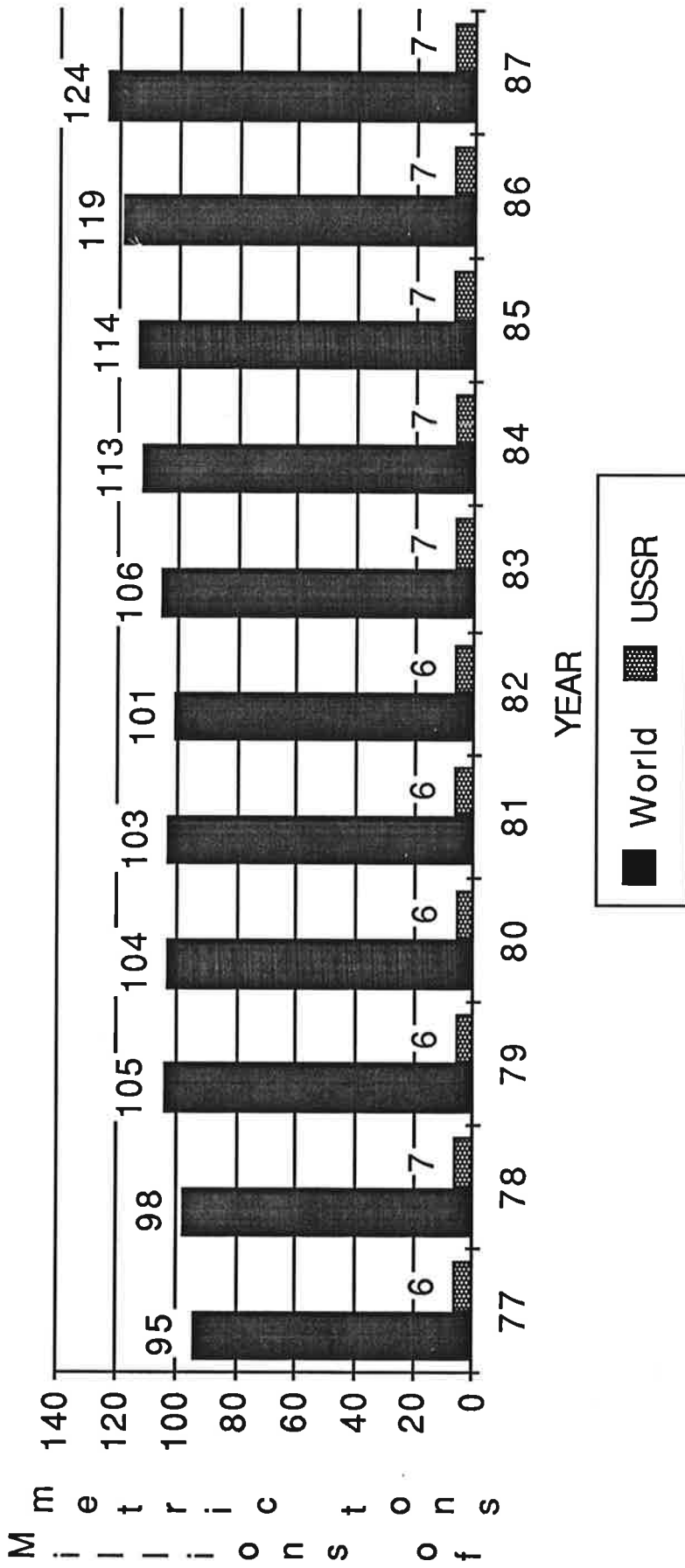
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-75 * USSR: PERCENT OF WORLD OTHER PAPER
AND PAPERBOARD PRODUCTION
1977-87



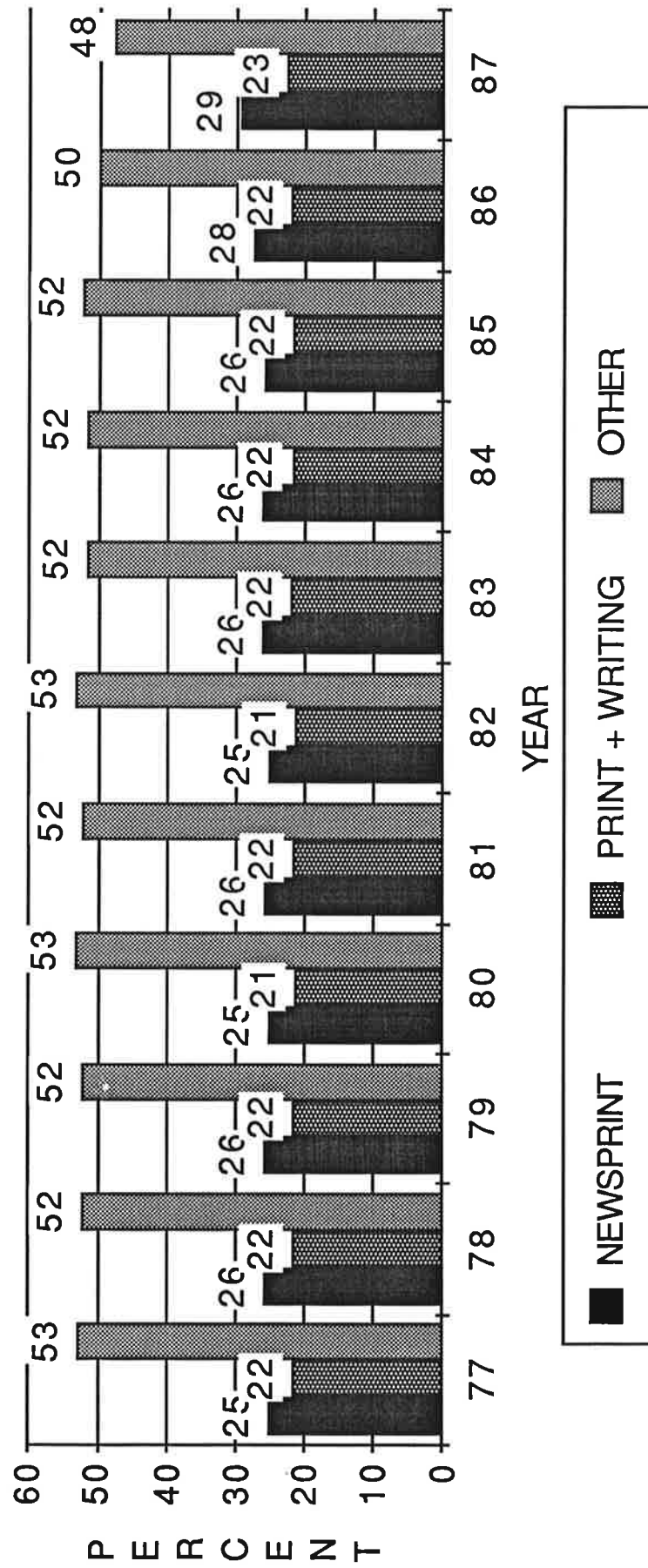
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-76 * USSR AND WORLD PRODUCTION
OF OTHER PAPER AND PAPERBOARD (Volume)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 3-77 * USSR PAPER PRODUCTION
BY TYPE AND PRODUCT
1977-87



SOURCE: FAO Forest Products Annual 1987, SSSR Narodnoye Khozaystvo different years

by 1987. Large increases occurred between 1940 and 1980 when output increased 4.5 million tons or more than 500 percent. Between 1980 and 1985, output increased 698 thousand tons or by 13 percent, and between 1985 and 1987, output expanded by an additional 205 thousand tons, or 3 percent.

As Figure 3.78 shows, paper production is not evenly distributed throughout the USSR. The dominant producing republic is the RSFSR which produces approximately 85 percent of the total USSR output. Minor amounts have been produced in the Ukrainian and Belorussian SSR.

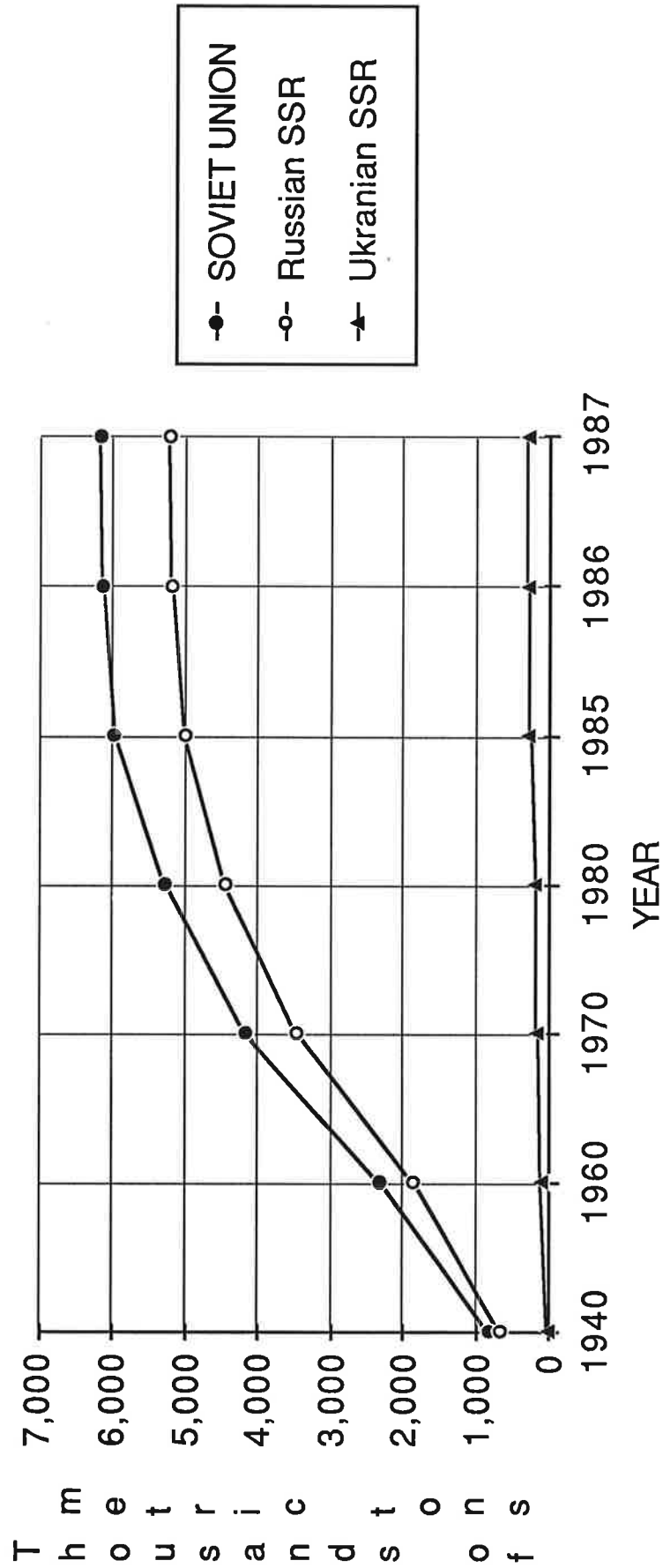
The uneven distribution of the paper production is even more pronounced when the distribution is examined within the RSFSR. Three regions account for 64 percent of the total USSR production of 75 percent of the RSFSR production. These three regions are the North region, Volga-Vyatsky region and the Ural region. The three regions lying east of the Ural mountains only produce 6 percent of the country's total production. Figure 3.79 shows the distribution of paper production within the USSR.

A general increase in the production of paper can be expected in the future as the USSR continues to develop its industry by focussing on higher value added products.

Paperboard Production

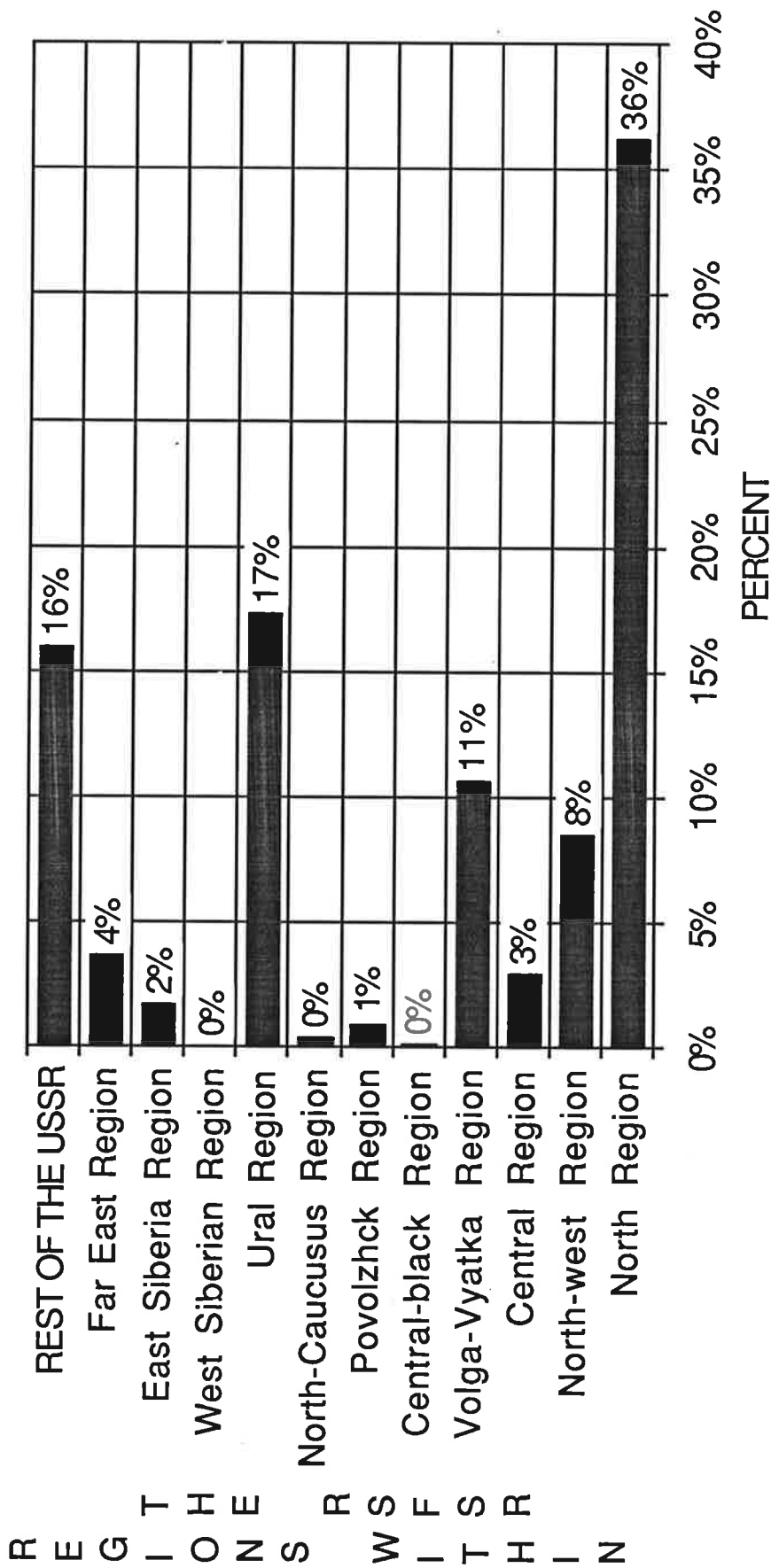
Paperboard production is not clearly separated out in the UN statistics so it is not possible to clearly state the extent which the USSR contributes to the world production. However, since 1940 output in this particular segment of the

FIGURE 3-78 * USSR PAPER PRODUCTION BY MAJOR
 REPUBLIC OF ORIGIN (Volume)
 1940-1987



SOURCE: SSSR Narodnoye Khozaystvo v 1987 g

FIGURE 3-79*USSR REGIONAL PAPER PRODUCTION (%)1987



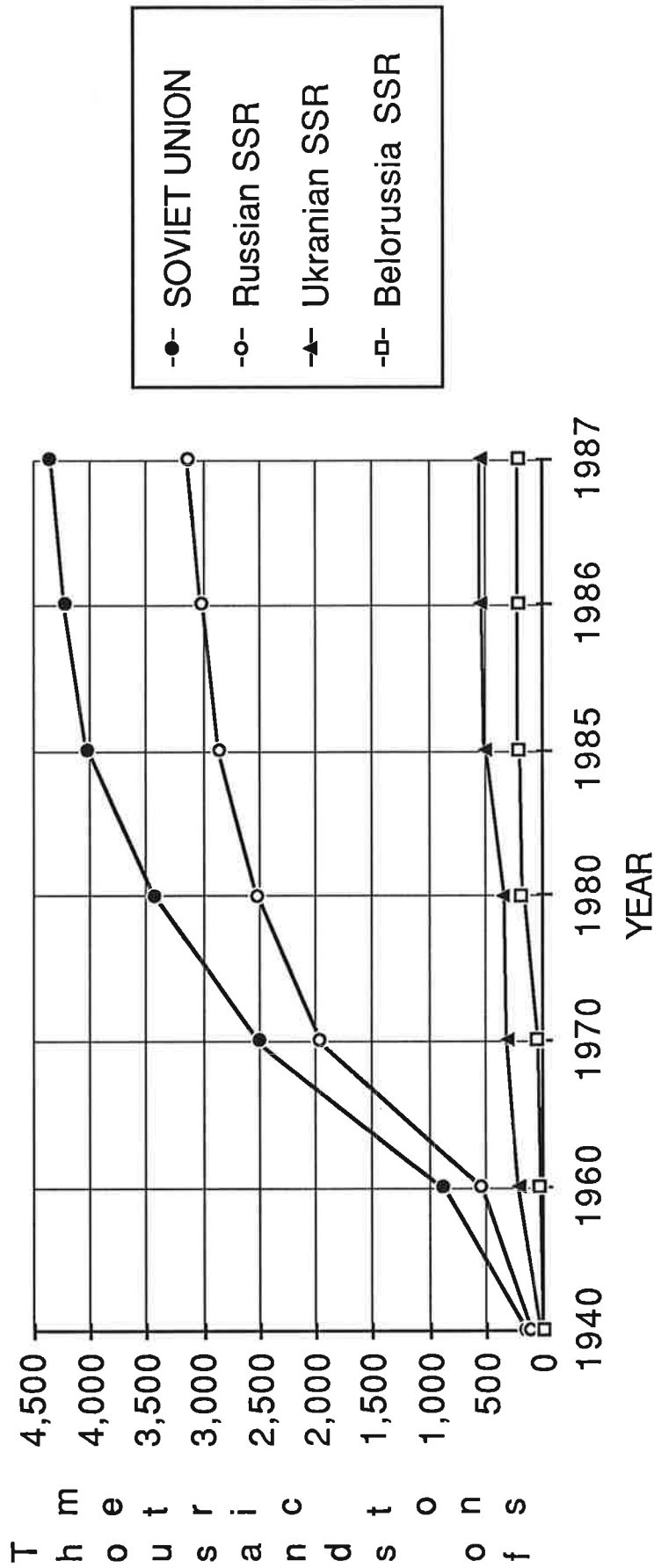
SOURCE: RSFSR Narodnoye Khozaustvo v 1987 g

industry has grown from 153 thousand metric tons to more than 4300 thousand metric tons. Since 1970, the output has increased by 74 percent, reaching 4.4 million tons in 1987. Figure 3.80 shows USSR output of paperboard by major republic for selected years between 1940 and 1987.

The paperboard production is not evenly distributed throughout the country. Russia is the dominant producer, contributing in recent years slightly more than 70 percent of the total USSR output. Other major producing republics include the Ukrainian and Belorussian SSR which in 1986 produced 13 percent and 5 percent of total USSR production respectively. As Figure 3.81 shows, the production of paperboard within the RSFSR is not evenly distributed. Four regions account for 47 percent of the total USSR production. These four regions are North, Central, North-west, and East Siberian region. The three regions east of the Ural mountains account for only 20 percent of total USSR production.

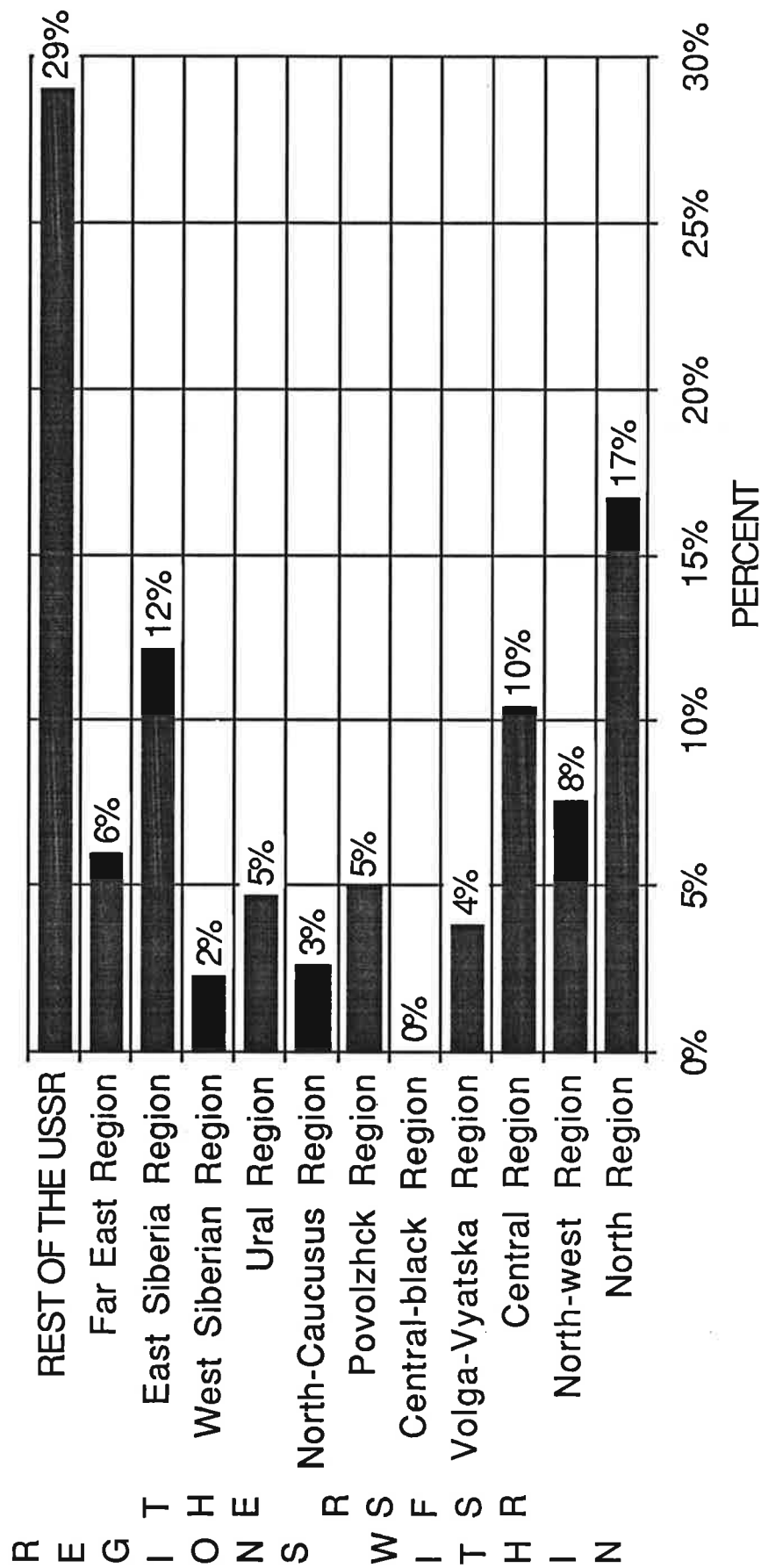
A general increase in the production of paperboard can be expected in the future as the USSR continues to develop its industry by focussing on higher value added products.

FIGURE 3-80 * USSR REGIONAL DISTRIBUTION OF PAPERBOARD PRODUCTION BY MAJOR REPUBLIC OF ORIGIN (Volume) 1940-1987



SOURCE: SSSR Narodnoye Khozaystvo v 1987 g

FIGURE 3-81* USSR REGIONAL PAPERBOARD PRODUCTION (%)1987



SOURCE: RSFSR Narodnoye Khozaustvo v 1987 g

FOREIGN TRADE

Importance to the Economy

The Soviet Union, until quite recently, has been a reluctant participant in international trade.¹ Since the introduction of the planned economy in 1928, foreign trade has not been a significant part of the Soviet economy. With the consolidation of the command economy in 1930, the volume of foreign trade dropped drastically and the Soviet economy became isolated from the outside world. Just before the Second World War, the share of foreign trade turnover in national income dropped to 1-2 percent, and the share of exports fell below 1 percent.

After World War II, trade grew slowly despite the formation of the Council for Mutual Economic Assistance (CMEA)². By 1970, foreign trade turnover amounted to only 4 percent of GNP versus 8 percent for the USA, 18 percent in Japan, 26 percent in France, 32 percent in England, and 38 percent in West Germany.^{3,4}

Subsequent to 1970, Soviet trade increased rapidly due to development of detente and improving commodity prices. By 1985, the share of foreign trade turnover reached 12-15 percent of GNP. This was similar to the USA for that year. However, this growth in value was not matched by a corresponding increase in volume of trade. The apparent increase was brought on by a rapid rise in the world price for oil and gas. While the value of the trade turnover was almost 7 times greater in 1985 than in 1970, the physical volume of

trade was only twice as large.

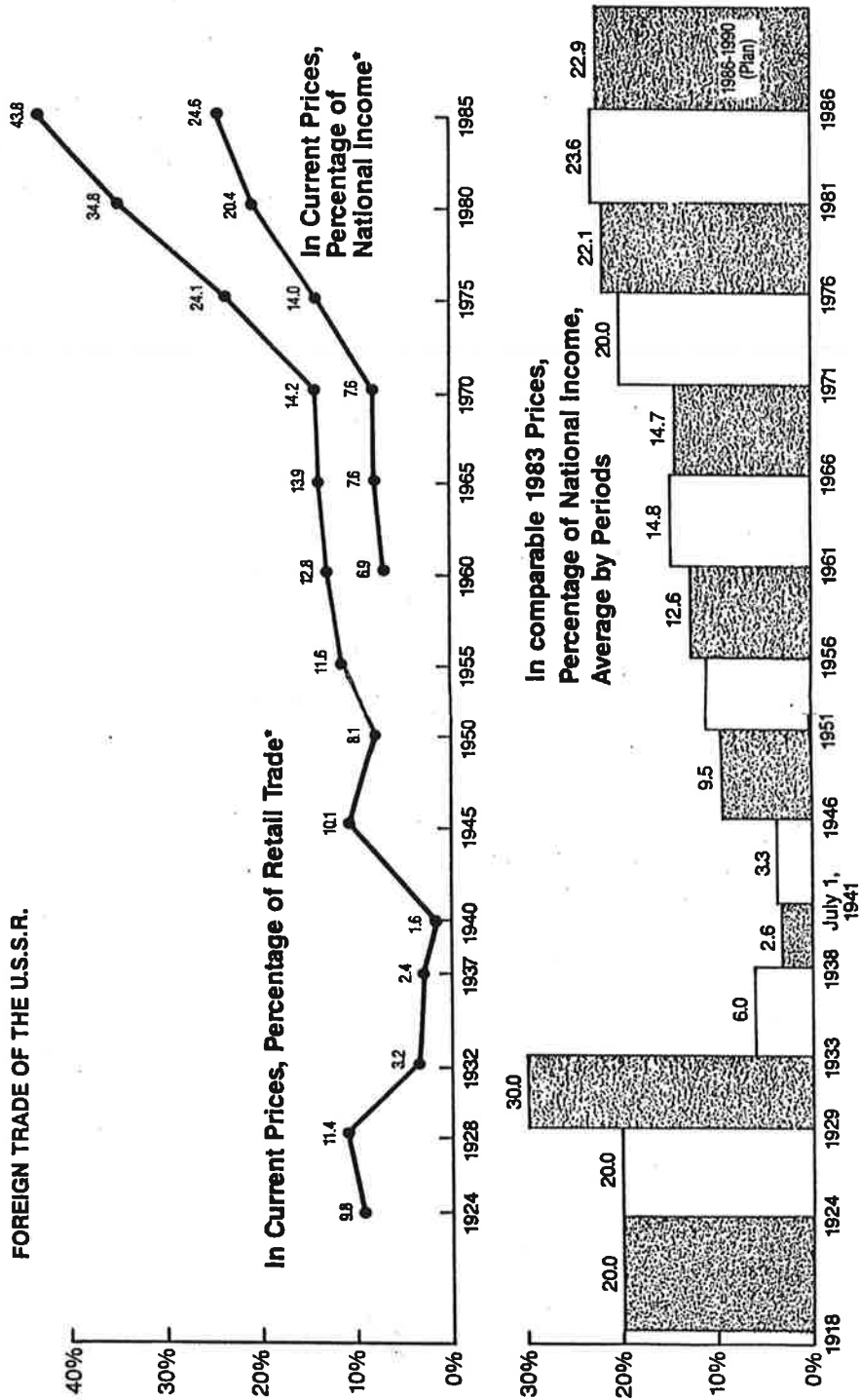
Figure 4.1 shows foreign trade of the USSR as a percentage of national income.

This modest contribution of foreign trade to the overall economy has been attributed to five factors⁵:

1. From the inception of the Soviet State, Marxist-Leninist ideology did not embrace the historic argument concerning the benefits accruing to international trade through the concept of comparative advantage. Western markets were in constant stages of flux which could frustrate the planned nature of the Soviet economy. In addition, learned opinion held that with the vast resources of the Soviet Union, it would be possible to have "socialism in one country".
2. Soviet leadership held an initial perception that the Soviet socialist experiment was threatened by a "hostile capitalist encirclement". This effectively discouraged the Soviet Union from overly relying on foreign markets for its economic development.
3. Since the Soviet Economic system relied heavily on central planning, over reliance on foreign trade, a sector over which the planners could have little influence, would introduce significant uncertainty to the planning process.
4. Soviet perception had it that capitalistic countries have erected significant barriers against trade with them. This started with the trade embargoes following the post revolutionary time of 1917 and has continued to the present day restrictions on lending, failure to grant tariff reductions, and controls on strategic commodities⁶.
5. Fifth, and most significant, the mechanisms for trade have posed a significant barrier to Soviet participation in the World trading and financial system. These arrangements include isolation of the Soviet enterprise both as a producer and consumer of goods and services in the economy and a monetary reward system which discouraged innovation and introduction of change onto the existing system.⁷

FIGURE 4.1

FOREIGN TRADE OF THE U.S.S.R.



* Recalculation of foreign currency into rubles by following exchange rate per dollar: 1924—0.199 rubles; 1928—0.194 rubles; 1932—0.199 rubles; 1937, 1940, 1945—0.530; 1950, 1955, 1960, 1970—0.900. Then by the rate set by Gosbank.

SOURCE: Narodnoe khozjaistvo S.S.S.R. [The Economy of the U.S.S.R.]; *Mirovaia ekonomika i mezhdunarodnye otnosheniia*, 1987, No. 11, p. 47.

Distribution of Foreign Trade

General

Soviet foreign trade has increased since 1960, reaching a peak in 1985 when total trade (exports plus imports) reached 142 billion roubles. The drop off in 1986 and 1987 was due primarily to the decline in the world price of petroleum products. Total turnover in 1987 was 128 billion roubles.

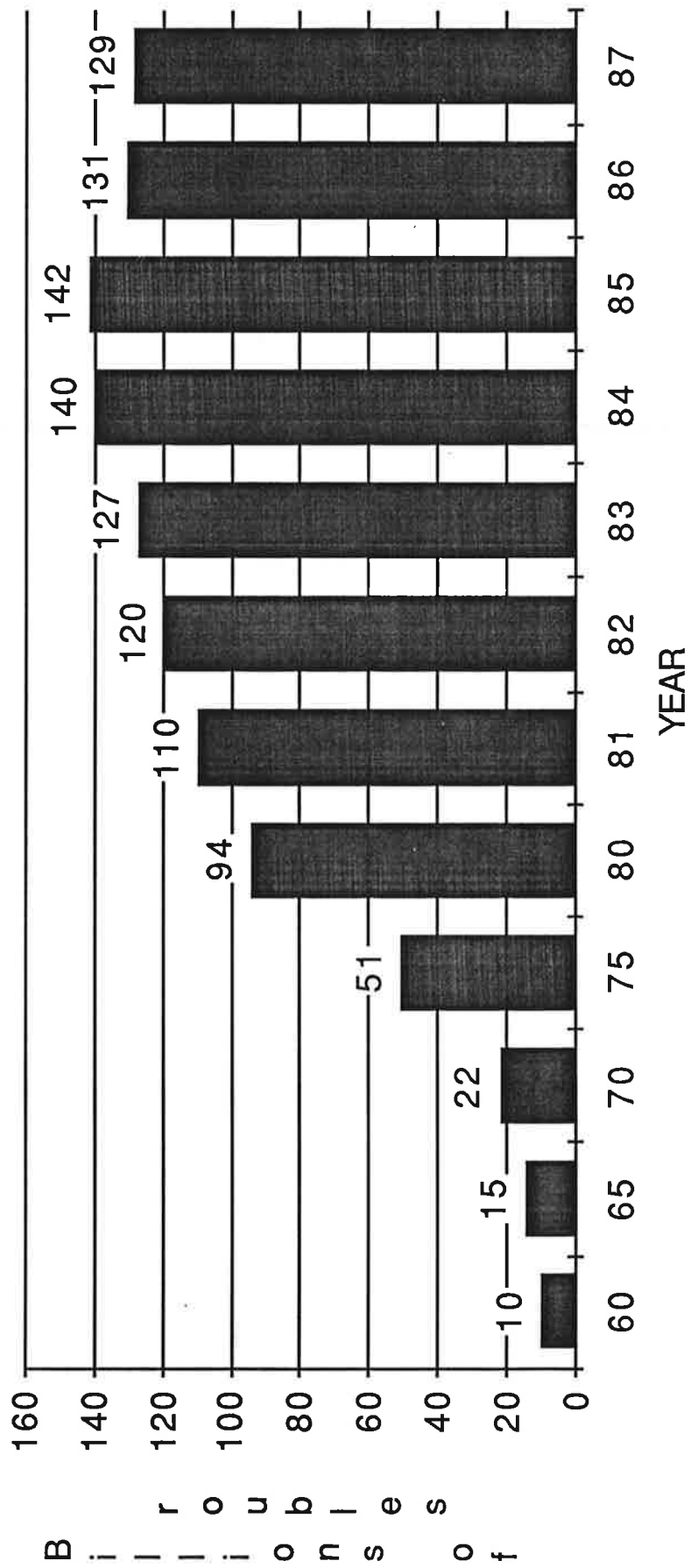
Exports and imports have followed a similar pattern as total turnover. However, exports reached a peak of 74 billion roubles in 1984 before declining to 68 billion roubles in 1987. Imports, on the other hand, reached a peak of 69 billion roubles in 1985 before declining to 61 billion roubles in 1987. The Soviet Union has consistently shown a trade surplus in its rouble denominated trade.

As mentioned in the previous section, trade value began to increase in the early seventies following a decrease in international tension brought on by detente, and the rapid escalation in the world price for oil. This is clearly evident when examining Figure 4.2 which shows the distribution of foreign trade for the period 1960 to 1987. Figure 4.3 contrasts exports and imports for the same period.

Country Groupings

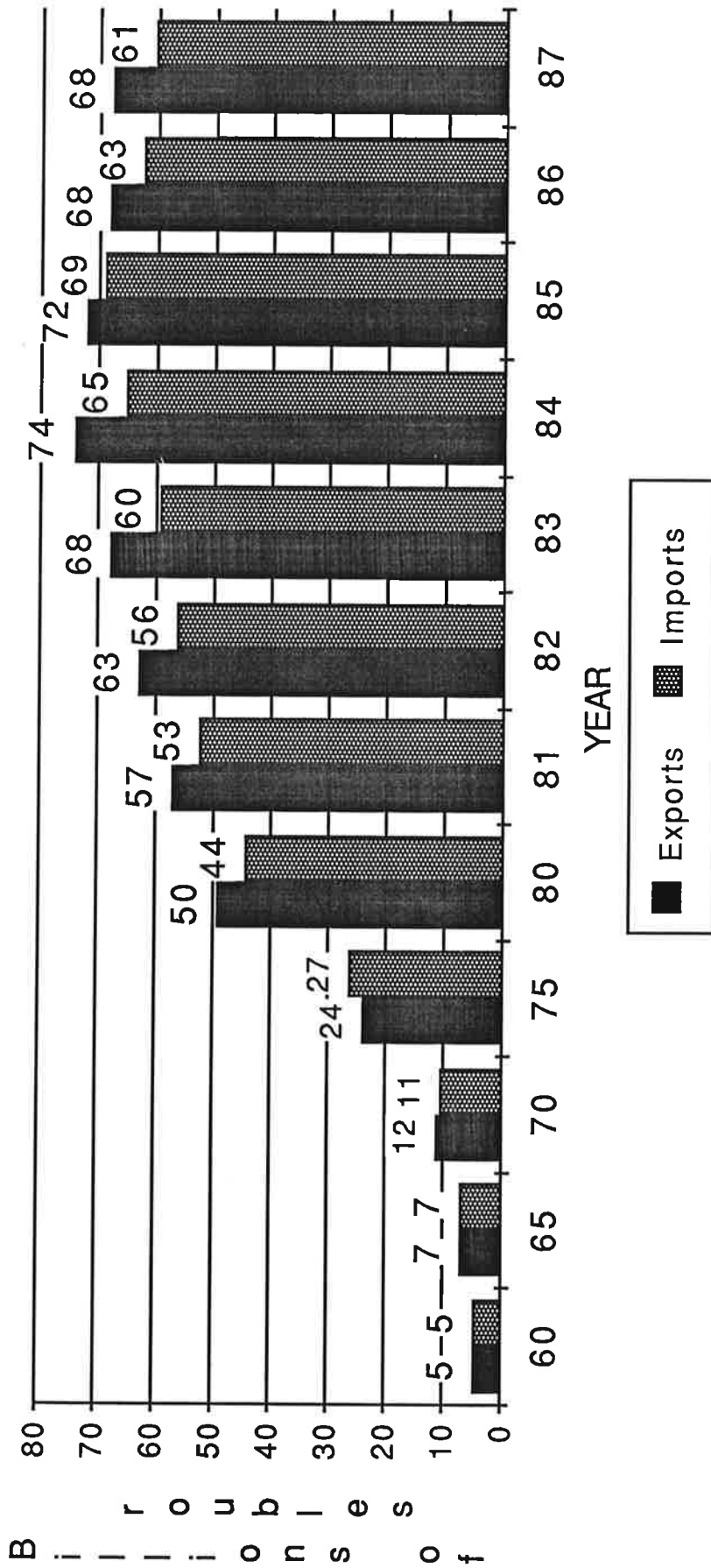
The Soviet Union trades with countries from four

FIGURE 4-2 * USSR: TOTAL FOREIGN TRADE TURNOVER
1960-1987



SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-3 * USSR: EXPORTS AND IMPORTS
1960-1987



SOURCE: Vneshnyaya Torgovlya, various years

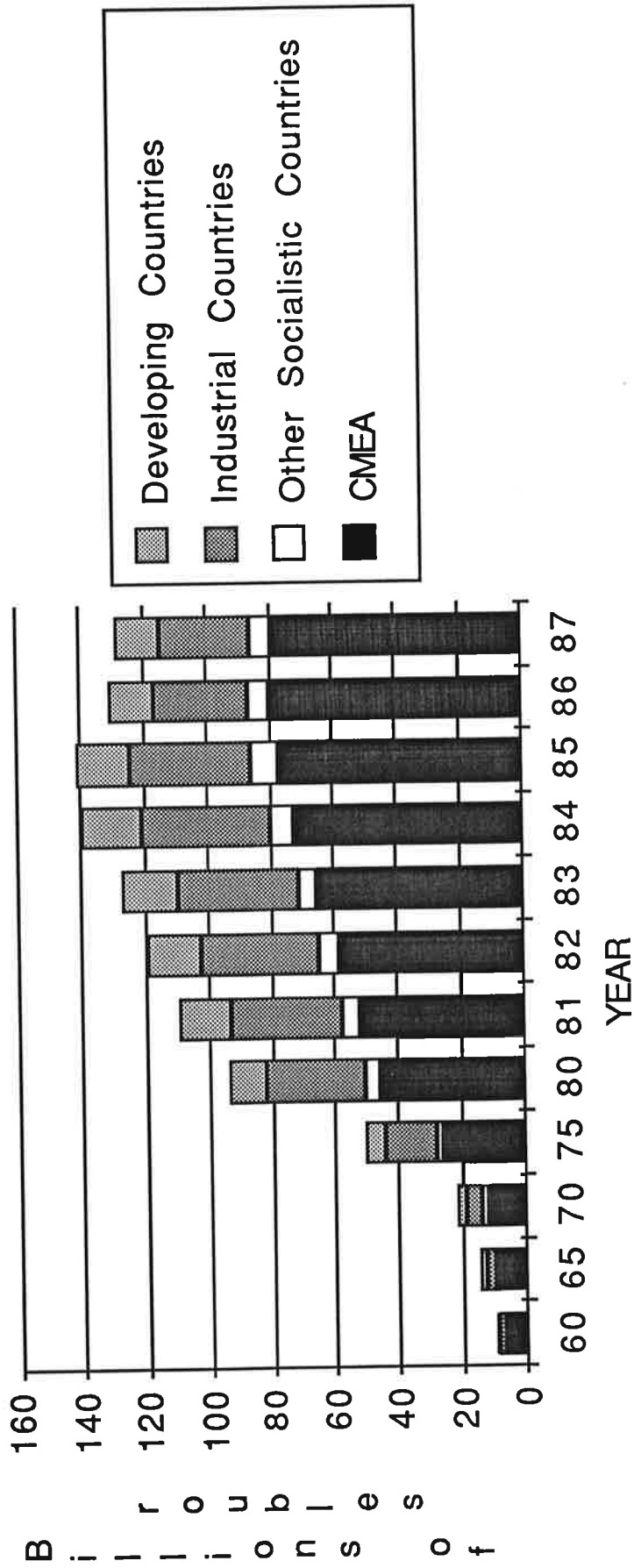
separate categories . These categories are:

1. Member countries of the Council of Mutual Economic Assistance (CMEA). These countries are: Bulgaria, Hungary, Vietnam, German Democratic Republic, Cuba, Mongolia, Poland, Rumania, Czechoslovakia;
2. Other Socialistic Countries. These countries include: China, North Korea, Yugoslavia;
3. Industrial Developed Countries. These countries include: Austria, Belgium, Great Britain, Greece, Spain, Italy, Canada, Netherlands, United States, Federal Republic of Germany, Finland, Switzerland, Sweden, Japan;
4. Developing Countries. These countries include: Algiers, Angola, Argentina, Afghanistan, Brazil, Egypt, India, Iraq, Iran, Kampuchea, Libya, Malaysia, Morocco, Nigeria, Nicaragua, Saudi Arabia, Syria, Turkey, and Ethiopia.

As is evident from Figures 4.4 and 4.5, most of the trade has been with member countries of the CMEA. The extent of this trade has varied from a low of 45 percent of total turnover in 1981 to a high of 62 percent in 1987. The next most significant trading partner has been the industrialized countries, followed by the developing countries and other socialistic countries. Figure 4.4 shows total USSR foreign trade turnover segregated by country groupings. Figure 4.5 shows the proportion of each country grouping of total Soviet foreign trade turnover.

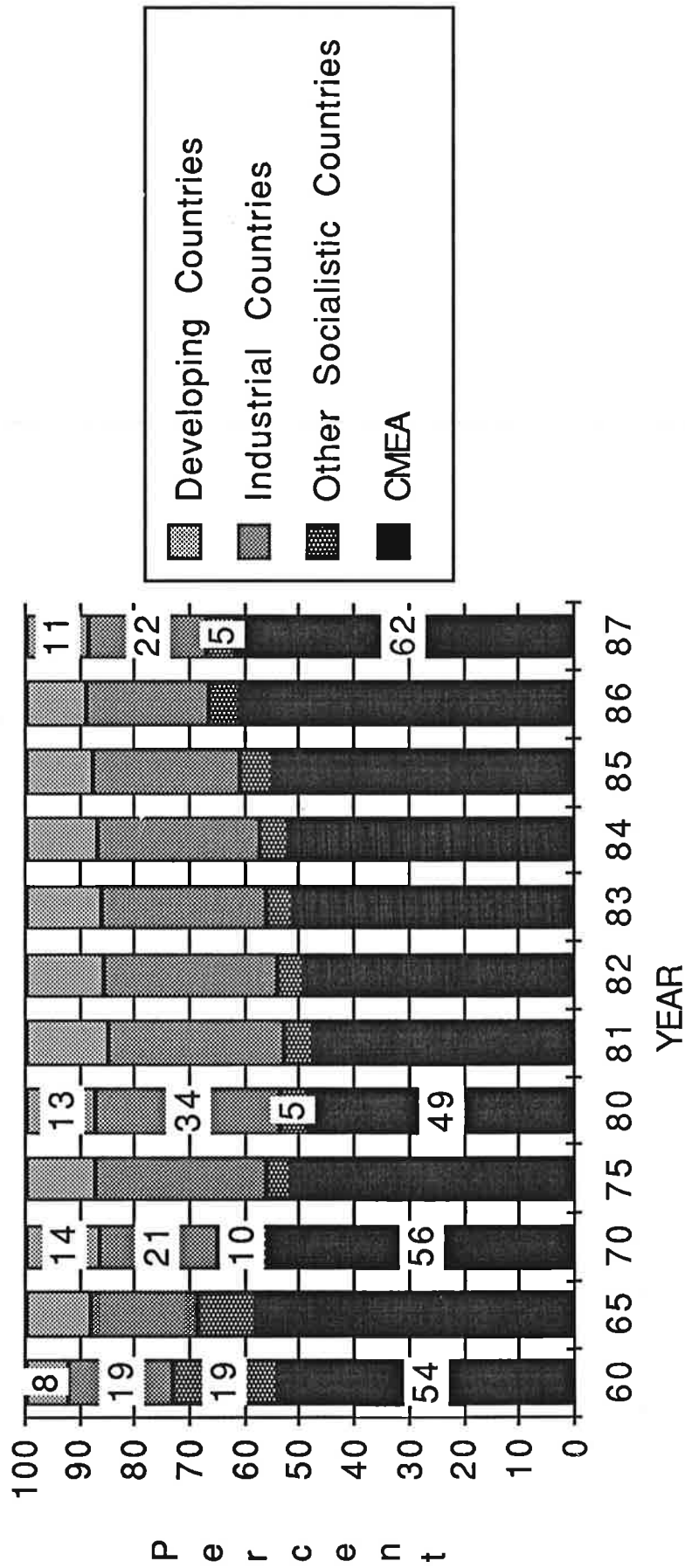
Total trade with the CMEA countries has varied from a low of 5.6 billion roubles in 1960 to a high of 86 billion roubles in 1986. Total trade with the industrialized countries has varied from 1.9 billion roubles in 1960 to a high of 40.9 billion roubles in 1984. Trade with developing countries

FIGURE 4-4 * USSR FOREIGN TRADE TURNOVER
BY COUNTRY CATEGORIES
1960-1987



SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-5 * USSR: PERCENT DISTRIBUTION OF TOTAL RUBLE
TURNOVER VALUE BY COUNTRY GROUPING



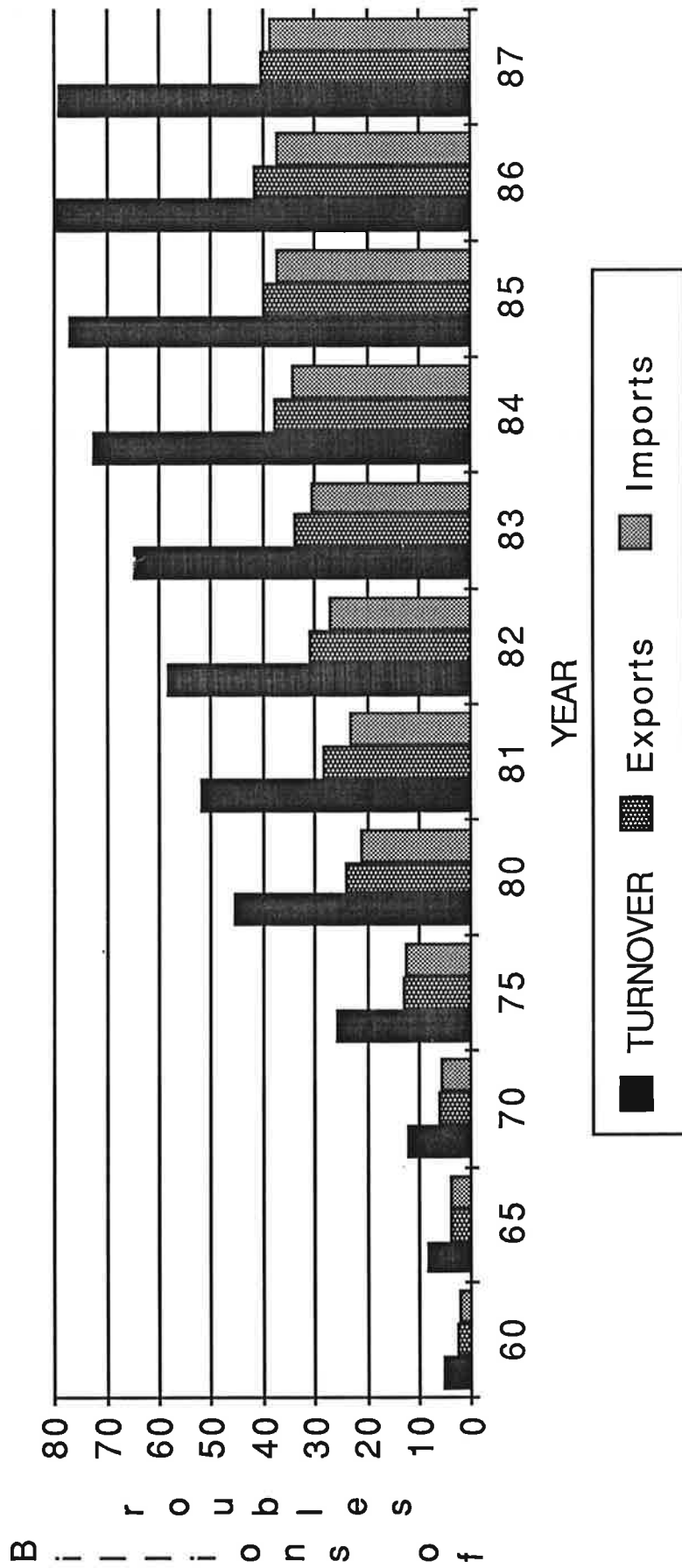
SOURCE: Vneshnyaya Torgovlya, various years

has varied from 0.86 billion roubles in 1960 to 18.5 billion roubles in 1984. Trade with Other Socialistic Countries has varied from a low of 1.6 billion roubles in 1964 to a high of 8.8 billion roubles in 1985.

Figures 4.6 through 4.9 show exports, imports, and total turnover for each of the four categories of countries for the period 1960 through 1987.

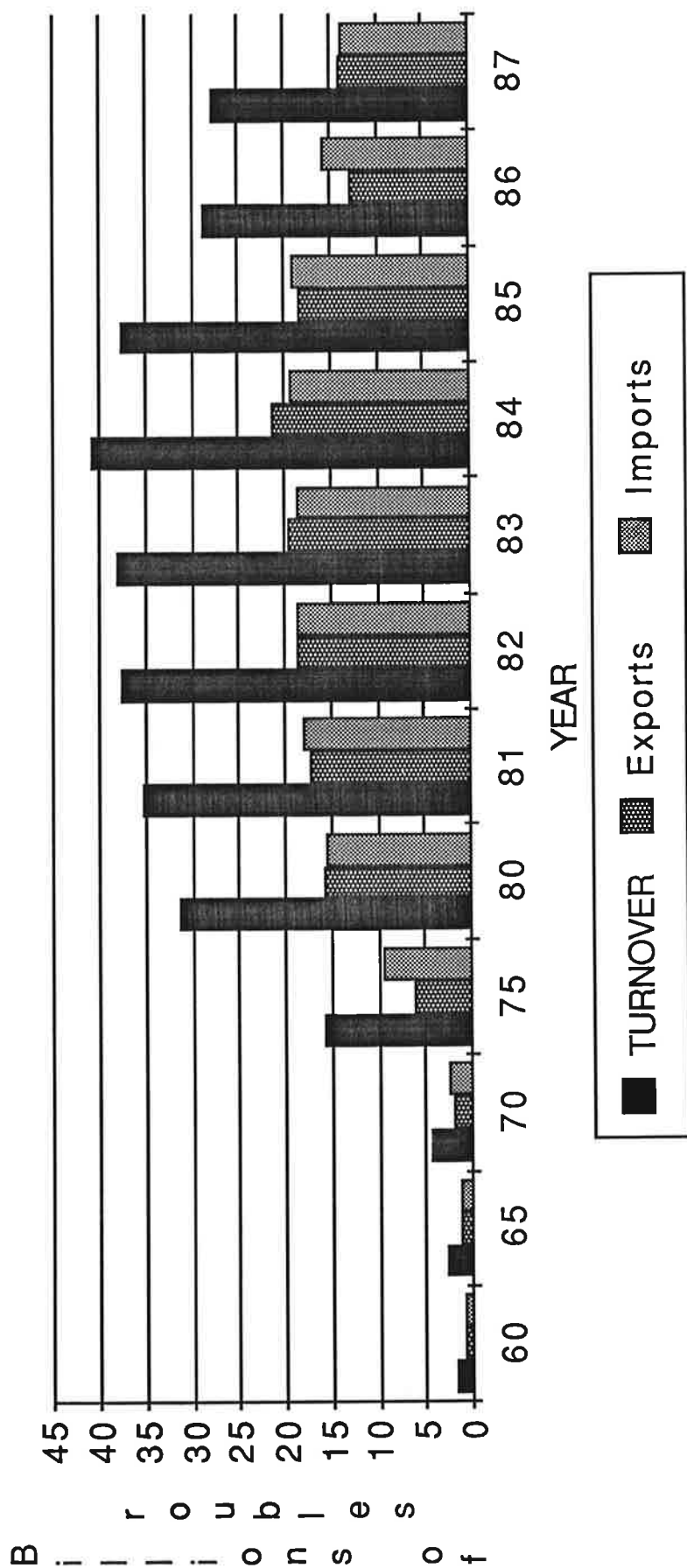
Table 4.1 shows the proportional distribution of trade between member countries of the four previously identified groups and the USSR for 1987. The major trading partners in CMEA are the German Democratic Republic (GDR), Czechoslovakia, Poland, and Bulgaria which together accounted for 63 percent of the bilateral CMEA trade with the USSR, or 42 percent of total USSR foreign trade turnover. The major trading nations in the Industrialized group were the Federal Republic of Germany (FRG), Finland, Italy, France, and Japan which collectively accounted for 61 percent of the industrial group trade with the USSR, or 14 percent of the total USSR foreign trade. The bulk of the trade with the other socialistic countries was accounted for by Yugoslavia with 58 percent of the trade by this group of countries, or 3 percent of the total USSR foreign trade turnover. The major trading countries in the developing country category were India, Afghanistan and Iraq which collectively accounted for 28 percent of the developing countries' group trade with the USSR, or 3 percent of the total USSR foreign trade turnover.

FIGURE 4-6 * USSR: FOREIGN TRADE WITH
CMEA COUNTRIES
1960-87



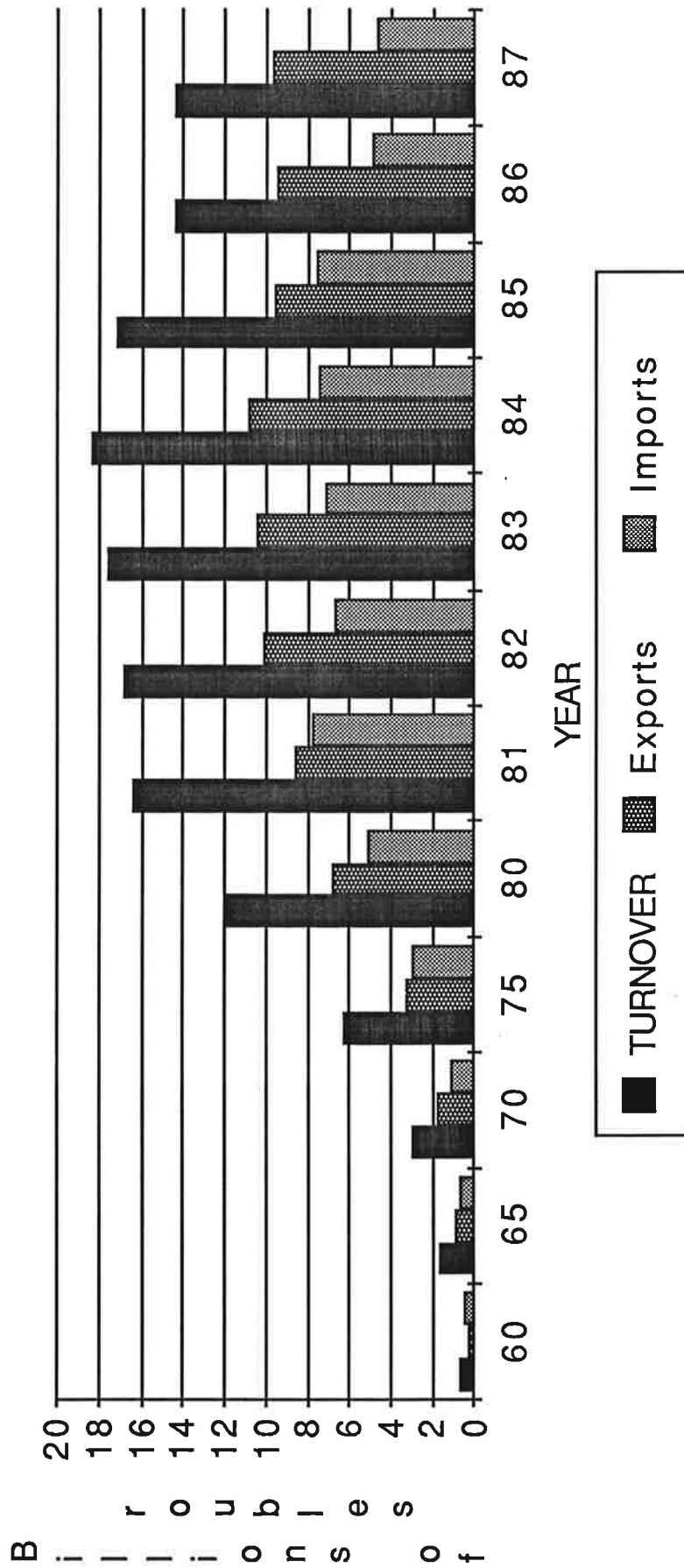
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-7 * USSR: FOREIGN TRADE WITH INDUSTRIALIZED COUNTRIES 1960-87



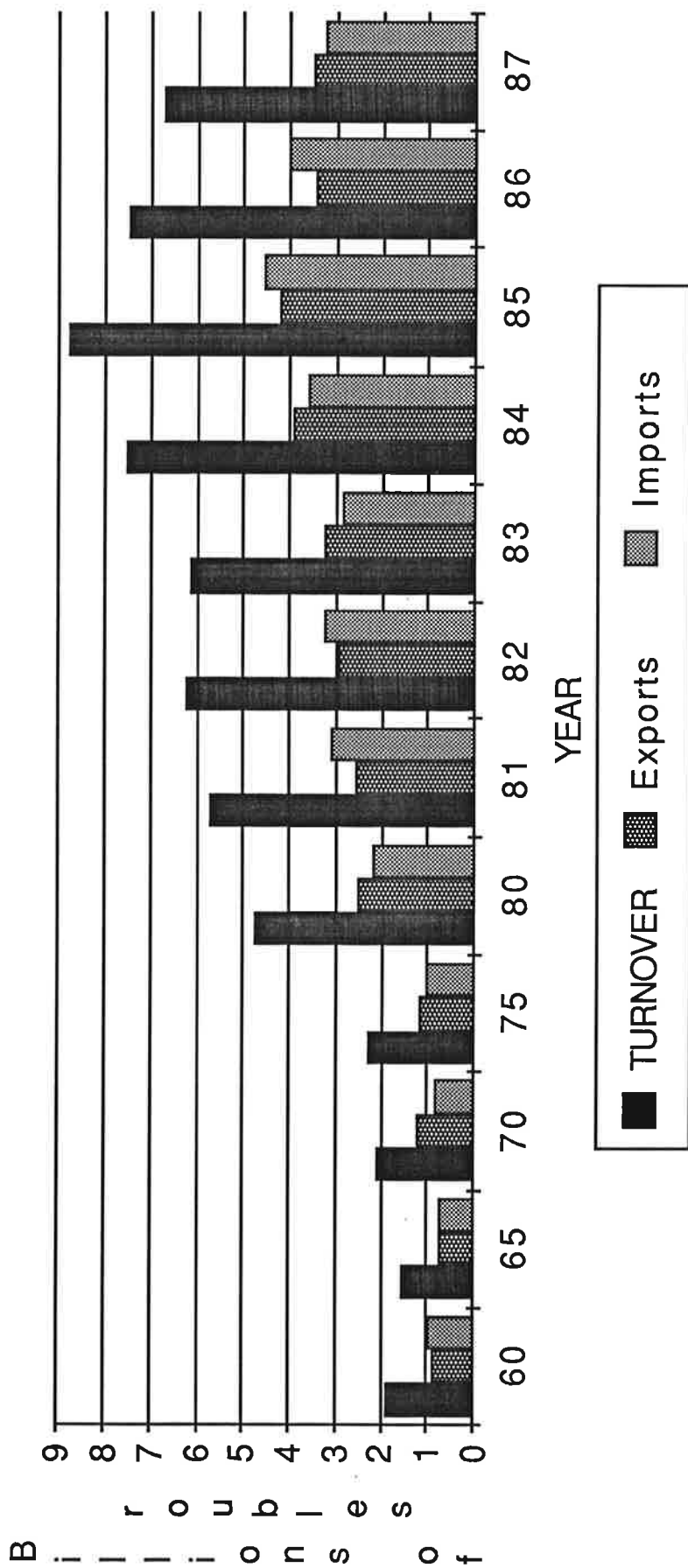
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-8 * USSR: FOREIGN TRADE WITH
DEVELOPING COUNTRIES
1960-87



SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-9 * USSR: FOREIGN TRADE WITH
OTHER SOCIALISTIC COUNTRIES
1960-87



SOURCE: Vneshnyaya Torgovlya, various years

TABLE 4-1: DISTRIBUTION OF FOREIGN TRADE TURNOVER OF THE USSR IN PERCENT FOR 1987

	Percent	Percent	Percent
SOCIALISTIC COUNTRIES	67	INDUSTRIAL COUNTRIES	21.8
of which:		DEVELOPING COUNTRIES	11.2
CMEA	61.7		
Bulgaria	9.9	Algers	0.8
Hungary	7.5	Angola	0.9
Vietnam	1.4	Argentina	1.6
GDR	11.4	Afghanistan	0.2
Cuba	5.9	Brazil	0.5
Mongolia	1.2	Egypt	2.7
Poland	10	India	0.4
Rumania	3.8	Iraq	0.8
Czechoslovakia	10.6	Iran	0.9
Other Socialistic Countries	5.3	Kampuchea	3.8
China	1.1	Libya	2.9
North Korea	1	Malaysia	2
Yugoslavia	3.1	Morocco	0.7
		Nigeria	0.5
		Nicaragua	2
		Saudi Arabia	0
		Syria	0.3
		Turkey	0.2
		Ethiopia	0.1

Source: Vneshnyaya Torgovlya v 1987 g, Finansy i statistika, Moscow, 1988

Composition of Trade

Foreign trade statistics of the Soviet Union are segregated according to nine broad product categories.⁸ As Figure 4.10 illustrates, imports have consisted primarily of equipment and machinery, food products and consumer goods. Together these three categories have consistently represented more than sixty percent of all imports. In 1987, they together represented nearly 70 percent by value of all goods imported into the USSR.

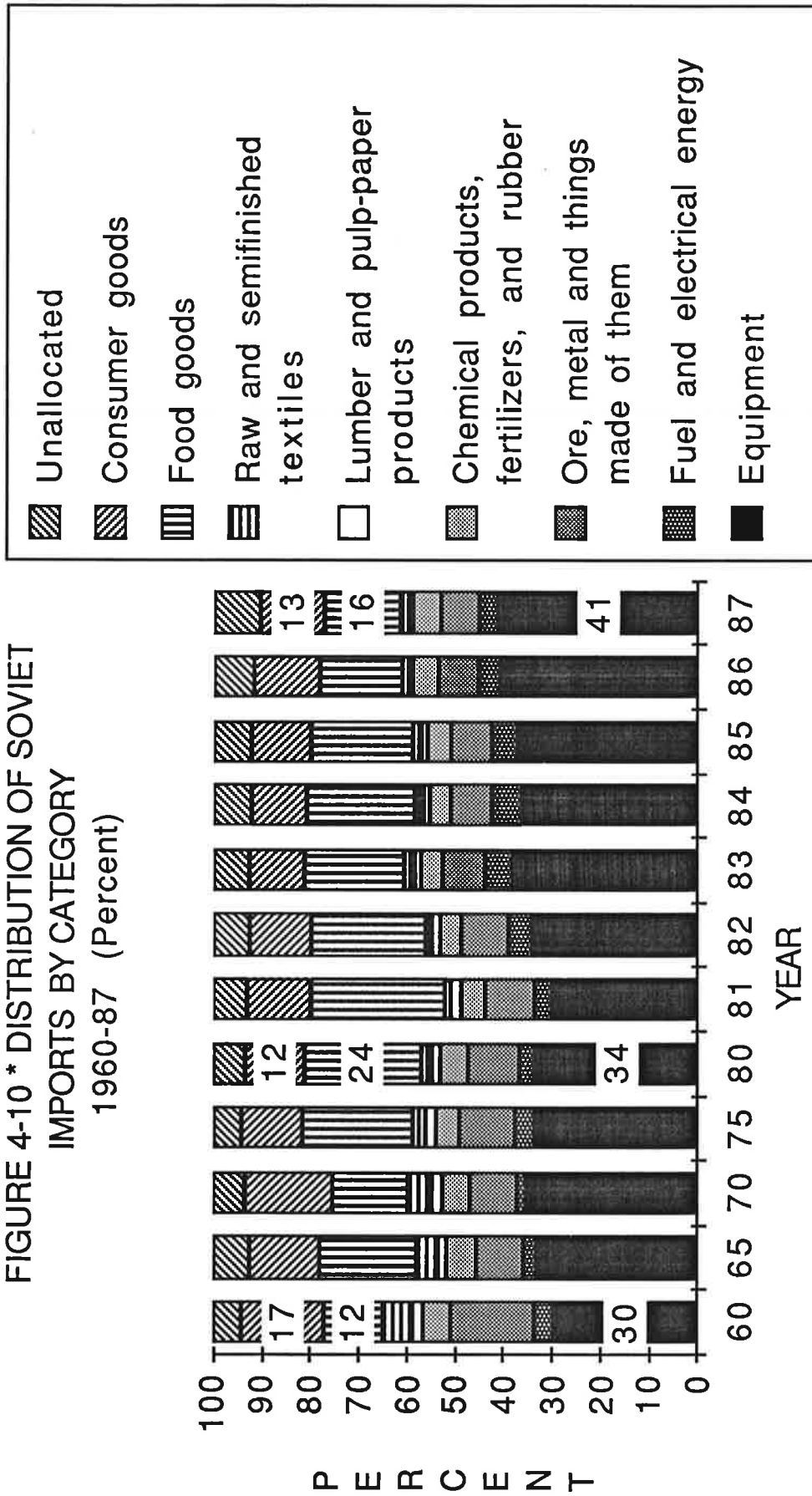
Exports on the other hand, have followed a decidedly different pattern, with the majority of exports falling in the machine and equipment, fuel and electrical energy, and ore and ore concentrates categories. Prior to the large increases in the price of energy in the mid 1970's, the major exports consisted of machinery and ore which together represented about 40 percent of the total value of trade. Beginning in 1974, with the first oil shock, the share in value of energy products began to increase. By 1985, energy had increased in importance and represented more than 50 percent of the total value of export trade.

Figure 4.11 shows the proportion of exports for each of the product categories for selected years since 1960.

Hard Currency Trade

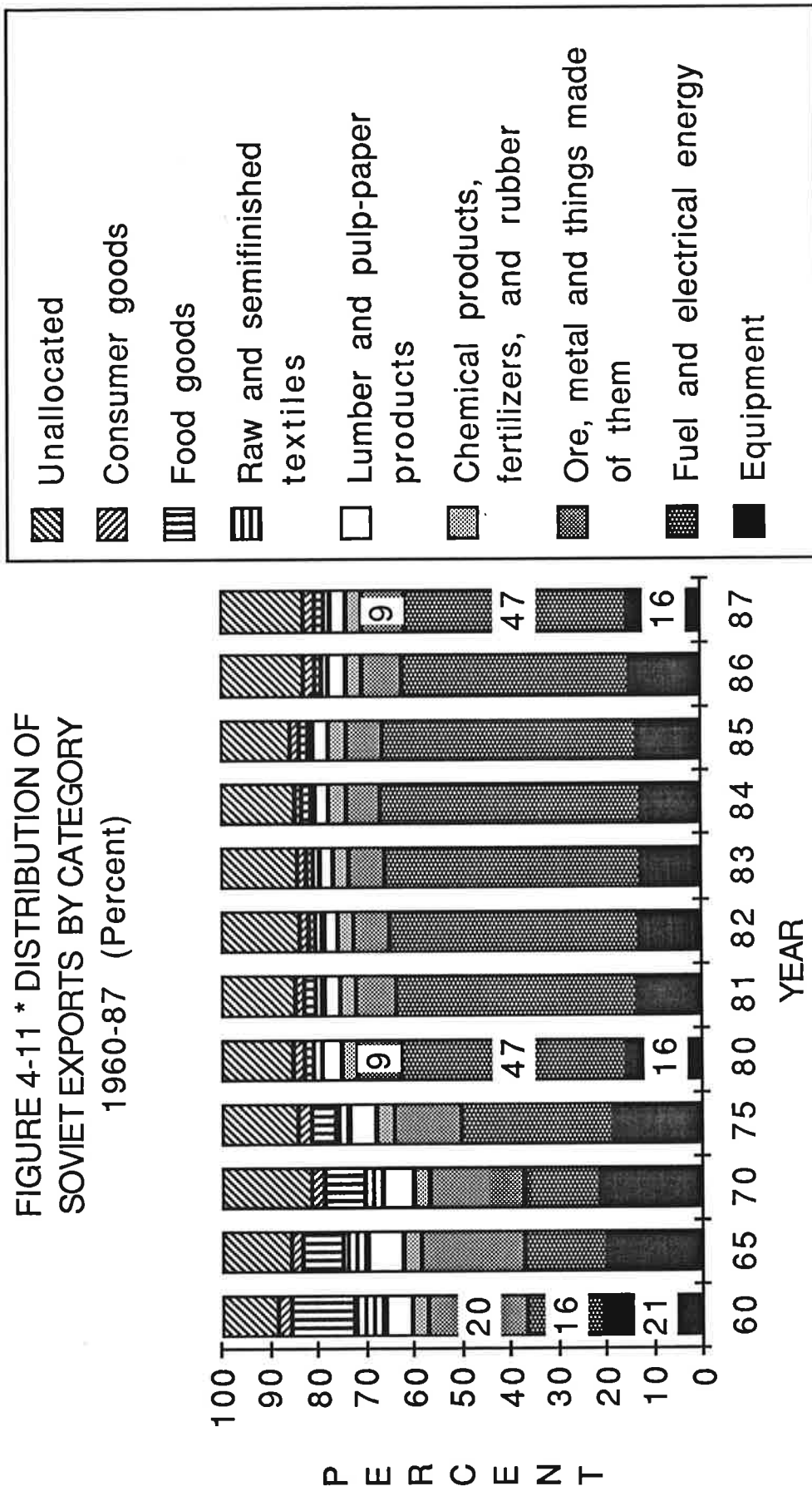
The ability of the Soviet Union to import goods and services from market economies is determined in part on the hard currency trade balance. Between 1970 and 1987, hard currency exports grew from 2.4 billion U.S. dollars to 29.1

FIGURE 4-10 * DISTRIBUTION OF SOVIET
IMPORTS BY CATEGORY
1960-87 (Percent)



SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-11 * DISTRIBUTION OF
SOVIET EXPORTS BY CATEGORY
1960-87 (Percent)



SOURCE: Vneshnyaya Torgovlya, various years

billion U.S. dollars. Hard currency imports grew from 2.7 billion U.S. dollars to 22.9 billion U.S. dollars. Since 1980, the USSR has consistently generated a trade surplus in hard currency. The surplus has varied from 534 million U.S. dollars in 1985 to 6.2 billion U.S. dollars in 1987.

Hard currency exports have varied from 19 percent of total exports in 1970 to 36 percent in 1980 before falling off to 27 percent in 1987. Hard currency imports varied from a low of 23 percent in 1970 to a high of 38 percent in 1975 and 1980 before declining to 24 percent in 1987.

The major contributor to the hard currency exports has been petroleum products which in 1987 generated 46 percent of total hard currency. Hard currency imports have consisted mainly of equipment, rolled ferrous metals, and chemicals which represented 26, 16, and 12 percent respectively of hard currency imports in 1987.

Table 4.2 shows hard currency trade of the USSR for selected years between 1970 and 1987. Table 4.3 shows Soviet export trade for selected years between 1960 and 1987. Table 4.4 shows Soviet import trade for selected years between 1960 and 1987. All three tables are denominated in United States dollars.

Significance of Forest Products Trade

The significance of the Soviet Union's forest product sector trade can be examined in terms of its contribution to the world forest economy for selected products. In 1987, the

TABLE 4-2 * USSR: Hard Currency Table, by Commodity

	Million US \$							Share of Total to the World ^b Percent		
	1970	1975	1980	1986	1987	1970	1975	1980	1986	1987
Exports	2,405	9,453	27,874	25,111	29,092	19	28	31	30	27
Petroleum and petroleum products	387	3,170	12,123	7,001	10,272	26	39	44	22	28
Natural gas	1	220	2,710	3,638	2,731	2	34	48	35	27
Coal and coke	92	390	366	355	410	23	28	22	16	18
Machinery and equipment	140	560	1,468	1,662	2,114	5	9	12	11	13
Ferrous metals	128	155	246	408	421	9	6	7	9	9
Wood and wood products	365	714	1,510	1,037	1,191	44	37	49	32	34
Chemicals	61	242	758	791	848	18	26	37	29	28
Agricultural products	167	522	458	274	390	12	22	17	11	14
Diamonds	175	478	1,304	NA	0	NA	NA	NA	NA	0
Other	889	3,002	6,931	9,945	10,715	21	33	44	12	14
Imports	2,711	14,257	26,060	23,098	22,928	23	38	38	26	23
Grain	101	2,323	4,503	2,178	1,961	75	87	88	76	80
Other agricultural products	512	1,591	4,301	2,305	2,509	24	25	35	19	19
Machinery and equipment	927	4,593	6,039	6,509	5,935	2	37	26	18	15
Rolled ferrous metals ^c	279	2,565	3,481	3,508	3,600	49	80	80	70	69
Chemicals	248	800	1,953	2,249	2,837	50	55	60	56	63
Consumer goods	272	464	767	1,098	855	11	9	8	9	7
Other	372	1,921	5,016	5,251	5,231	22	67	82	7	7

^a Including all countries trading with the Soviet Union on a hard currency basis as of 1 January 1987.

^b because of the artificial prices the USSR uses in its CEMA country trade.

^c Including imports of pipes.

^d The importance of hard currency trade is overstated for exports and understated for imports in Soviet statistics

Source: Handbook of Economic Statistics, 1989, Directorate of Intelligence, page 162

TABLE 4-3 * USSR: Total Imports, by product grouping (U.S.\$)

	1960	1970	1975	1980	1983	1984	1985	1986	1987
Total imports	5,623	11,720	37,076	68,473	80,445	80,409	83,315	88,874	95,970
Machinery and equipment	1,673	4,166	12,574	23,198	30,709	29,451	30,941	36,146	39,746
Transportation equipment	659	1,232	3,326	4,674	6,731	6,509	7,571	8,234	8,295
Fuels, lubricants, and related materials	237	226	1,447	1,126	3,042	3,420	3,048	2,457	3,609
Natural gas, coal and coke	93	144	752	208	300	316	314	285	1,055
Petroleum and petroleum products	144	82	695	918	2,742	3,104	2,734	2,172	2,554
Ores and concentrates	314	304	631	881	931	1,030	1,058	1,245	1,376
Base metals and manufactures	545	691	3,595	4,653	4,948	4,656	4,897	5,263	5,480
Ferrous metals	373	593	3,346	4,635	4,937	4,644	4,886	5,252	5,468
Rolled ferrous metals	338	568	3,197	4,335	4,694	4,398	4,597	4,997	5,185
Nonferrous metals	172	98	249	18	11	12	11	10	12
Tin	35	30	65	NA	NA	NA	NA	NA	0
Chemicals	149	493	1,447	3,275	3,216	3,256	3,744	3,990	4,516
Rubber and rubber products	196	194	331	351 ^b	285	213 ^b	191	196	246
Wood and wood products	105	248	796	1,369	1,076	1,000	1,046	1,112	1,140
Textile raw materials and semimanufactures	364	561	889	1,493	1,671	1,312	1,410	1,196	1,441
Cotton fiber	180	249	271	96	323	317	304	130	137
Wool fiber	118	120	265	502	565	355	465	459	642
Agricultural products	NA	2,303	9,110	17,437	17,713	18,719	17,546	14,779	15,339
Grain ^c	NA	135	2,673	5,114	5,147	6,816	5,950	2,868	2,463
Other agricultural products	NA	2,168	6,437	12,323	12,566	11,903	11,596	11,911	12,876
Industrial consumer goods	960	2,137	4,763	8,254	9,158	9,266	10,317	11,709	12,239
Other and unspecified	467	397	1,493	6,436	7,696	8,086	9,117	10,781	10,838

^a Official Soviet statistics using US dollar exchange rates for

the Soviet foreign exchange ruble as announced by the State

^b Only natural rubber reported.

^c Excluding wheat flour.

Bank of the USSR. Imports are f.o.b.

Source: Handbook of Economic Statistics, 1989, Directorate of Intelligence, page 161

TABLE 4-4 * USSR: Total Exports, by product grouping (U.S.\$)

	1960	1970	1975	1980	1983	1984	1985	1986	1987
Total exports ^b	5,558	12,787	33,406	76,437	91,652	91,495	87,196	97,053	107,664
Machinery and equipment	1,141	2,753	6,241	12,081	11,426	11,408	12,147	14,539	16,721
Fuels, lubricants, and related materials	902	1,986	10,476	35,908	49,193	49,743	45,910	45,938	50,017
Coal and coke ^c	242	408	1,399	1,695	1,757	1,730	1,836	2,230	2,282
Petroleum and petroleum products	657	1,469	8,212	27,851	38,092	38,001	33,843	31,987	36,066
Ores and concentrates	243	403	868	993	1,053	1,042	982	1,222	1,310
Iron ore	175	325	692	651	682	662	623	777	826
Base metals and manufactures	837	1,978	3,813	NA	NA	NA	NA	4,440	4,771
Ferrous metals	642	1,351	2,673	3,551	3,681	3,534	3,616	4,439	4,771
Rolled ferrous metals	480	961	1,794	2,465	2,503	2,346	2,387	2,903	3,128
Nonferrous metals	195	627	1,140	NA	NA	NA	NA	NA	NA
Aluminum	35	184	356	NA	NA	NA	NA	NA	NA
Chemicals	150	334	949	2,025	2,307	2,707	2,837	2,770	2,979
Wood and wood products	305	831	1,916	3,093	2,587	2,575	2,638	3,289	3,502
Lumber	183	333	780	1,207	936	941	976	1,128	1,183
Textile raw materials and semimanufactures	358	437	976	1,435	1,297	1,142	1,155	1,350	1,647
Cotton fiber	288	372	917	1,357	1,195	1,000	1,008	1,145	1,374
Agricultural products	NA	1,451	2,410	2,690	2,299	2,158	2,157	2,401	2,870
Grain ^d	NA	399	508	310	326	305	235	157	168
Other agricultural products	NA	1,052	1,902	2,380	1,973	1,853	1,922	2,244	2,702
Industrial consumer goods	205	316	841	1,272	1,298	1,246	1,291	1,672	2,069
Other and unspecified	715	2,298	4,916	16,940	20,192	19,474	18,079	19,432	21,798

^a Official Soviet statistics using US dollar exchange rates for released data for total exports but withheld data on exports of base metals and manufactures.

^b The Soviet foreign exchange ruble as announced by the State Bank of the USSR. Exports are f.o.b.

^c Including small amounts of charcoal and other solid fuels.

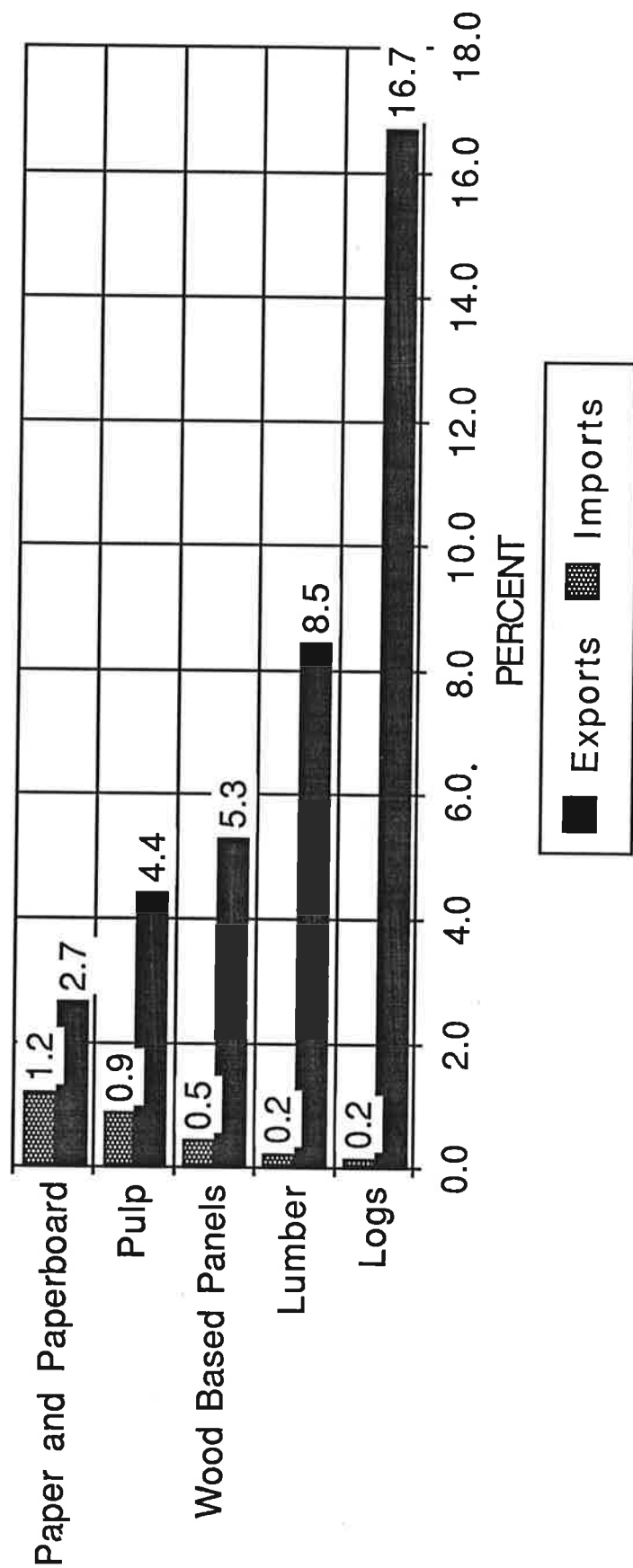
^d The major components do not add up to the total export figure for the 1980-85 period because the Soviet Union Excluding wheat flour.

Source: Handbook of Economic Statistics, 1989, Directorate of Intelligence, page 160

Soviet Union harvested 18 percent of the industrial roundwood, produced 20 percent of lumber, 7 percent of pulp production, 5 percent of paper and paperboard production, and 11 percent of the wood based panel production. In terms of exports, it is one of the major exporters of industrial wood (17 percent of total world trade) and in lumber (9 percent of world sawnwood volume). It has hitherto been a minor wood importing nation, choosing to selectively import forest products to balance deficiencies in internal production. Figure 4.12 shows the Soviet exports and imports as a percentage of world trade by major product category. Figure 4.13 shows the volume of Soviet exports and imports relative to world trade for the five major product groups. Likewise, Figure 4.14 shows the Soviet exports and imports of pulp and paper products relative to world trade.

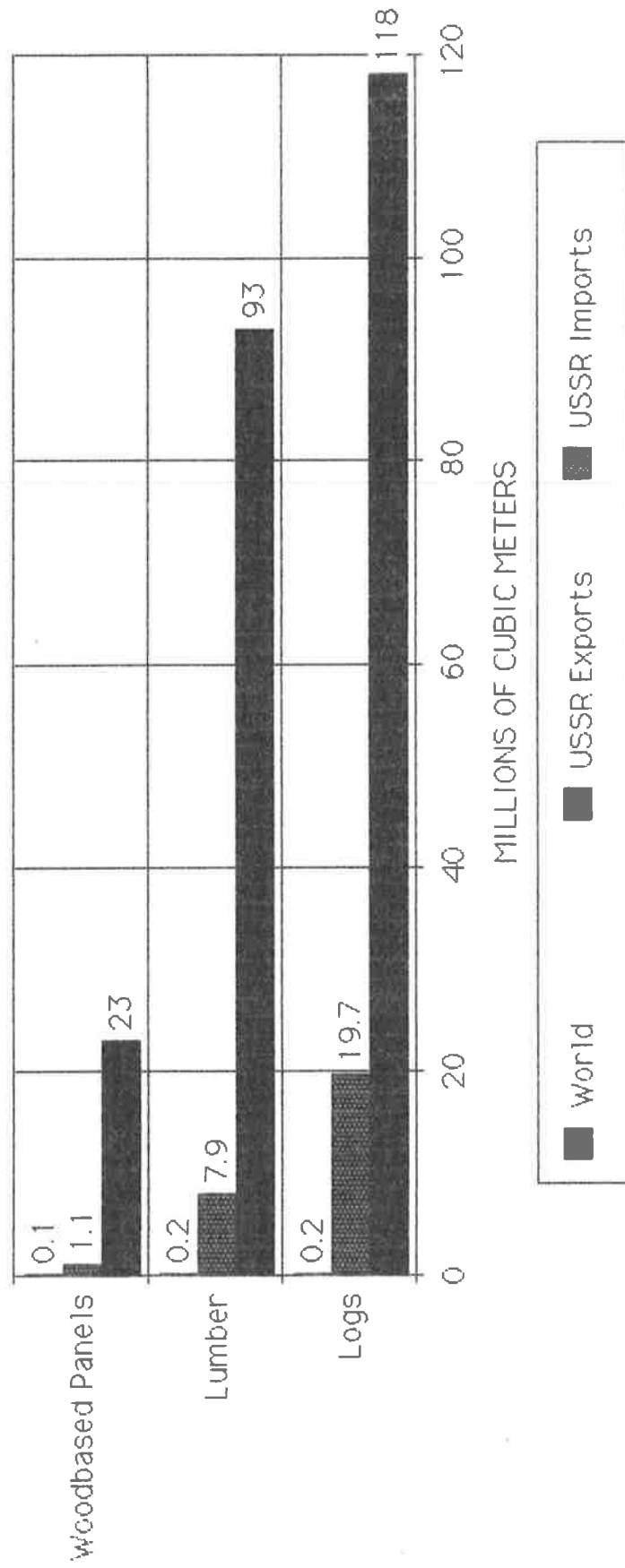
The Soviet Union has been a net exporter of a small fraction of its forest product output, generally no more than ten percent of the production of any one forest product. For 1987, net exports varied from 7 percent for roundwood and paper to 8 percent for pulp and wood based panels. Figures 4.15 through 4.19 show imports, exports, production, and apparent consumption for a variety of forest products for selected years between 1977 and 1987.

FIGURE 4-12 * SOVIET EXPORTS AND IMPORTS AS A PERCENT OF
 WORLD TRADE IN PAPER AND PAPERBOARD, PULP,
 WOOD BASED PANELS, LUMBER, AND LOGS
 1987



SOURCE: FAO Forest Products Annula Year Book for 1987

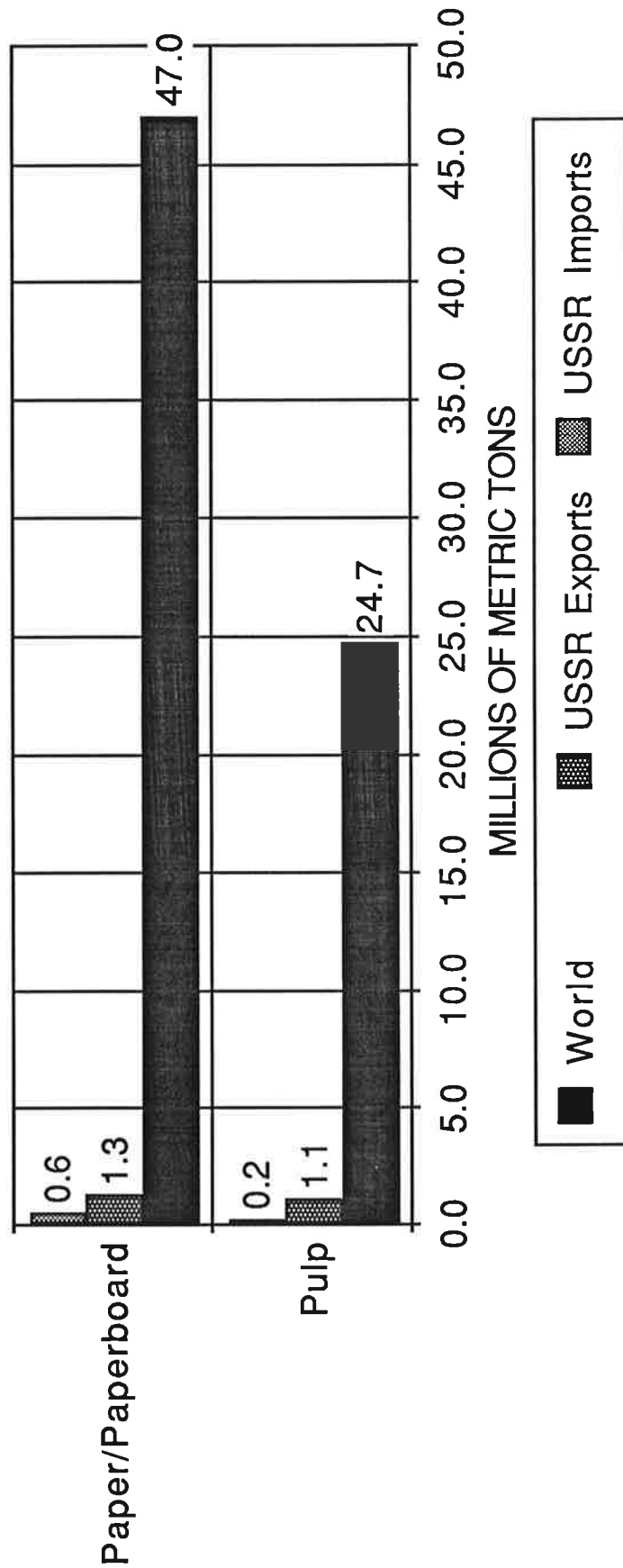
FIGURE 4-13 * USSR EXPORTS AND IMPORTS, AND AVERAGE OF
 WORLD EXPORTS AND IMPORTS, WOODBASED PANELS, LUMBER,
 AND LOGS
 1987



Revised: July 26/90

SOURCE: FAO Forest Products Annual Year Book for 1987

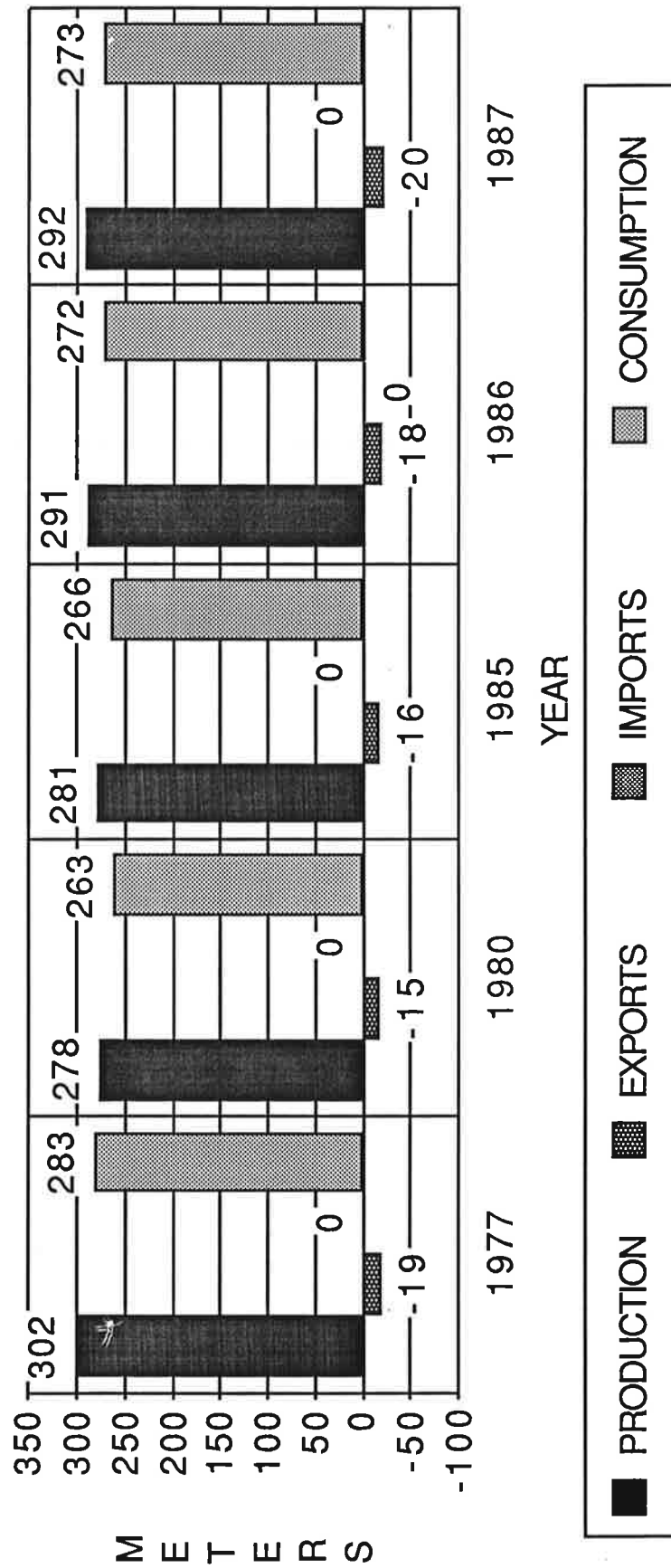
FIGURE 4-14 * USSR EXPORTS AND IMPORTS, AND AVERAGE OF
 WORLD EXPORTS AND IMPORTS, OF PULP, AND
 PAPER AND PAPERBOARD
 1987



SOURCE: FAO Forest Products Annu Year Book for 1987

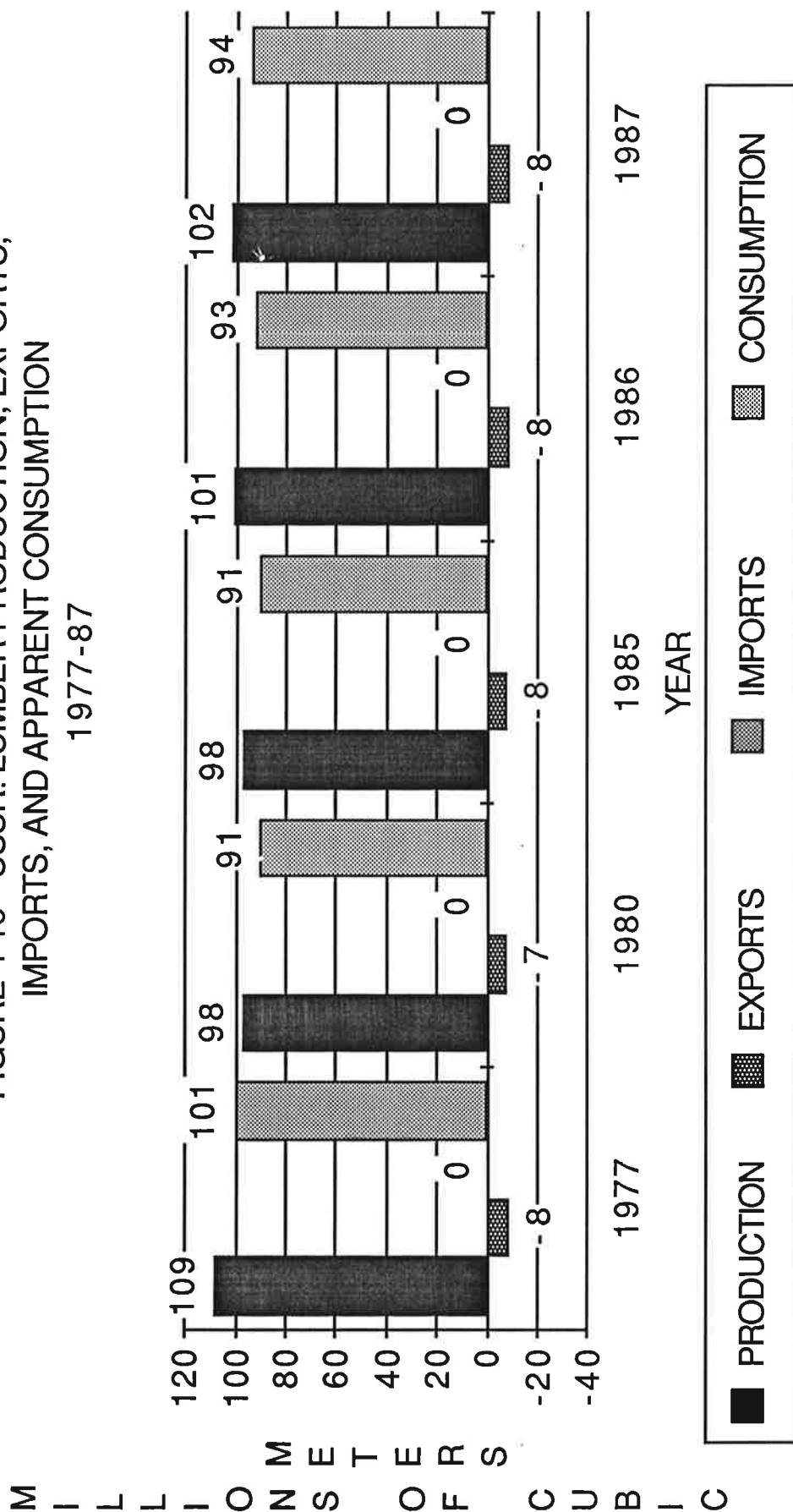
FIGURE 4-15 * USSR: INDUSTRIAL ROUNDWOOD PRODUCTION, EXPORTS,
IMPORTS, AND APPARENT CONSUMPTION
1977-87

M I L L I O N S O F C U B I C



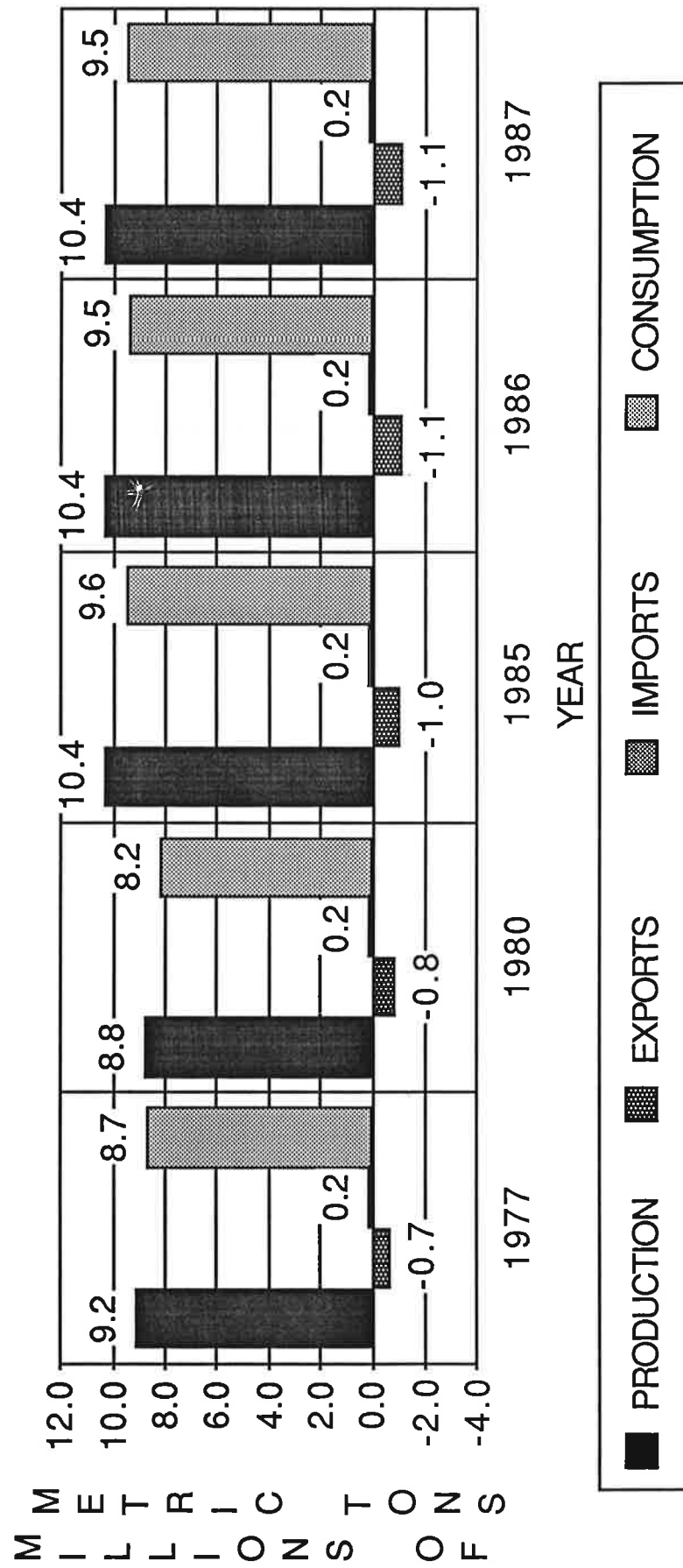
SOURCE: FAO Forest Products Annual Yearbook for 1987

FIGURE 4-16 * USSR: LUMBER PRODUCTION, EXPORTS,
IMPORTS, AND APPARENT CONSUMPTION
1977-87



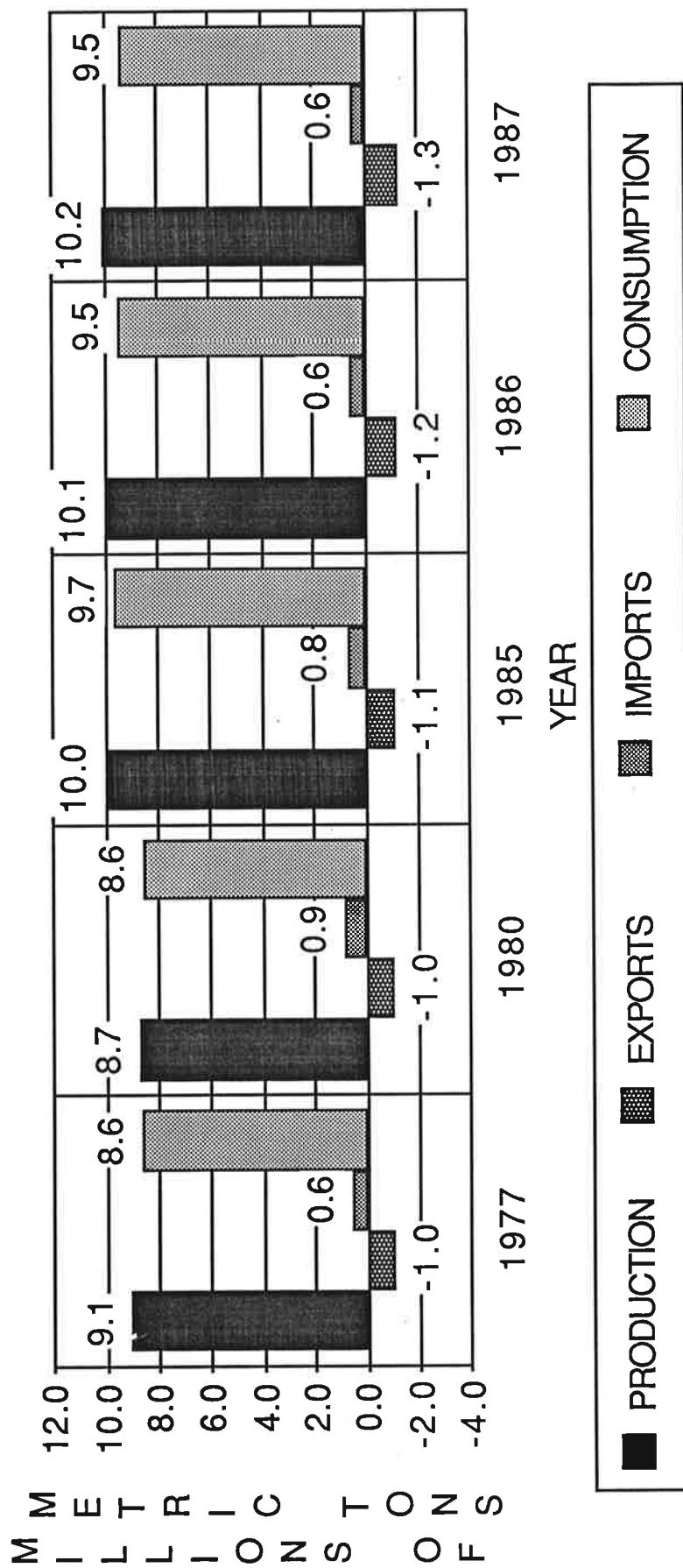
SOURCE: FAO Forest Products Annual Yearbook for 1987

FIGURE 4-17 * USSR: TOTAL PULP PRODUCTION, EXPORTS,
IMPORTS, AND APPARENT CONSUMPTION
1977-87



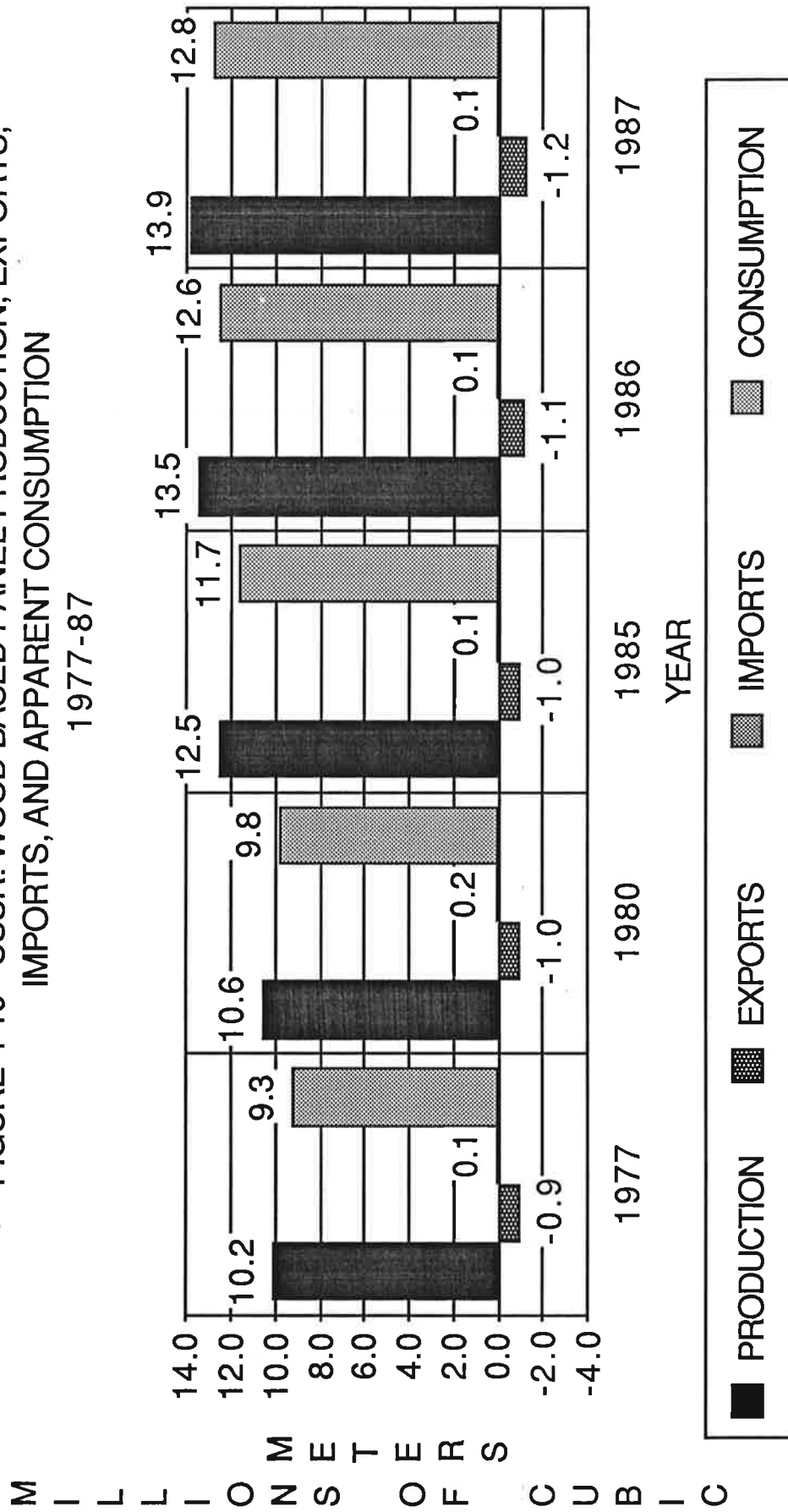
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-18 * USSR: PAPER AND PAPERBOARD PRODUCTION, EXPORTS,
IMPORTS, AND APPARENT CONSUMPTION
1977-87



SOURCE: FAO Forest Products Annual Yearbook for 1987

FIGURE 4-19 * USSR: WOOD BASED PANEL PRODUCTION, EXPORTS,
IMPORTS, AND APPARENT CONSUMPTION
1977-87



SOURCE: FAO Forest Products Annual Yearbook for 1987

Exports

Total forest products exports by the Soviet Union increased from 33 billion roubles in 1977 to 68 billion roubles in 1987, a 106 percent increase. At the same time, exports of forest products increased from 1.8 billion rouble to 2.3 billion roubles.⁹ This represented an increase of only 29 percent. Forest product exports contributed only 3 percent of total exports in 1987, down from 5 percent in 1977.

Forestry equipment, as a component of the forest product trade, is insignificant and represents less than two percent of the total forest products exports.

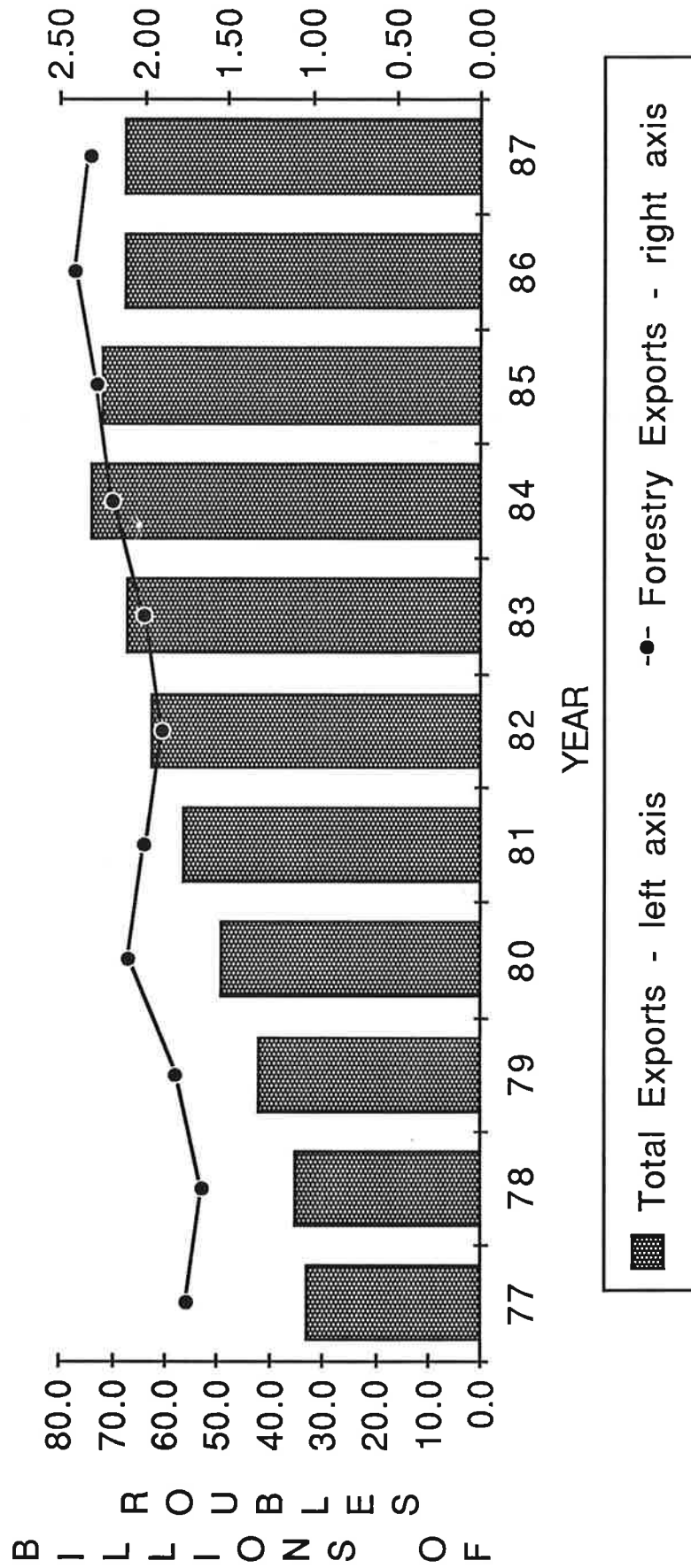
Figure 4.20 shows the proportion of forest product exports to total exports. Figure 4.21 shows the component contribution of forestry equipment to total forest product exports.

Imports

At the same time, total imports of the Soviet Union increased from 30 billion roubles to 61 billion rouble. This represented an increase of 102 percent. Forest product imports increased from 780 thousand roubles to 1.05 million roubles, an increase of only 35 percent. The share of total imports represented by forest products was two percent in both 1977 and 1987.

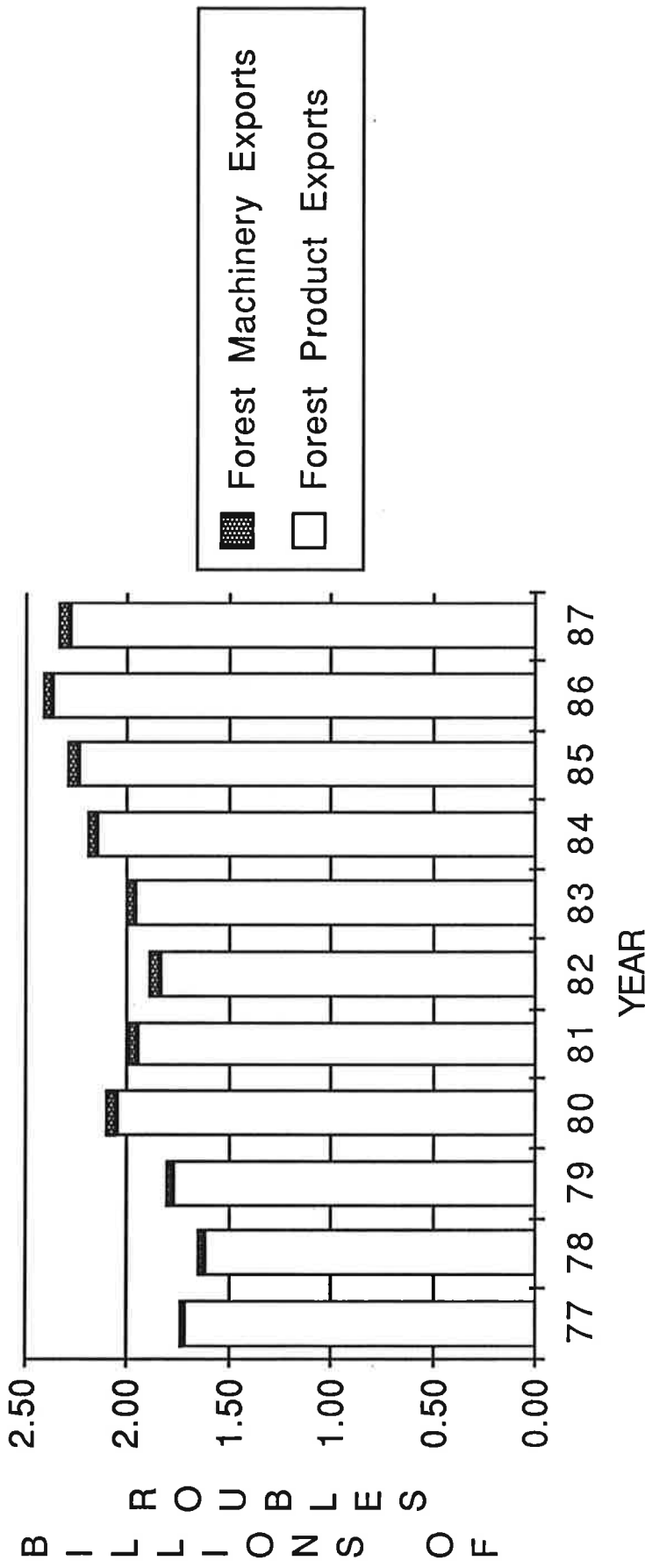
While the contribution of forestry equipment to the total forest product trade exports has been insignificant, it represented a sizable proportion of forest product imports, varying from 15 to 33 percent of total forest product imports

FIGURE 4-20 * USSR: TOTAL EXPORTS AND FORESTRY EXPORTS
 (PRODUCTS PLUS MANUFACTURING MACHINERY)
 1977-87



SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-21 * USSR: FORESTRY EXPORTS BY PRODUCT
AND MANUFACTURING MACHINERY
1977-87



SOURCE: Vneshnyaya Torgovlya, various years

between 1977 and 1987.

Figure 4.22 shows the proportion of forest product trade to total trade. Figure 4.23 shows the component contribution of equipment to total forest product imports.

Forest Products Trade Turnover

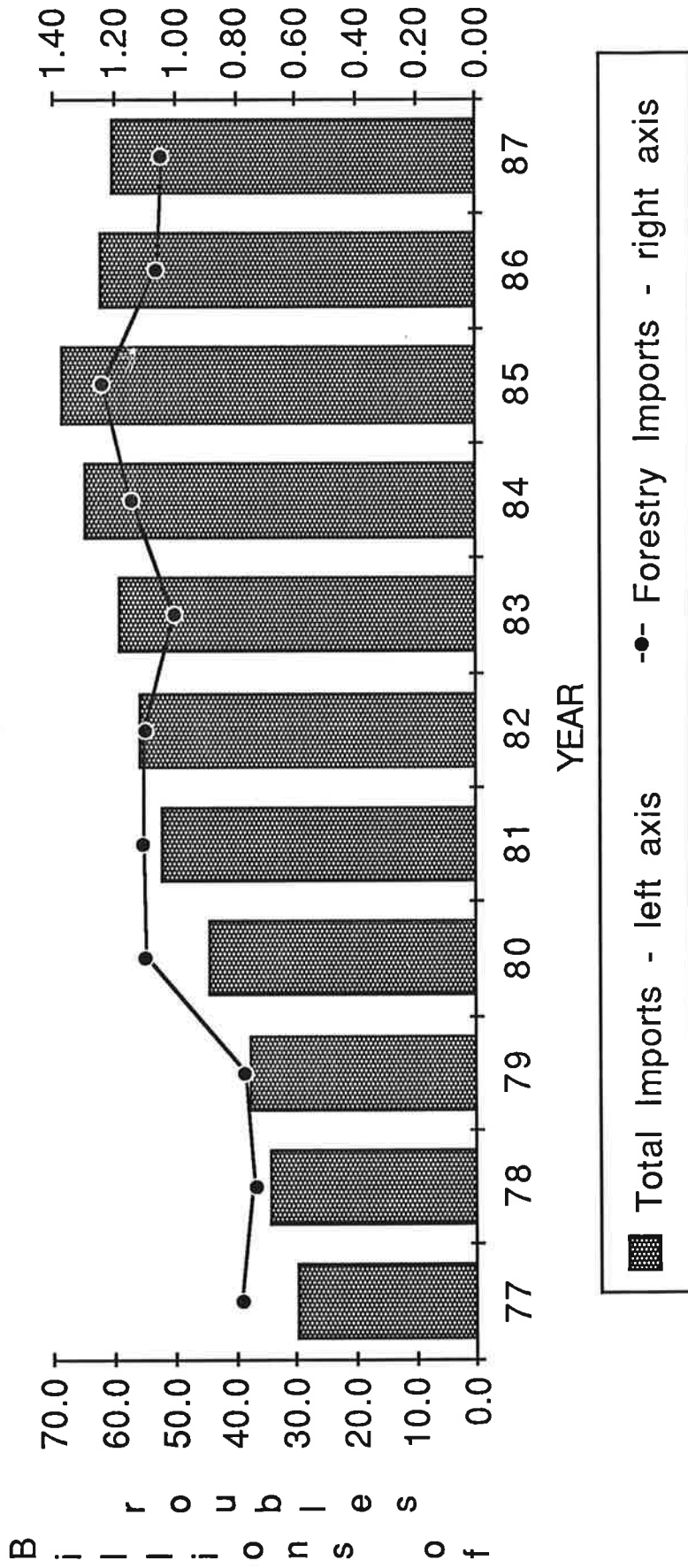
Forest products exports have consistently exceeded forest product imports by factors varying from a low of 1.8 in 1981 to a high of 2.4 in 1979. In 1987, this ratio was 2.3. Figure 4.24 shows distribution of forest products imports and exports for the period 1977 to 1987.

Hard Currency Forest Products Trade

When examining foreign trade turnover in terms of hard currency trade¹⁰ the picture is decidedly different. Foreign trade is much more balanced when viewed on a hard currency basis than when it is considered in terms of total forest products trade. Between 1977 and 1987, hard currency imports averaged about 5 times the level of soft currency imports. Hard currency forest product exports, on the other hand, have recently lagged soft currency exports, averaging about 0.6 the level of soft currency exports from 1982 to 1987.

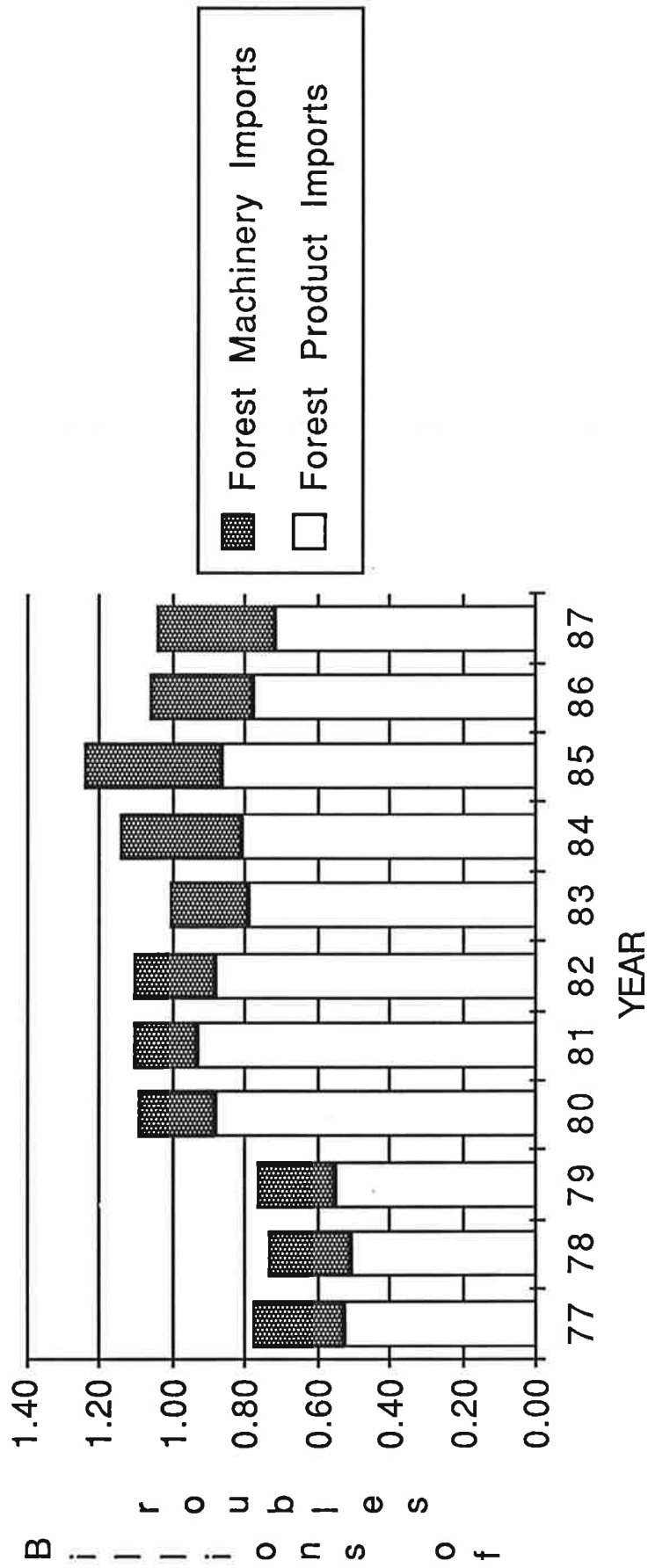
The ratio of hard currency exports to imports has fluctuated from 0.9:1 in 1985 to 1.9:1 in 1979. Figure 4.25 shows the ratios of hard currency forest products imports and exports relative to soft currency trade for the period 1977-87.

FIGURE 4-22 * USSR: TOTAL IMPORTS AND FORESTRY IMPORTS
 (PRODUCTS AND MANUFACTURING MACHINERY)
 1977-87



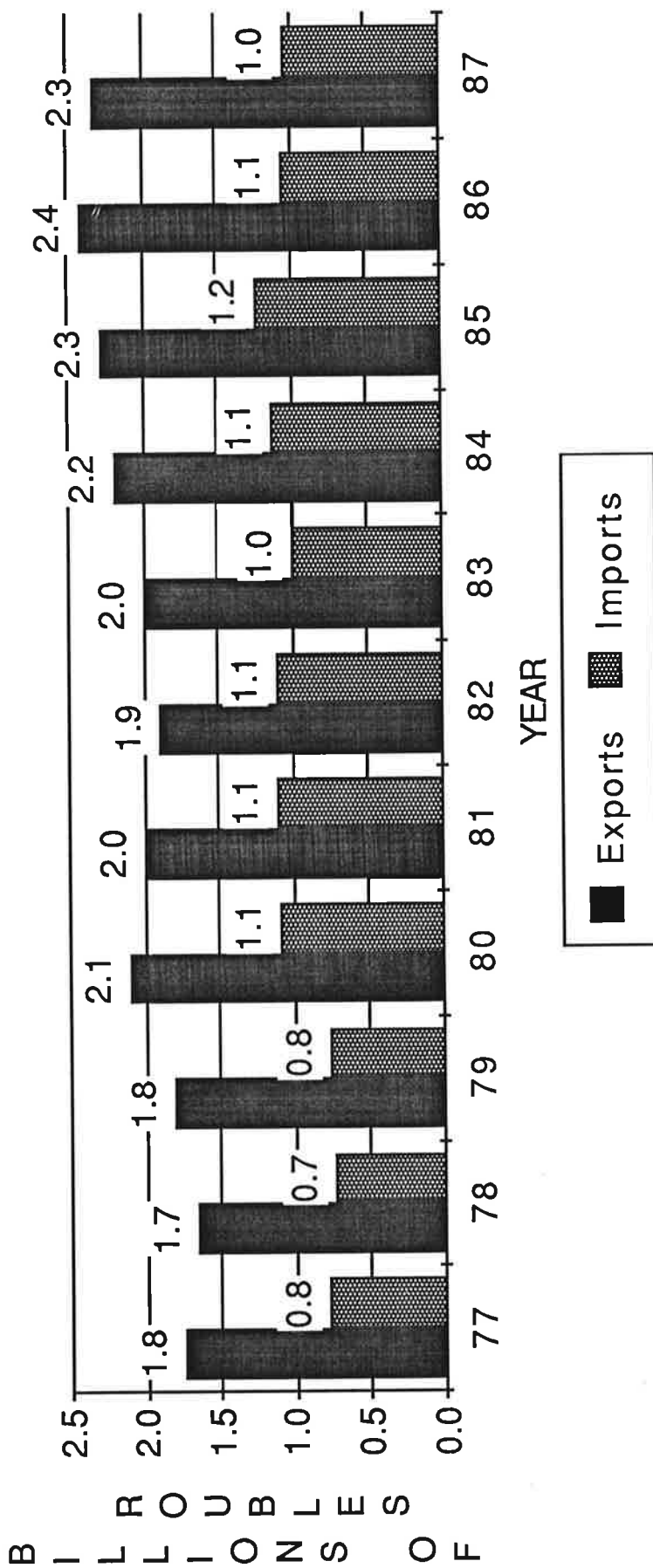
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-23 * USSR: FOREST IMPORTS BY PRODUCT
AND MANUFACTURING MACHINERY
1977-87



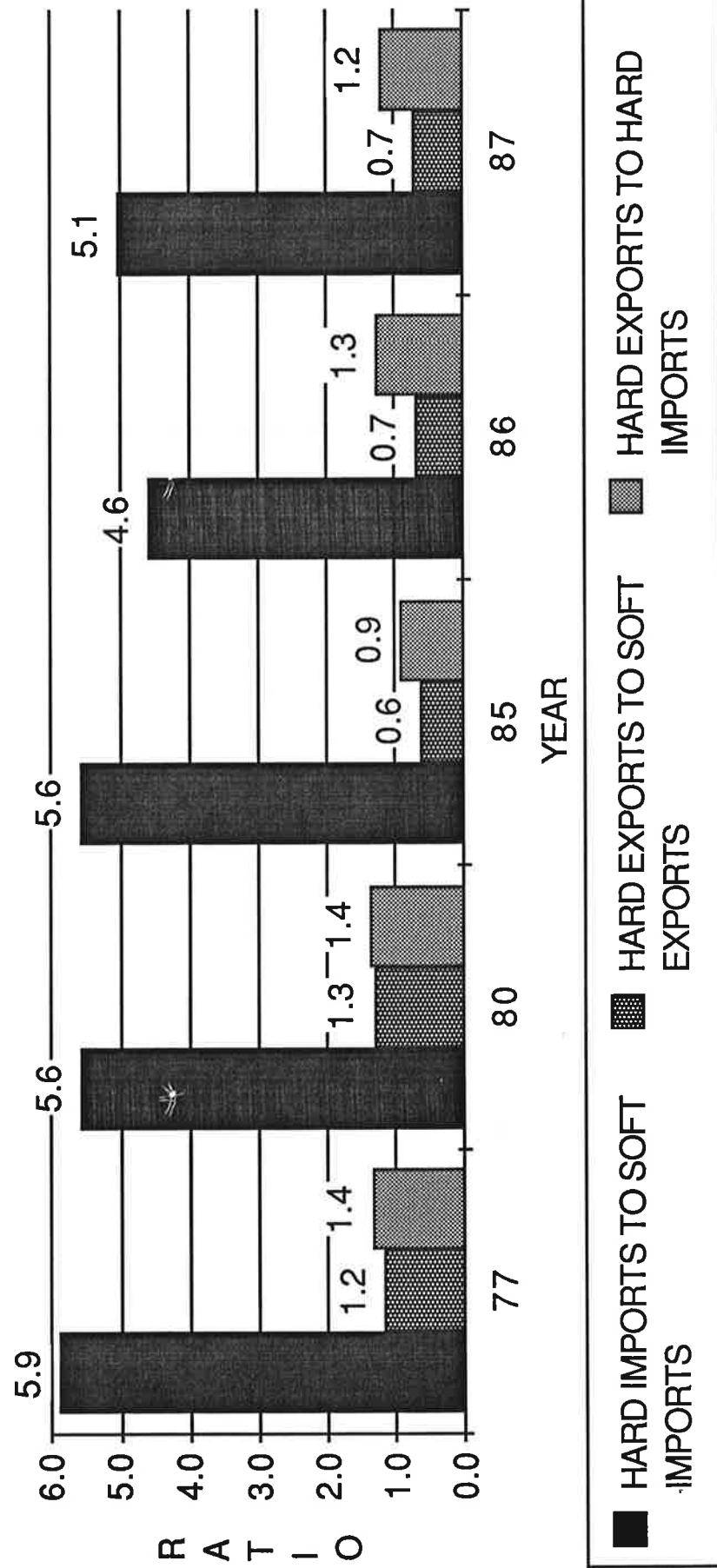
SOURCE: Vneshnyaya Torgovlya

FIGURE 4-24 * USSR: TOTAL FOREST PRODUCT AND FOREST
 PRODUCT MANUFACTURING MACHINERY
 EXPORTS AND IMPORTS
 1977-87



SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-25 * USSR FOREST TRADE: RELATIONSHIPS BETWEEN HARD AND SOFT CURRENCY IMPORTS AND EXPORTS



SOURCE: Vneshnyaya Torgovlya, various years

Forest Products Trade

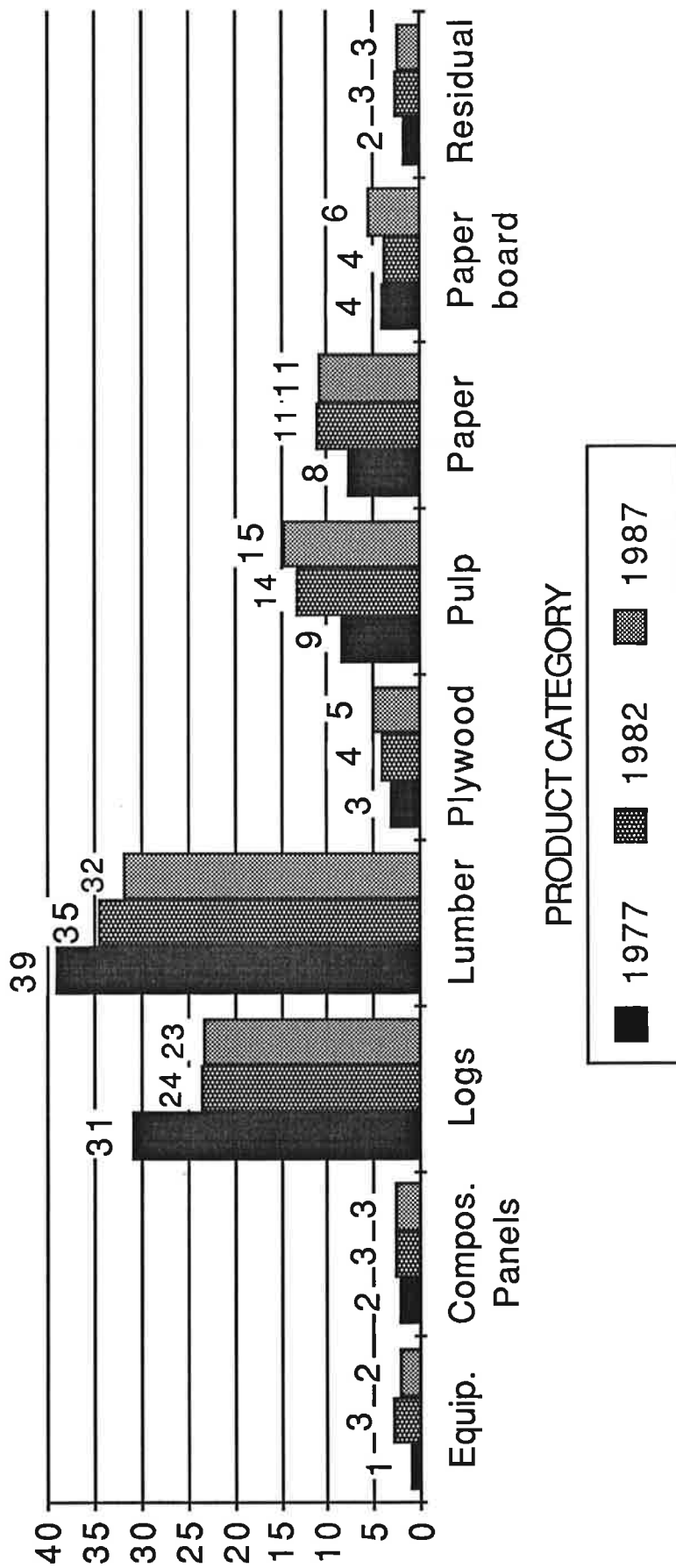
Product Categories

Exports: Figure 4.26 shows the distribution of forest product exports by product category. Exports are characterized by low value added products such as logs and lumber. While the percentage share of these commodities has been declining since 1977 (when they combined represented more than 70 percent of the forest product exports by value), they still represented a major proportion in 1987 (55 percent of total forest product exports).

During the same period, the share of higher value added products has been steadily increasing. Export share of equipment, pulp, paper, and paperboard increased from 20 percent in 1977 to more than 30 percent in 1987.

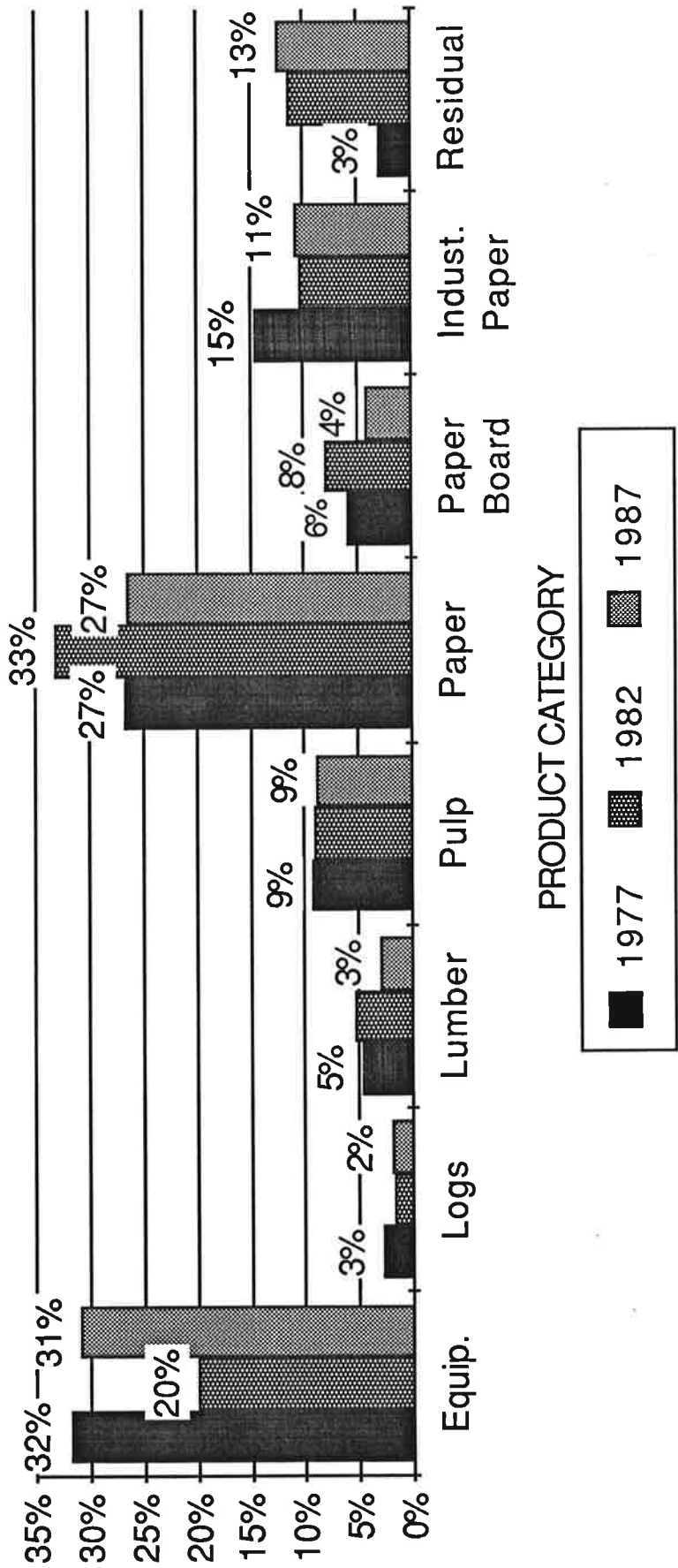
Imports Figure 4.27 shows the distribution of forest product imports by product category. What is striking about imports is the high component of higher value added products in contrast to Soviet forest product exports. The share of higher manufactured products (equipment, pulp, paper, cardboard, and industrial paper) has remained relatively constant between 1977 and 1987. In 1977, these five categories represented 88 percent of import, and 81 percent in 1987. The dichotomy in the structure of trade between exports (commodity oriented) and imports (more sophisticated products and a large component of equipment) of the Soviet forestry sector is apparent.

FIGURE 4-26 * DISTRIBUTION OF USSR FOREST PRODUCT EXPORTS
 BY PRODUCT - PERCENT OF TOTAL ROUBLE VALUE
 1977-87



SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-27 * DISTRIBUTION OF USSR FOREST PRODUCT IMPORTS
 BY PRODUCT - PERCENT OF TOTAL ROUBLE VALUE
 1977-87



SOURCE: Vneshnyaya Torgovlya, various years

Geographic Distribution by Value

Exports: Forest product exports are concentrated in two regions - West Europe and East Europe. These two regions have consistently represented more than 65 percent of the market for Soviet forest product exports. The other significant market areas are Market Asia (Japan) and Planned America (Cuba) which received 8 percent and 6 percent of Soviet forest product exports in 1987.

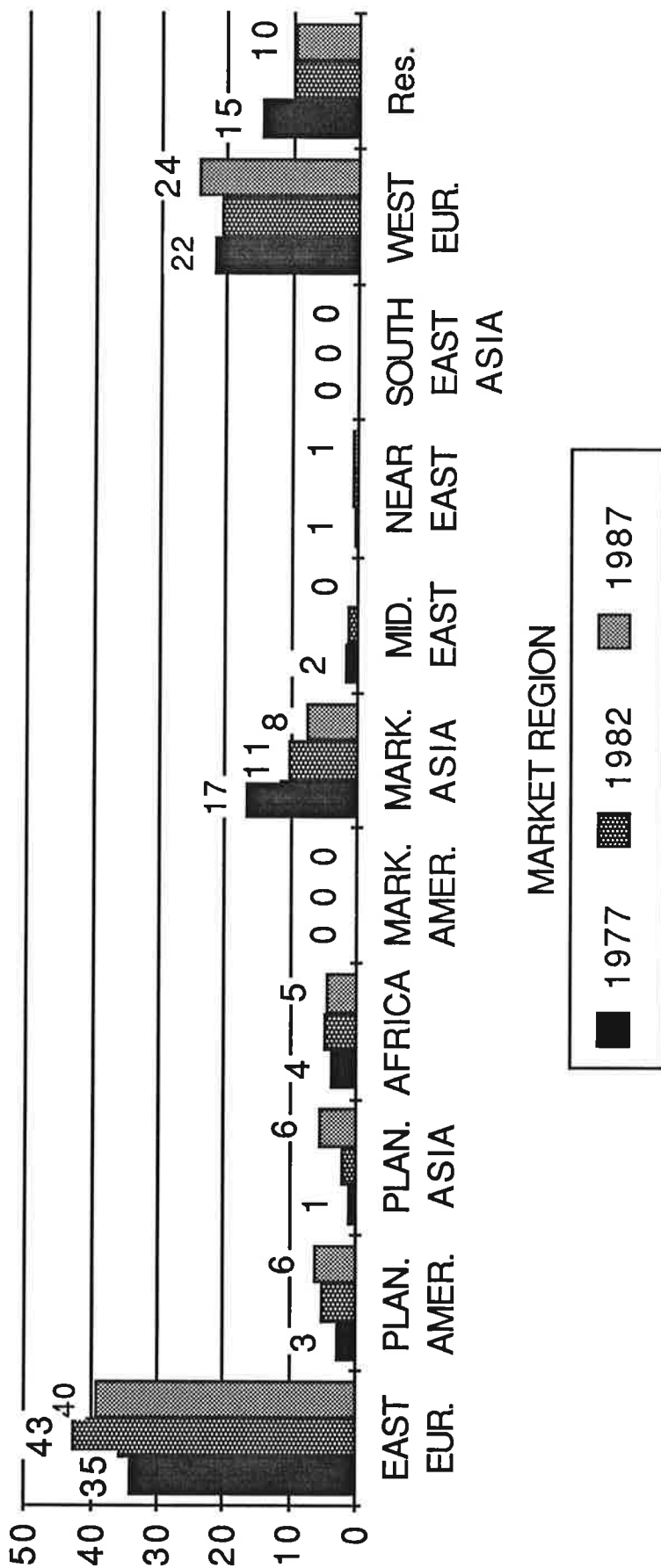
Figure 4.28 shows the distribution of forest products by geographic market region. Within each market, the importance of specific forest products is different. As Figure 4.29 shows, export trade to West Europe is dominated by logs and lumber which together represent more than 70 percent of the value of forest product exports to that region.

East Europe, on the other hand, has a much more balanced pattern of trade in forest products with 43 percent of value trade in logs and lumber and 47 percent in sophisticated products such as pulp, paper, and paperboard. Figure 4.30 shows the distribution of forest products trade to East Europe.

Exports to Planned Asia (China) consists entirely of logs while more than 90 percent of export value to market Asia (Japan) is made up of roundwood, with the balance in lumber.

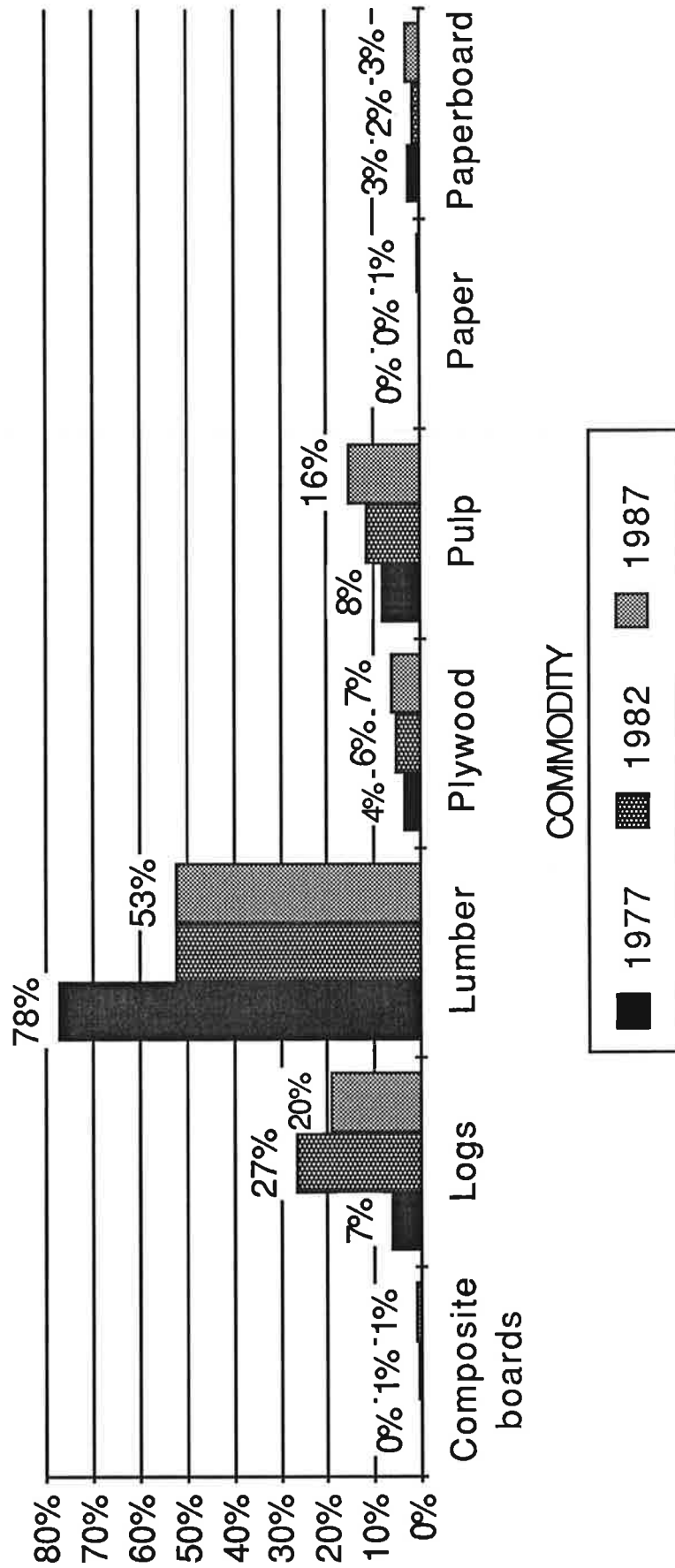
Imports: Soviet imports of forest products (Figure 4.31) originate primarily from West Europe which has consistently supplied more than 60 percent of the total value of Soviet imports of forest products. An additional 12 percent of

FIGURE 4-28 * DISTRIBUTION OF USSR FOREST PRODUCT EXPORTS
 BY MARKET REGION - PERCENT OF TOTAL ROUBLE VALUE
 1977-87



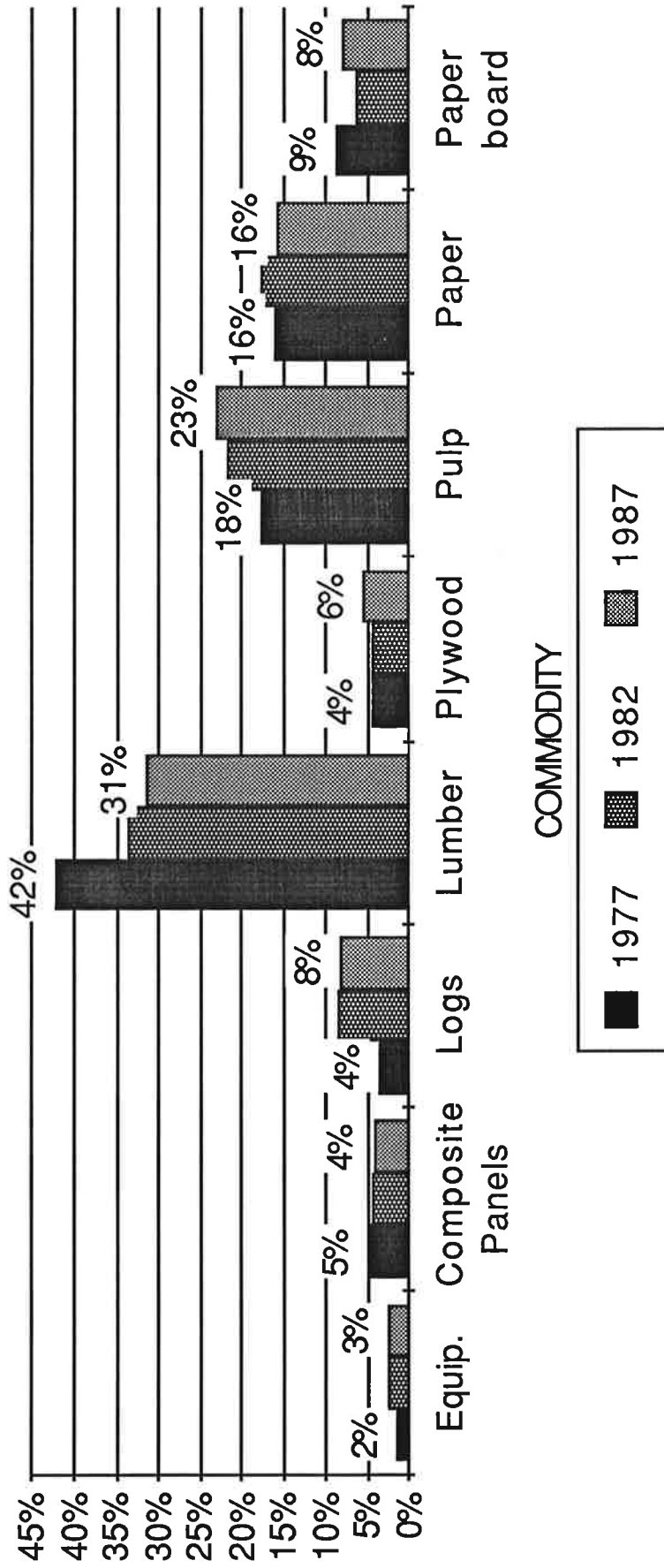
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-29 * USSR: FOREST PRODUCT EXPORTS TO WEST EUROPE
 BY PRODUCT - PERCENT OF TOTAL ROUBLE VALUE
 1977-87



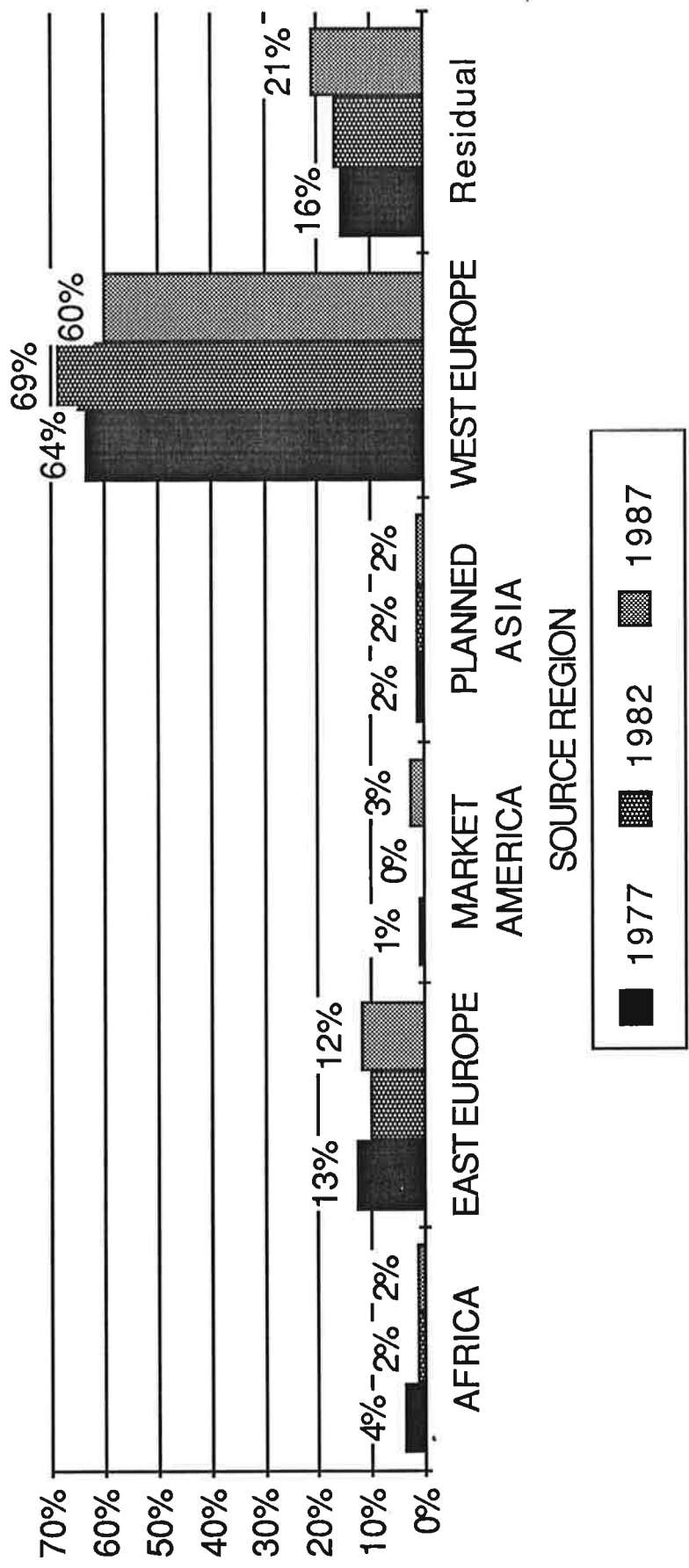
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-30 * USSR: FOREST PRODUCT EXPORTS TO EAST EUROPE
 BY PRODUCT - PERCENT OF TOTAL ROUBLE VALUE
 1977-87



SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-31 * USSR: FOREST PRODUCT IMPORTS
 BY REGIONAL SOURCE - PERCENT OF TOTAL ROUBLE VALUE
 1977-87



SOURCE: Vneshnyaya Torgovlya, various years

imports originate from East Europe.

As Figures 4.32 and 4.33 show, imports of forest products from both regions are predominantly higher value-added products. A significant portion of the imports from East Europe has been lumber. The proportion has declined in recent years however, and in 1987 lumber represented only 16 percent of the value total.

Turnover: The trade balance in each of the two major regions (West Europe and East Europe) shows an interesting contrast. Whereas the trade in forest products is very much in the Soviet Union's favor in East Europe, it is marginally in favor of West Europe for hard currency trade. Figure 4.34 and Figure 4.35 show forest products imports and exports for West Europe and East Europe.

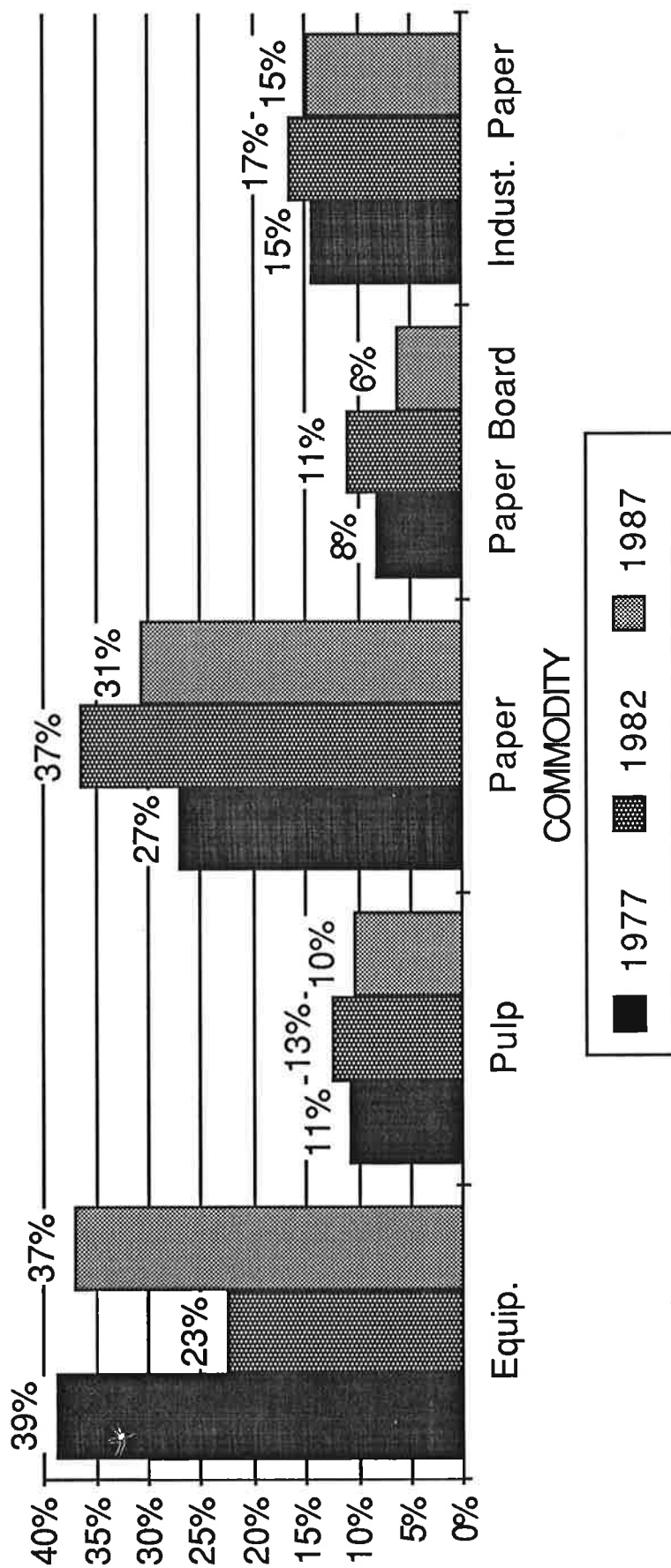
Product Export by Volume

Roundwood: The Soviet Union exports eight different grades of roundwood logs. The major categories are sawlogs and pulp logs which together have represented more than 80 percent of roundwood export from the Soviet Union. Table 4.5 shows the distribution of roundwood exports from the Soviet Union by log grade for the period 1977 to 1987.

Exports of roundwood from the Soviet Union has fluctuated widely during this 11 year period, reaching a nadir in 1982 of 13 million cubic meters and a maximum of 19 million in 1987.

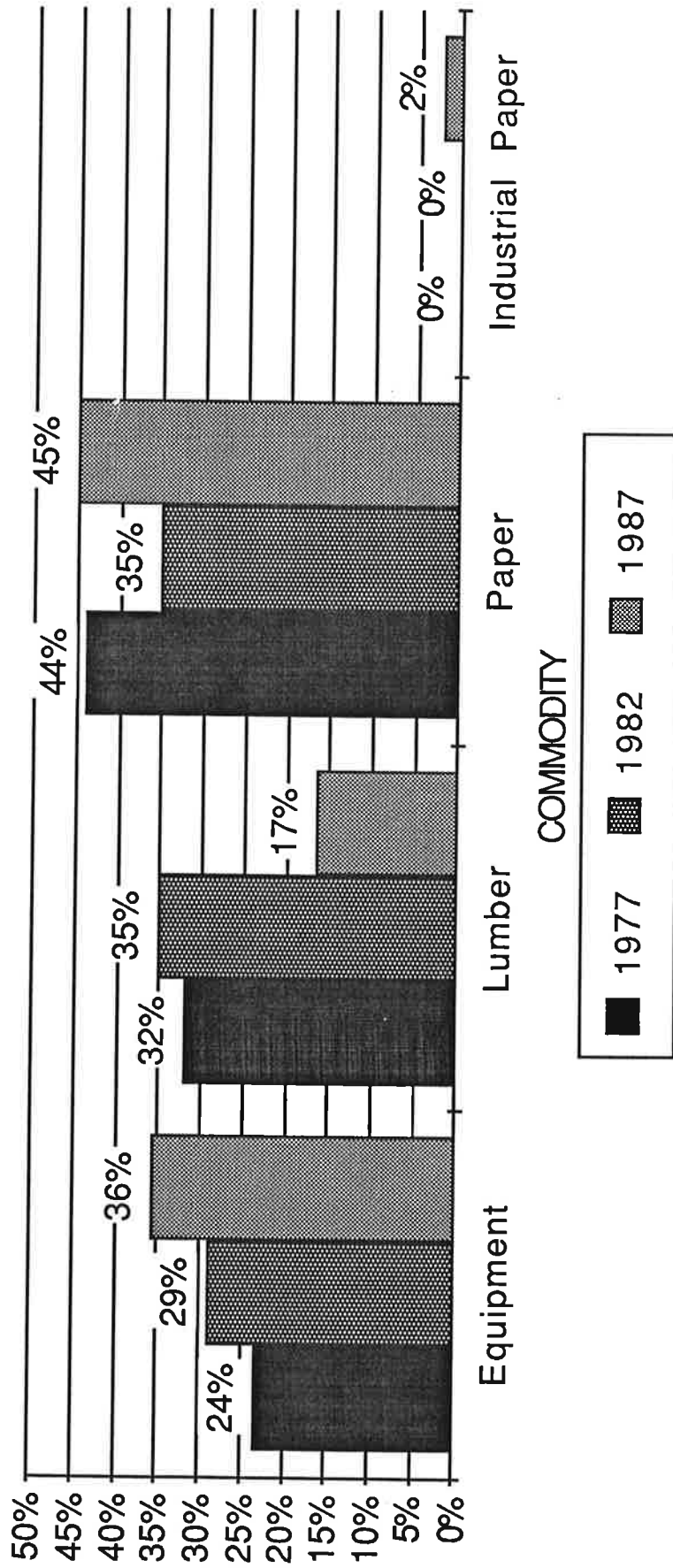
Sawlogs: The Soviet Union is a major exporter of sawlogs to world markets. It consistently contributed between 9 and 15 percent of the exports between 1977 and 1987, and has been

FIGURE 4-32 * USSR: FOREST PRODUCT IMPORTS FROM WEST EUROPE
 BY PRODUCT - PERCENT OF TOTAL ROUBLE VALUE
 1977-87



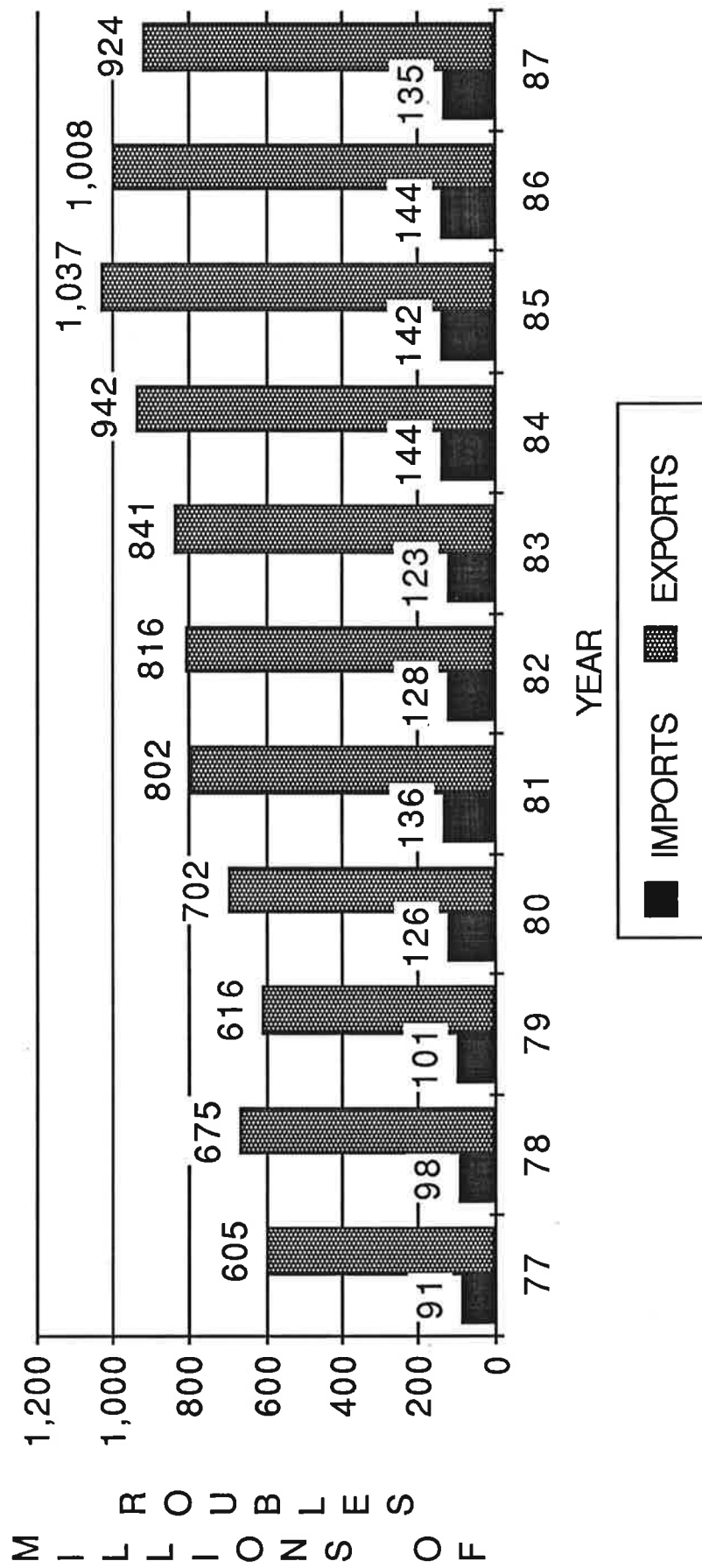
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-33 * USSR: FOREST PRODUCT IMPORTS FROM EAST EUROPE
 BY PRODUCT - PERCENT OF TOTAL ROUBLE VALUE
 1977-87



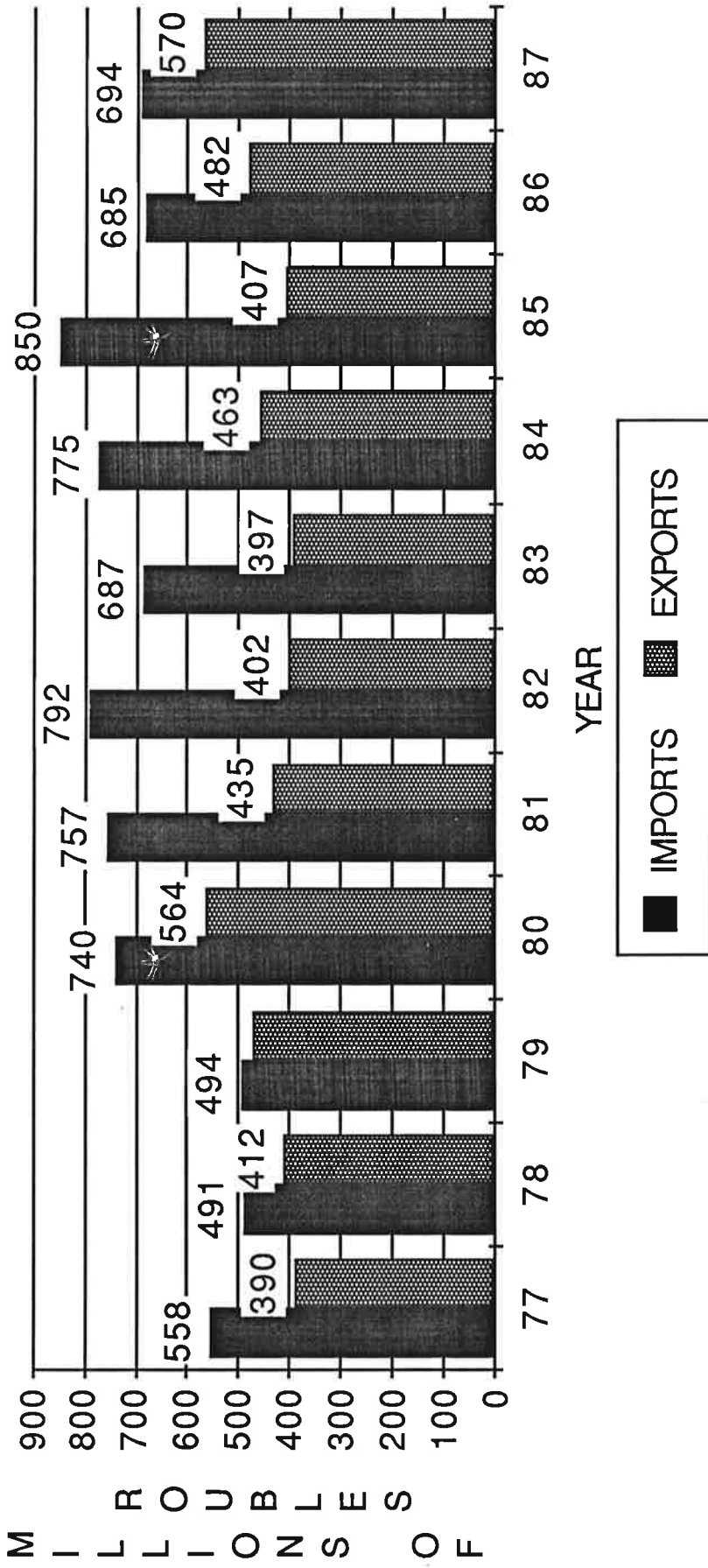
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-34 * USSR: FOREST PRODUCTS TRADE WITH EAST EUROPE
1977-87



SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-35 * USSR: FOREST PRODUCTS TRADE WITH WEST EUROPE
1977-87



SOURCE: Vneshnyaya Torgovlya, various years

TABLE 4-5: USSR EXPORTS OF ROUND LOGS BY GRADE ASSORTMENT - Volume (m3)

Product Code	1977-87										
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
SAW LOG	9,360,575	9,401,597	7,729,527	6,513,794	6,197,610	6,182,829	6,867,222	7,670,000	7,743,000	9,243,000	9,011,000
STAND, MINE (PROFS)	790,879	703,541	455,031	617,762	669,319	540,056	678,950	538,000	530,000	630,000	552,000
BALANCES (PULP LOG)	6,560,468	6,018,728	5,982,253	5,736,365	5,831,802	5,377,017	6,318,881	6,677,000	6,425,000	7,337,000	8,776,000
TIMBER FOR BUILDING	561,479	605,443	611,552	552,081	566,626	629,277	703,686	179,000	169,000	194,000	203,000
ROUND TIMBER, THIN	162,780	207,676	141,624	198,725	122,814	119,739	146,100	170,000	250,000	395,000	162,000
TIMBER, HYDROTECHNICAL	12,600	15,500	11,400	4,900	8,700	3,000	1,200				
RAW MATERIAL FOR MATCHES (BLOCK-LOGS, ASPEN)	51,084	49,300	53,560	41,500	38,391	32,100	51,200	47,500	38,500	44,400	45,500
TIMBER FOR PLYWOOD	22,692	21,200	21,089	26,200	32,227	24,500	20,500	20,000	19,500	21,600	28,101
TOTAL ROUNDWOOD EXPORTS BY GRADE OF LOG EXPORTED	17,522,557	17,022,985	15,006,036	13,691,327	13,467,489	12,908,518	14,787,741	15,301,500	15,175,000	17,865,000	18,777,601
UNACCOUNTED FOR IN VNESHNIYAYA TORGOVLYA	279,443	337,015	218,964	241,673	829,511	244,482	319,259	205,500	256,000	283,000	567,399
TOTAL USSR ROUNDWOOD EXPORTED	17,802,000	17,360,000	15,225,000	13,933,000	14,297,000	13,153,000	15,107,000	15,507,000	15,431,000	18,148,000	19,345,000

Source: Vneshnyaya Torgovlya, 1977 to 1987 g.

second in importance to the United States which supplied 27 percent of the export market. Figures 4.36 and 4.37 show the share of world sawlog exports supplied by the Soviet Union and a comparison of the Soviet exports to total world exports on a volume basis.

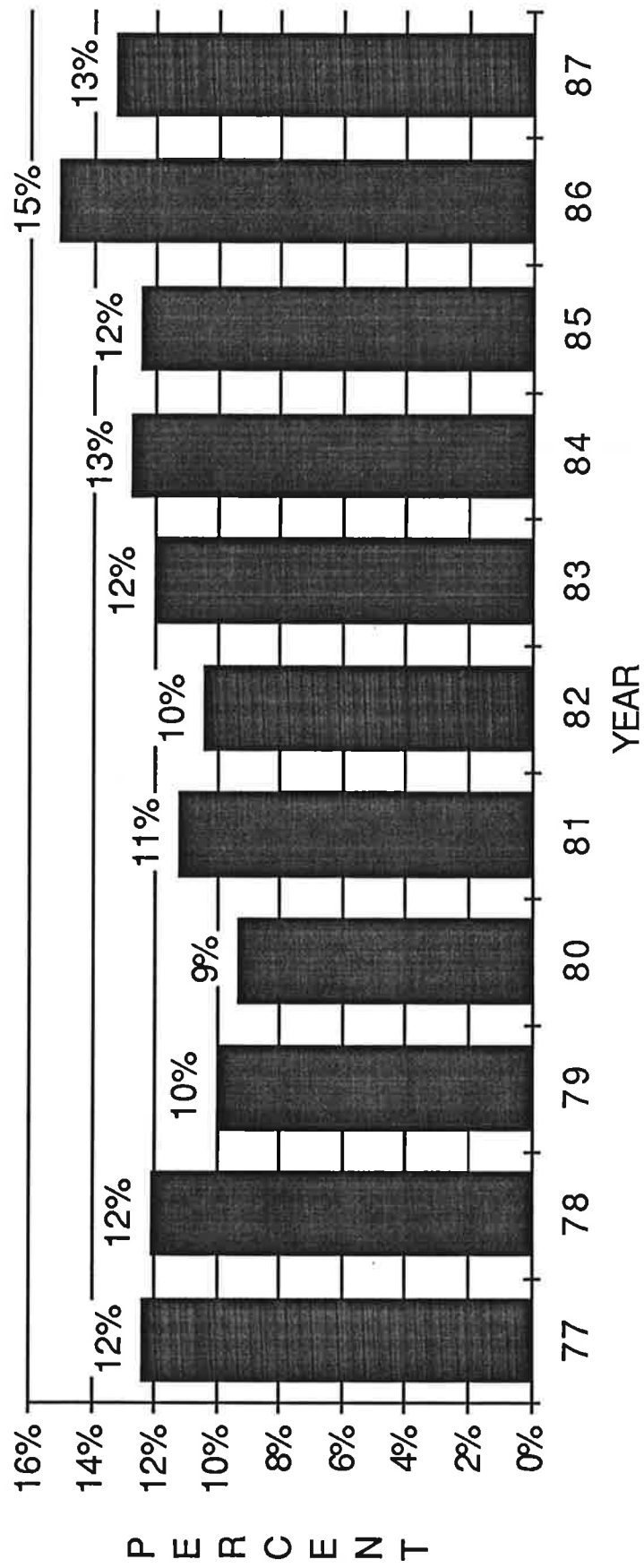
Soviet sawlog exports have fluctuated widely between 1977 and 1987. From a high of 9.3 million cubic meters in 1977, exports sank to a low of 6.2 million cubic meters in 1981, before rebounding to 9.0 million cubic meters in 1987. Exports as a share of domestic production has never exceeded 6 percent. Figures 4.38 and 4.39 show Soviet exports as a share of domestic production and contrast domestic production to export volume for the period 1977 to 1987.

The major market region for Soviet sawlogs was Market Asia (Japan) which imported 57 percent of Soviet exports in 1987. The next most significant market was the Planned Asia market (China) which accounted for 26 percent of the Soviet exports. Small amounts were exported to West Europe (principally Finland and Sweden), and to East Europe where the primary markets were Hungary and Bulgaria.

In 1987, Soviet exports to Japan represented 29 percent of Japan's total conifer sawlog imports while exports to China were 42 percent of their total conifer sawlog imports. On the other hand, exports to Finland represented 100 percent of Finnish conifer sawlog imports while exports to Sweden represented 46 percent of Swedish conifer sawlog imports.

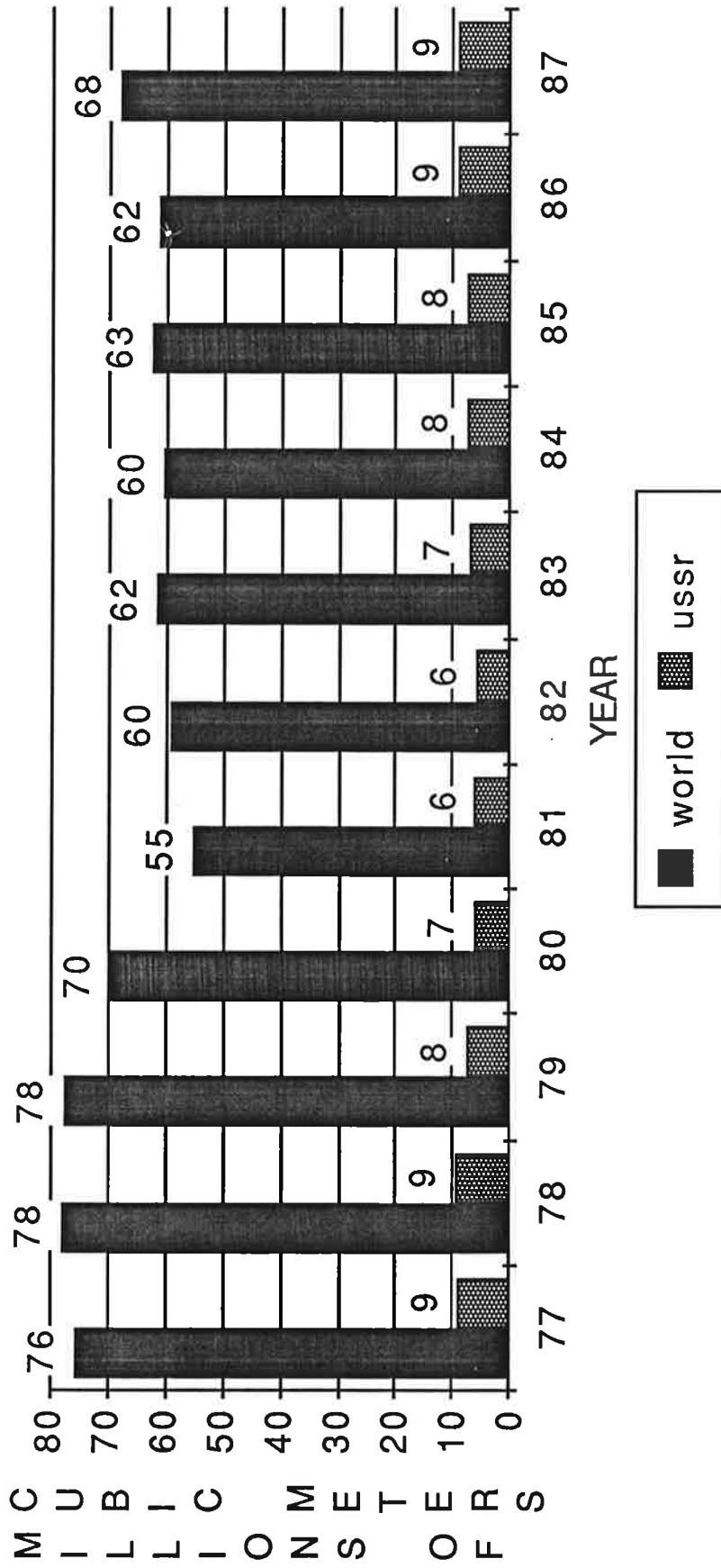
The significant change in Soviet export of sawlogs over

FIGURE 4-36 * USSR: SHARE OF WORLD
SAWLOG EXPORTS
1977-87



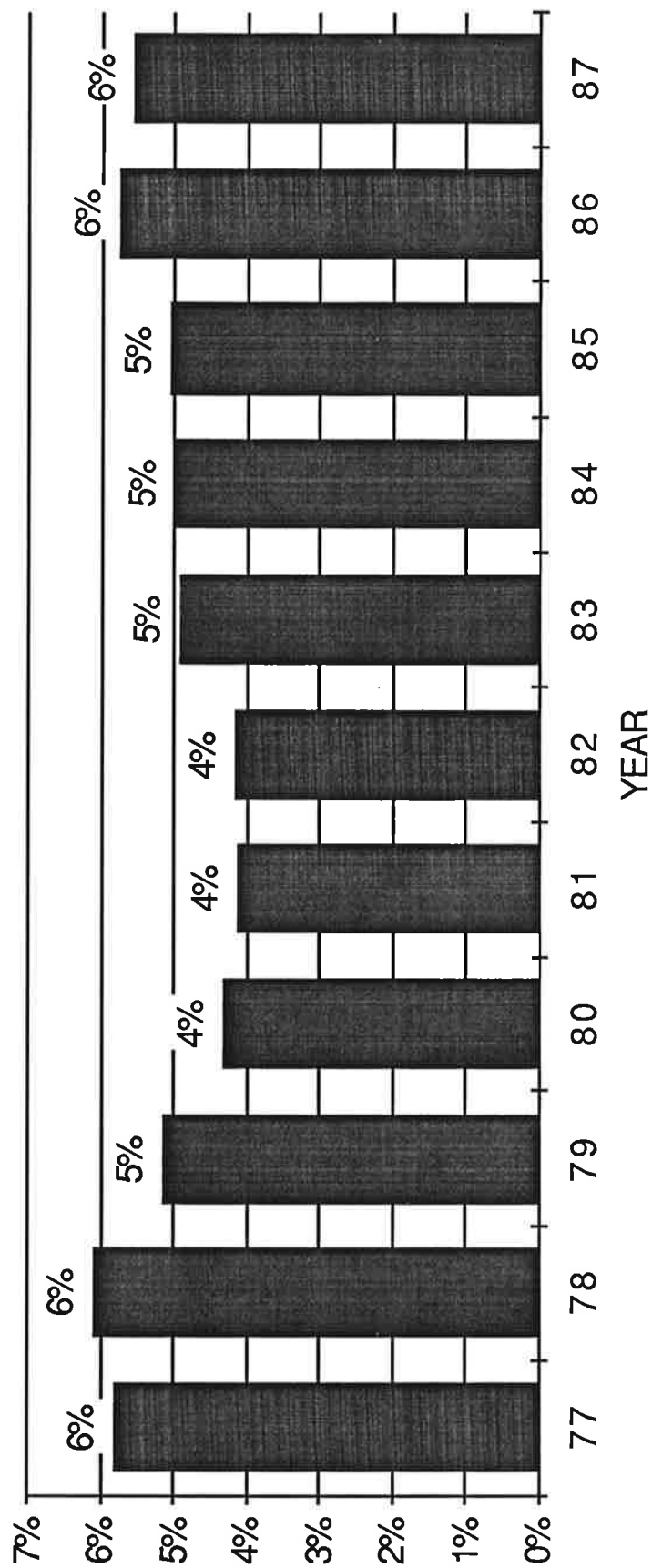
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-37 * WORLD AND USSR EXPORTS OF SAWLOGS
 CONIFER AND HARDWOOD, 1977-87



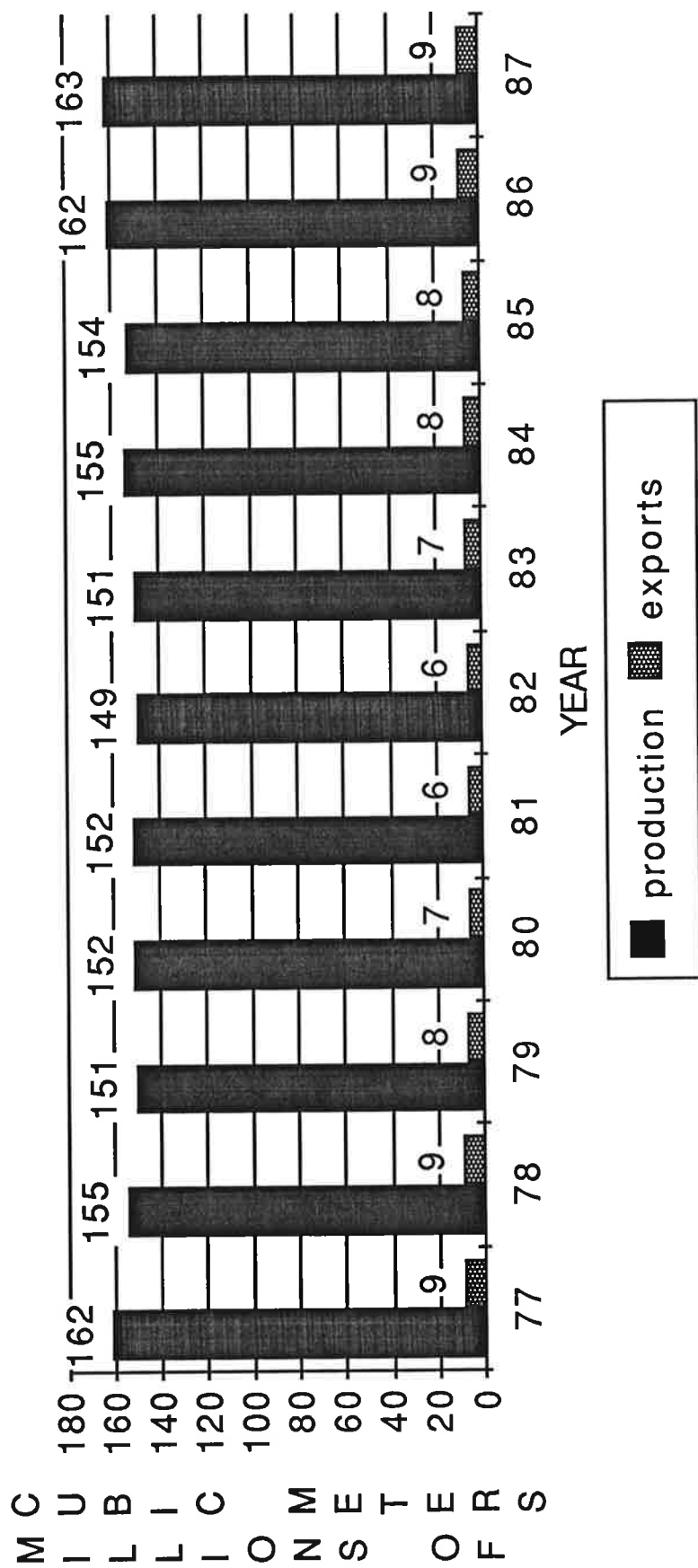
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-38 * USSR: SHARE OF DOMESTIC
SAWLOG PRODUCTION EXPORTED
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-39 * USSR EXPORTS AND DOMESTIC PRODUCTION OF SAWLOGS (CONIFER AND HARDWOOD) 1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

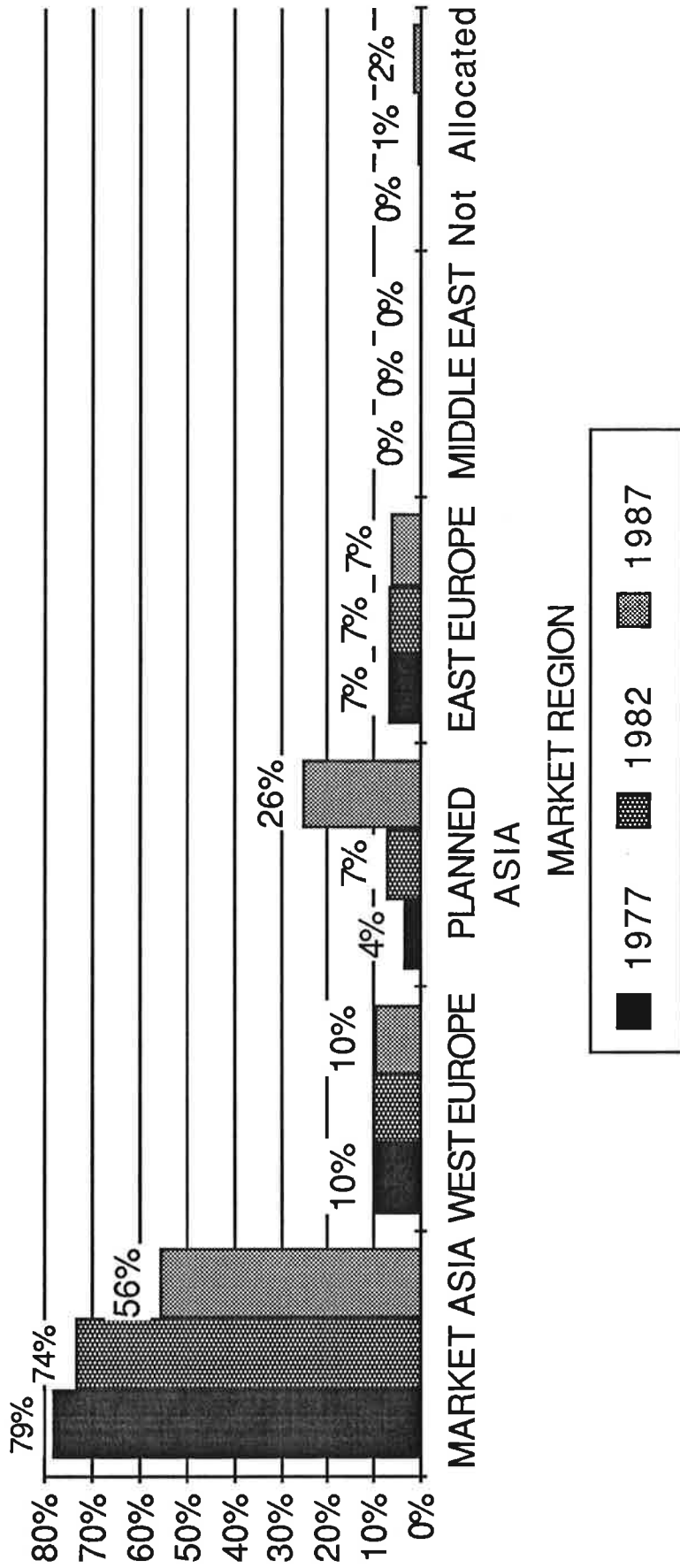
this period has been a shift away from a predominance of Japan to a significant position in the Chinese market. Rapid penetration of the Chinese market occurred in 1984 when the China share of total Soviet exports increased from 9 percent to 23 percent. Concomitant with this was a decline in export sales to Japan, from 74 percent to 59 percent of total Soviet exports. Figure 4.40 shows percentage distribution of sawlog sales by region. Figure 4.41 shows volume distribution.

Pulp Logs: The Soviet Union is the leading exporter of pulplogs to world markets. It consistently contributed between 30 and 39 percent of the exports between 1977 and 1987. France has been a distant second in importance, capturing 13 percent of the market in 1987. Figures 4.42 and 4.43 show the share of world pulp log exports supplied by the Soviet Union and a comparison of the Soviet exports to total world exports on a volume basis.

Exports of pulp logs fluctuated between 1977 and 1987. From a volume of 6.6 million cubic meters in 1977, export sales reached 8.7 million cubic meters in 1987. The trough was reached in 1982 when exports of pulpwood were 5.4 million cubic meters. Exports as a share of domestic production has never exceeded 24 percent. Figures 4.44 and 4.45 show Soviet exports as a share of domestic production and contrast domestic production to export volume for the period 1977 to 1987.

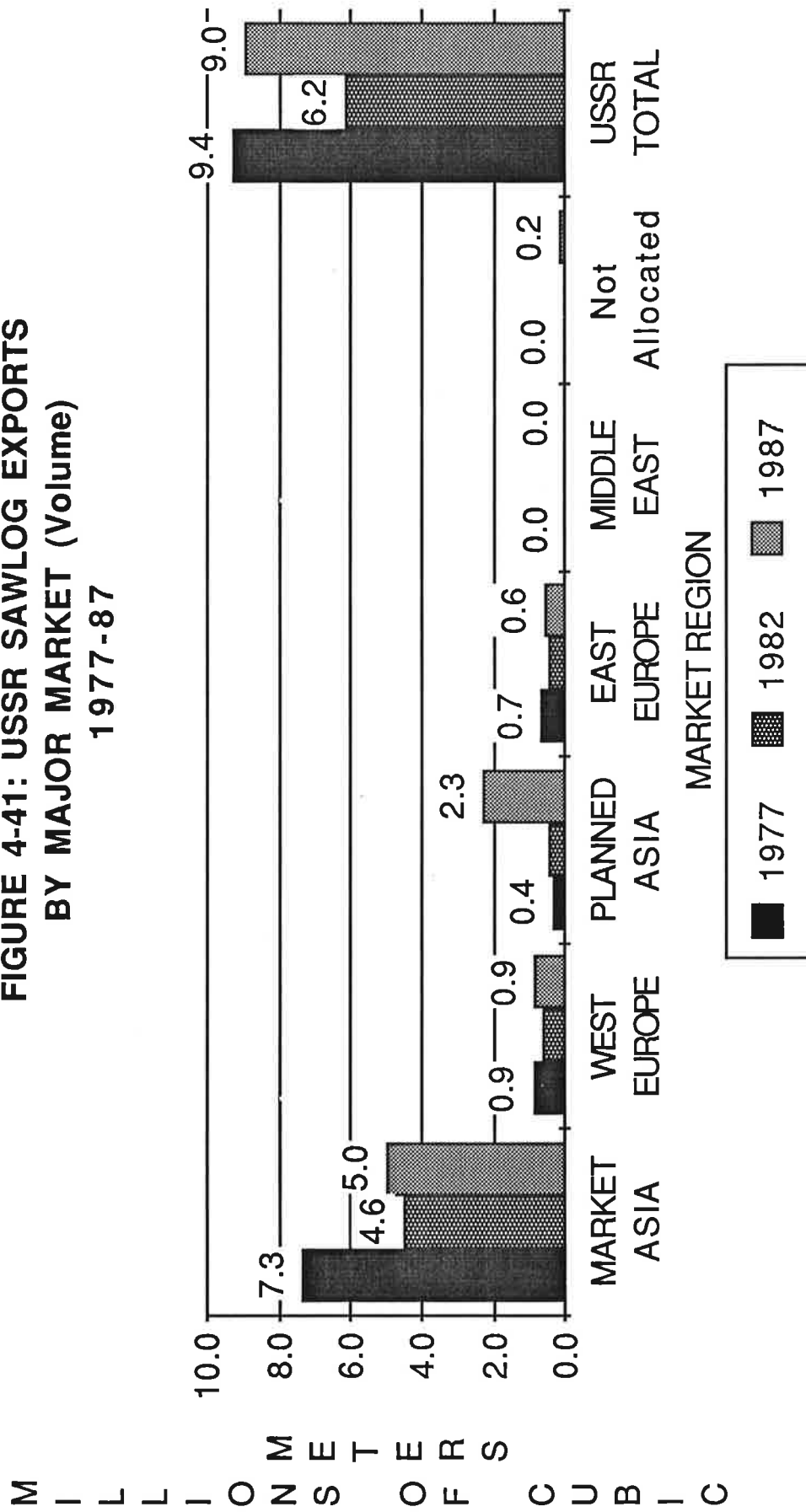
The major market for Soviet pulpwood was West Europe which consistently represented more than 50 percent (and in

**FIGURE 4-40: DISTRIBUTION OF USSR SAWLOG EXPORTS
BY MAJOR MARKET (Percent)
1977-87**



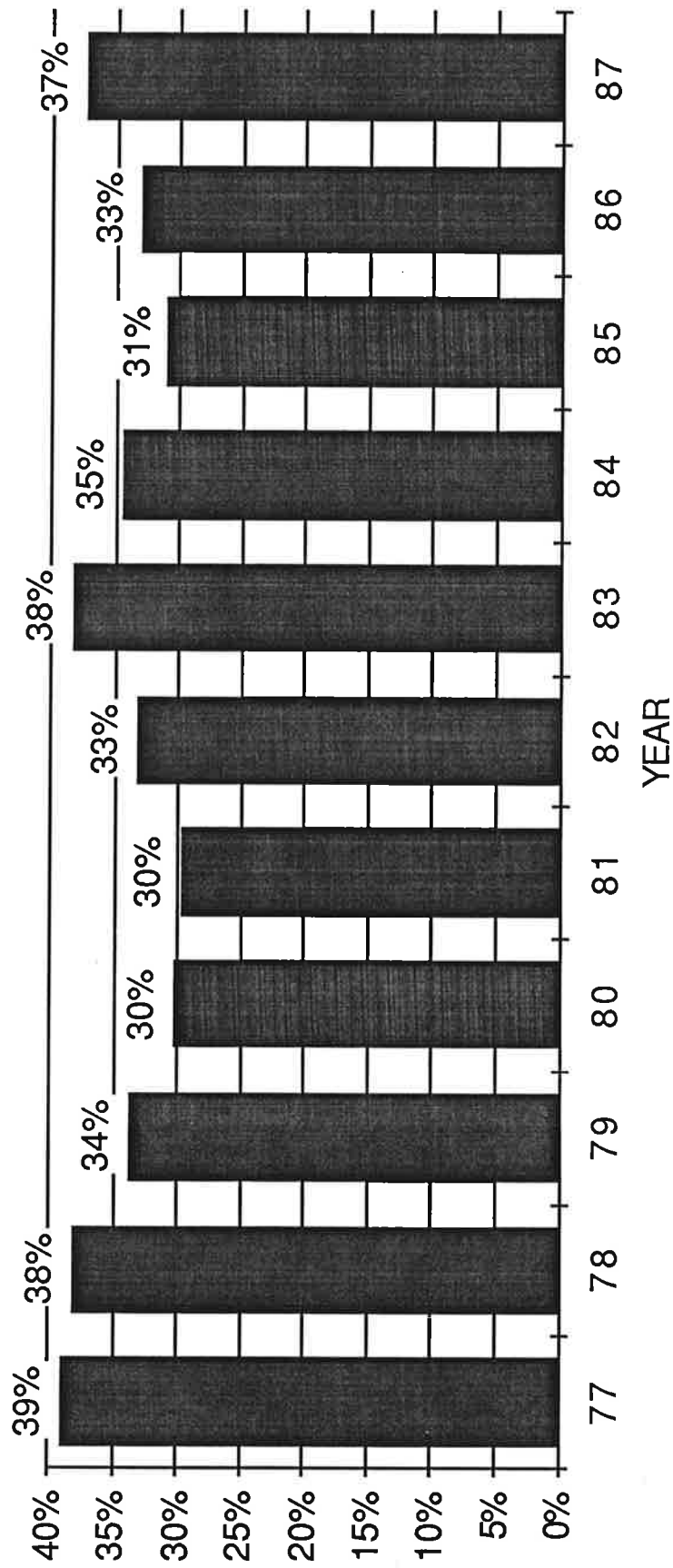
SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-41: USSR SAWLOG EXPORTS
BY MAJOR MARKET (Volume)
1977-87**



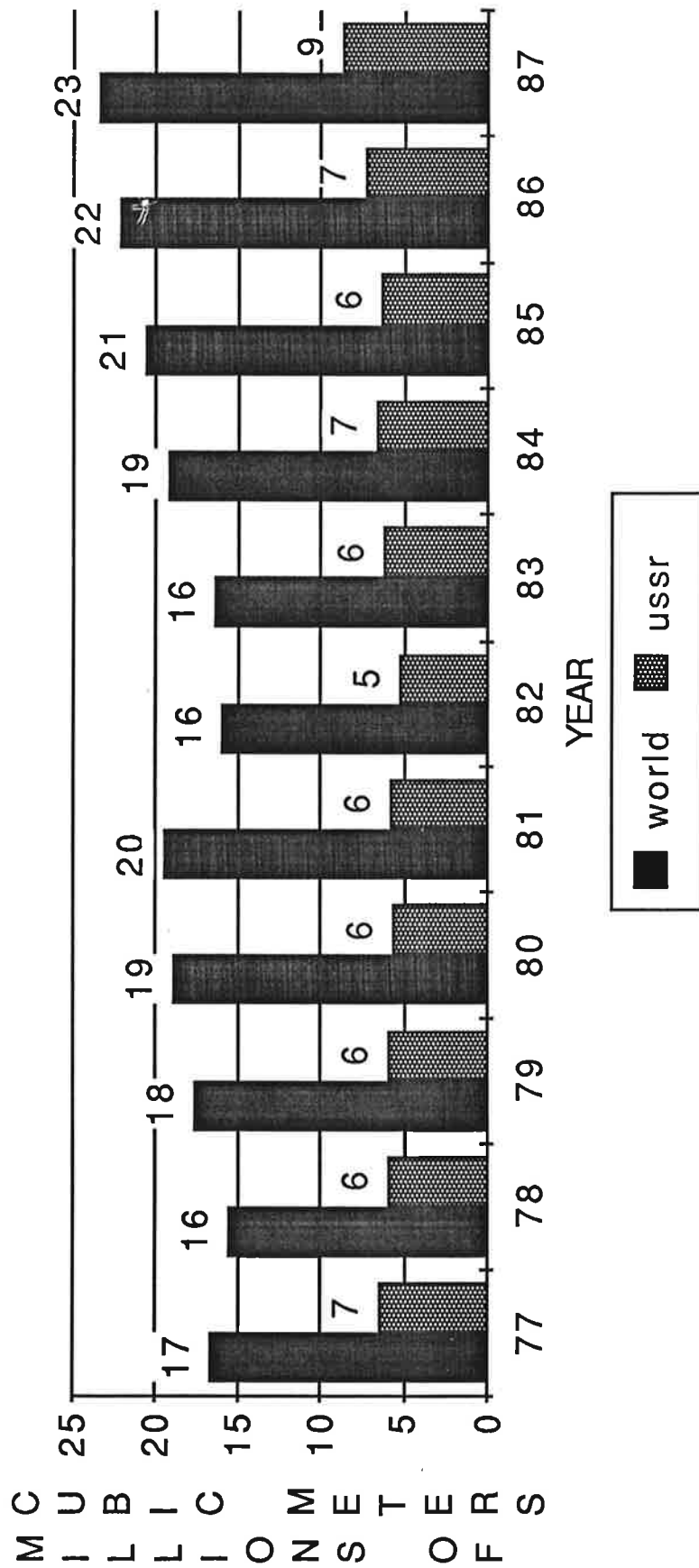
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-42 * USSR: SHARE OF WORLD
PULPLOG EXPORTS
1977-87



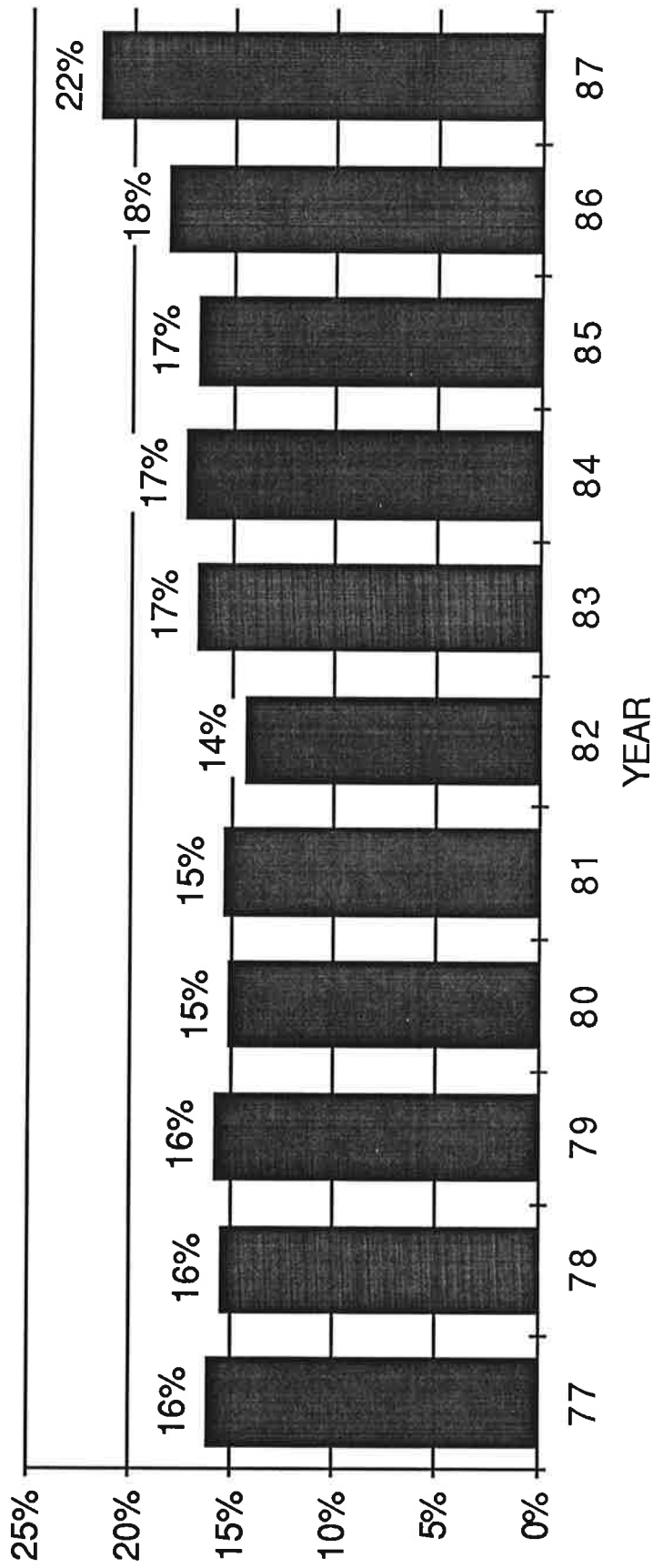
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-43 * WORLD AND USSR EXPORTS OF
PULPLOGS (CONIFER AND HARDWOOD)
1977-87



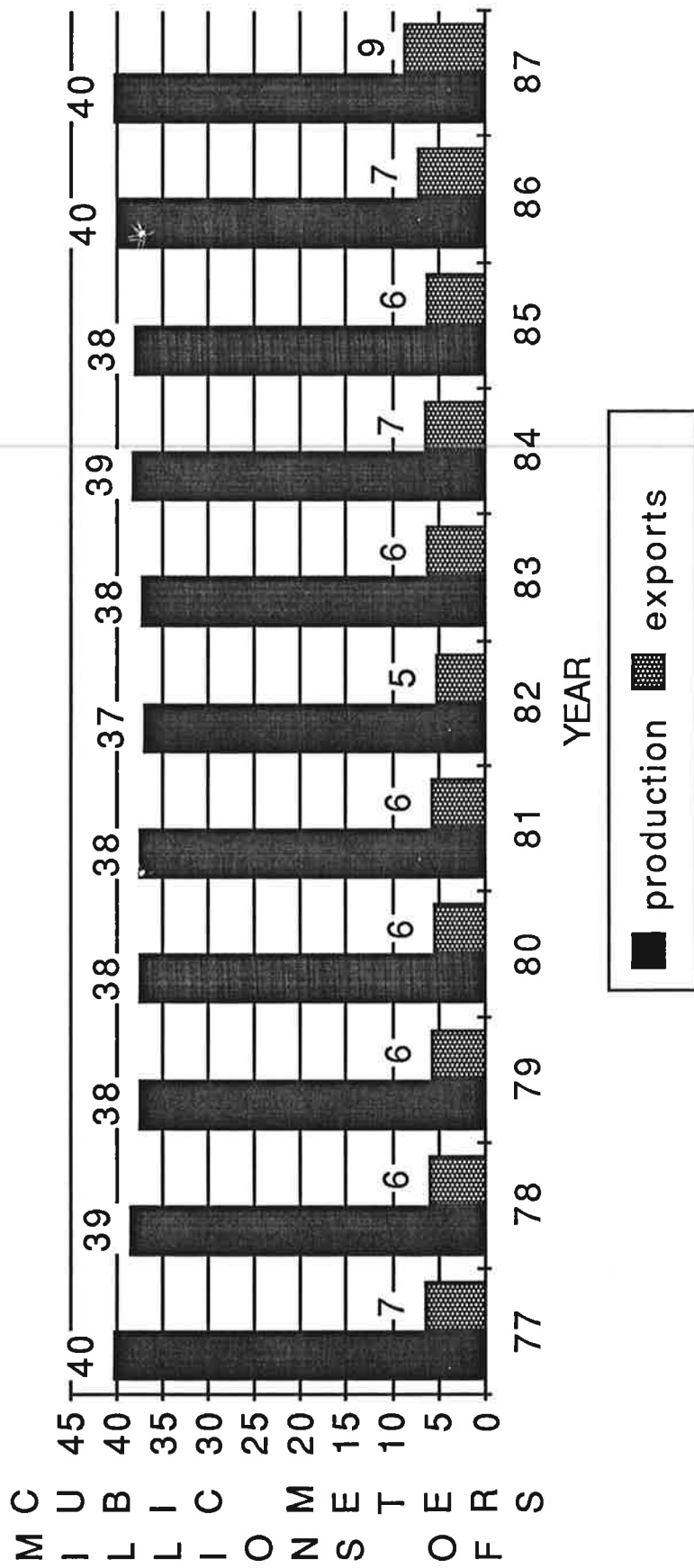
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-44 * USSR: SHARE OF DOMESTIC
PULPLOG PRODUCTION EXPORTED
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-45 * USSR EXPORTS AND DOMESTIC PRODUCTION
OF PULPLOGS (CONIFER AND HARDWOOD)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

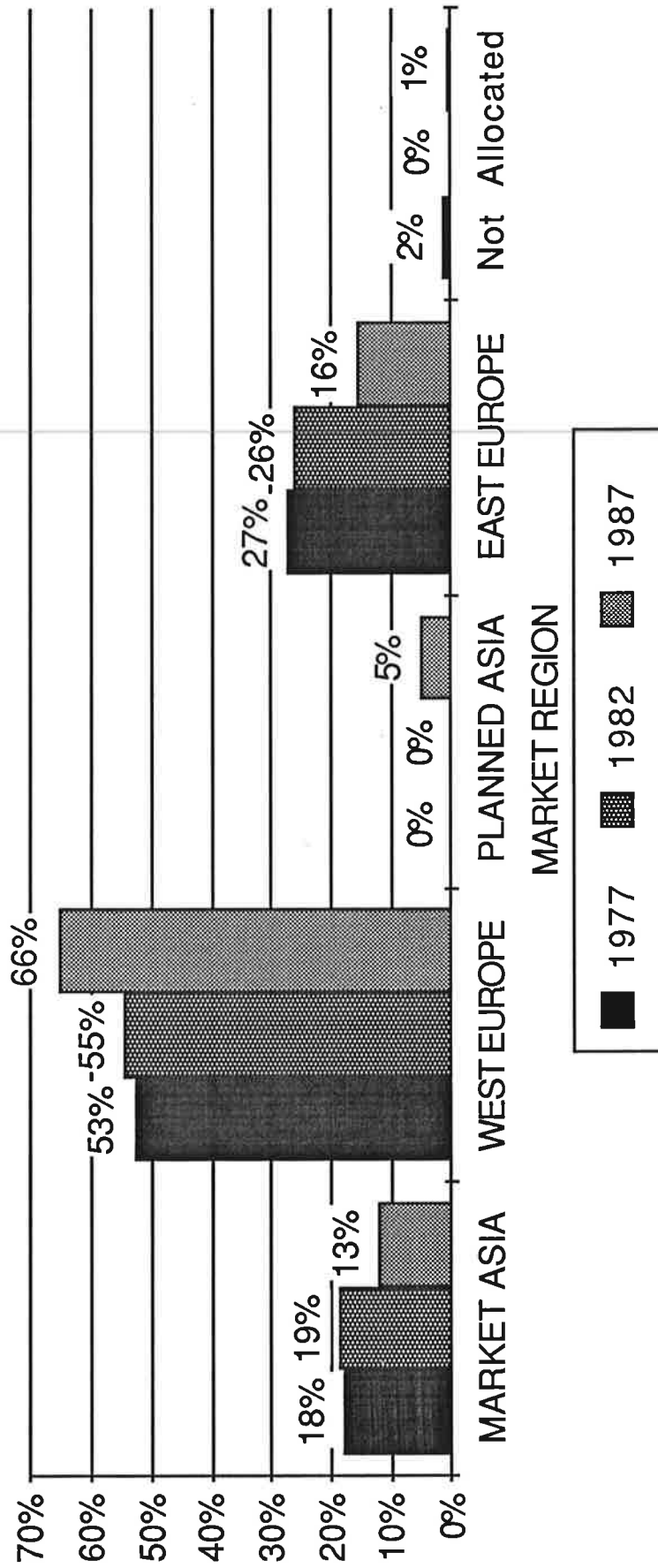
1987 66 percent) of the pulpwood exports from the USSR. The major countries to which pulpwood was exported were Finland with 34 percent of the total followed by Sweden with 19 percent. Significant volume of pulpwood was also exported to Market Asia (Japan), East Europe (mainly GDR) and Planned Asia (Mainland China).

In 1987, the USSR held 61 percent of the Finnish import market for pulpwood and 26 percent of the Swedish import market. In 1987 nearly all the Japanese imports of conifer pulpwood originated from the USSR. All the conifer pulpwood imports of the GDR came from the USSR in 1987, while 22 percent of conifer imports by China originated from the USSR. Figures 4.46 and 4.47 show the distribution of pulpwood export sales by region on a percentage and volume basis.

Chips, Particles, and Wood Residues: The Soviet Union exports small quantities of this type of product. While the export of chips et alia does not show up in the Soviet trade statistics, reference is made in the FAO trade statistics¹¹.

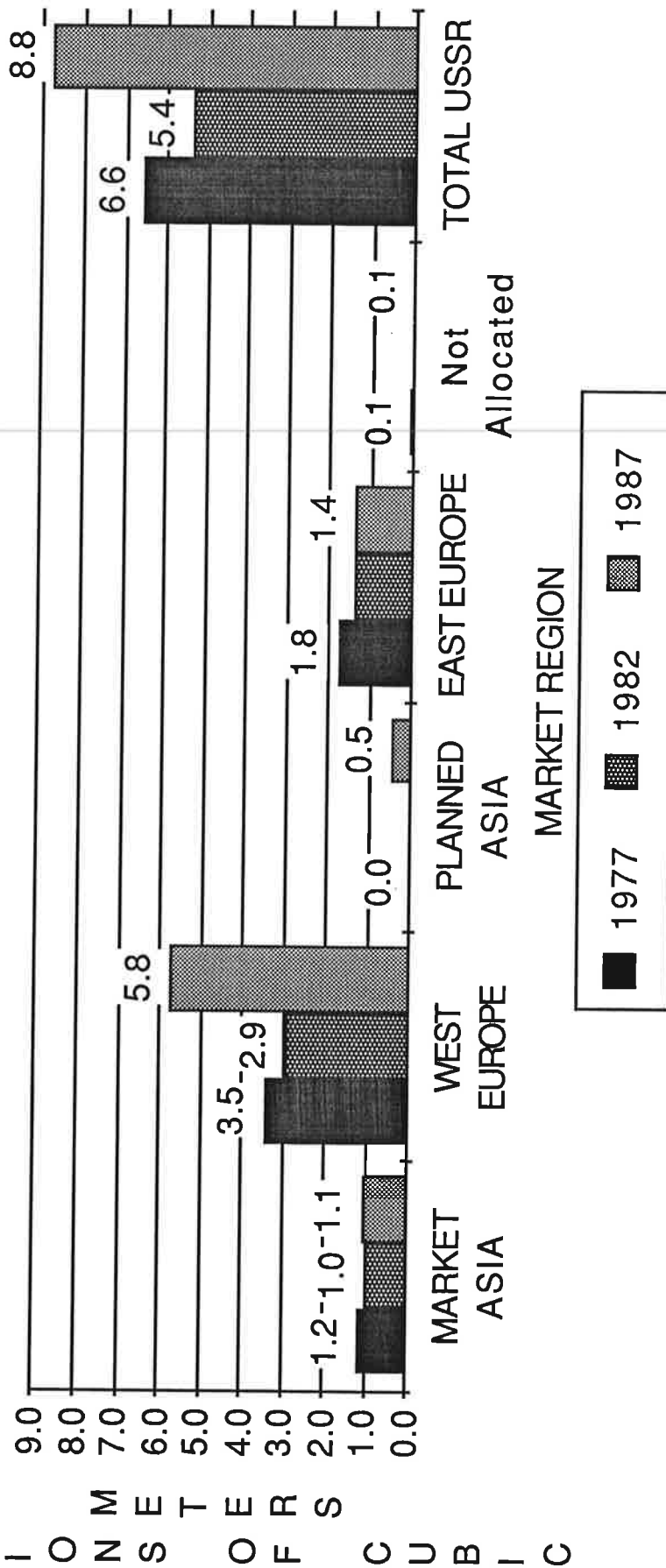
The Soviet Union is a minor player in the export of chips, particles and residues to world markets. It has consistently contributed between 3 and 9 percent of the exports between 1977 and 1987. Major exporters are the United States and Australia which respectively captured 18 percent and 35 percent of the market in 1987. Figures 4.48 and 4.49 show the share of world chip and particle exports captured by the Soviet Union and a comparison of the Soviet exports on

**FIGURE 4-46: DISTRIBUTION OF USSR PULP LOG EXPORTS
BY MAJOR MARKET (Percent)
1977-87**



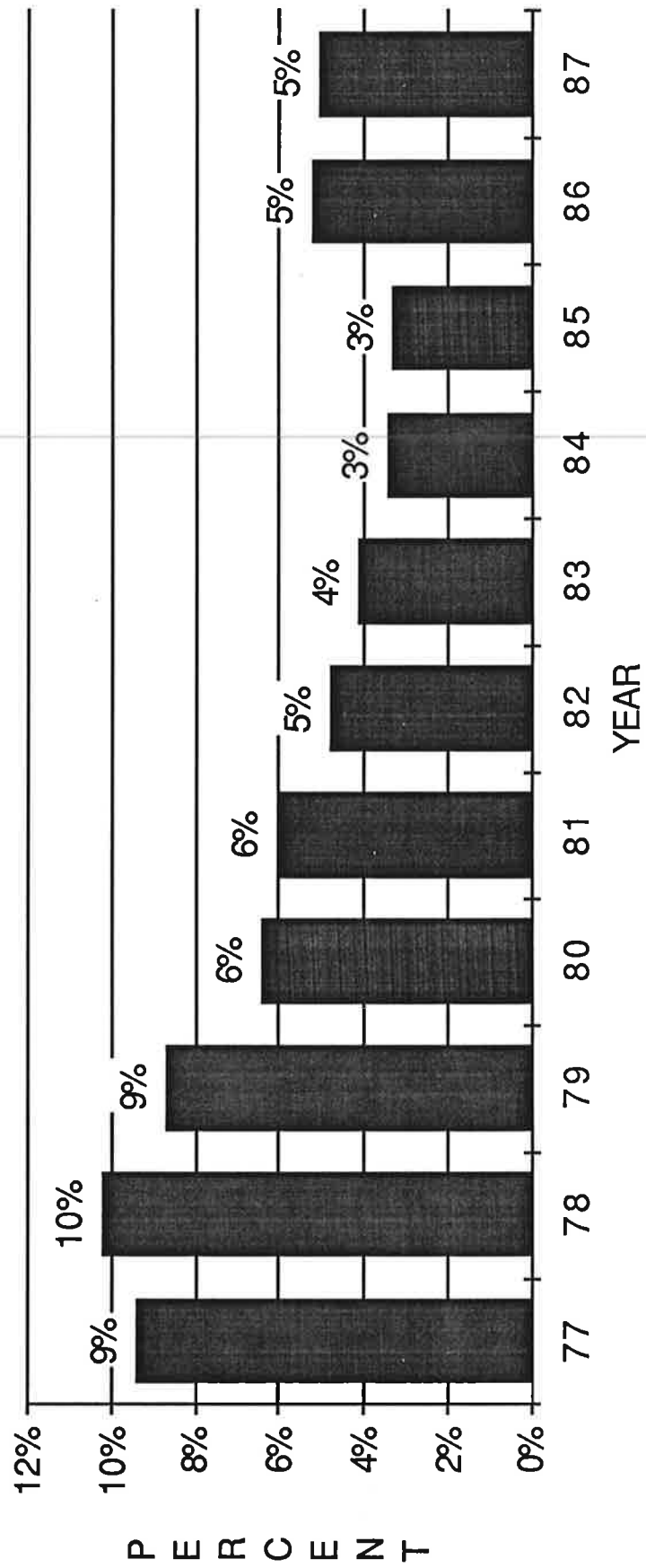
SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-47: USSR PULP LOG EXPORTS
BY MAJOR MARKET (Volume)
1977-87**



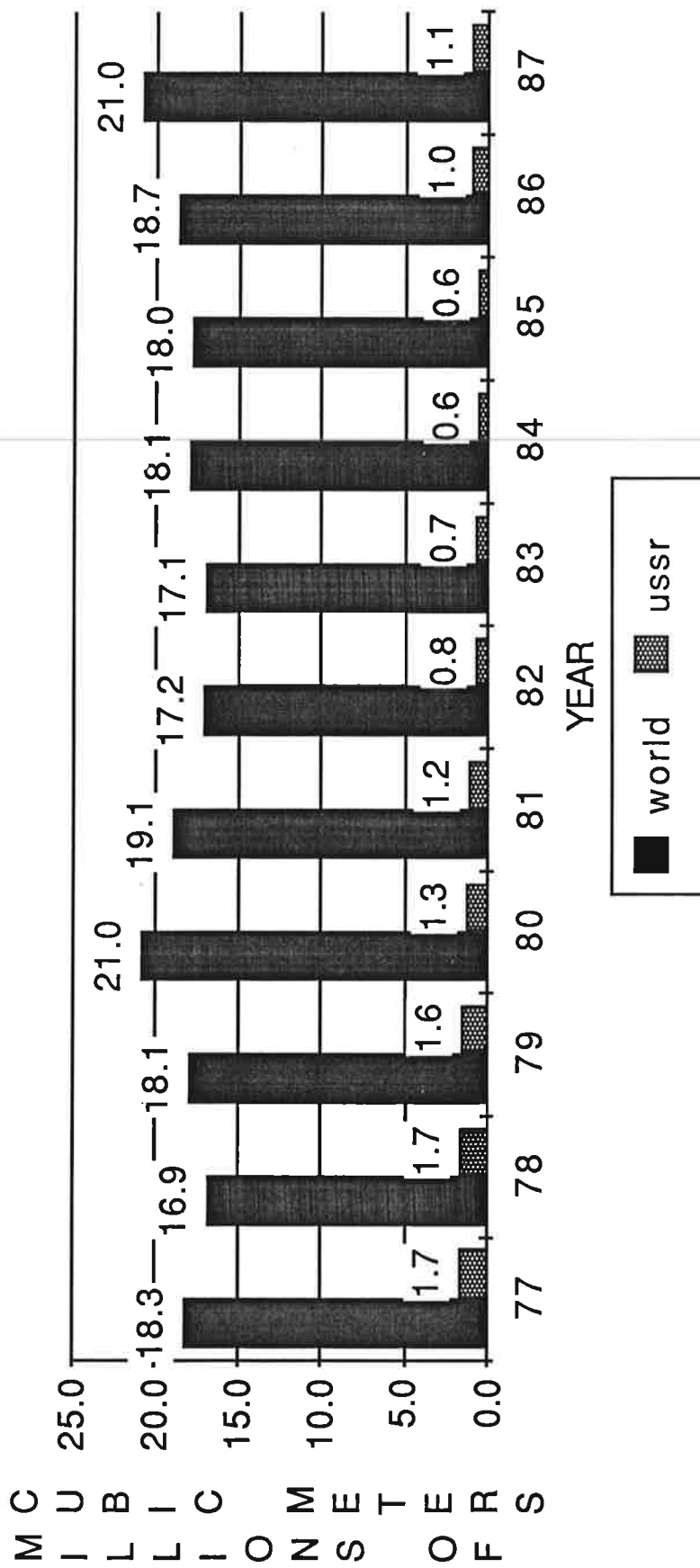
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-48 * USSR: SHARE OF WORLD WOOD CHIP, PARTICLES
AND RESIDUE EXPORTS
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-49 * WORLD AND USSR EXPORTS OF WOOD CHIPS,
PARTICLES AND RESIDUES
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

a volume basis.

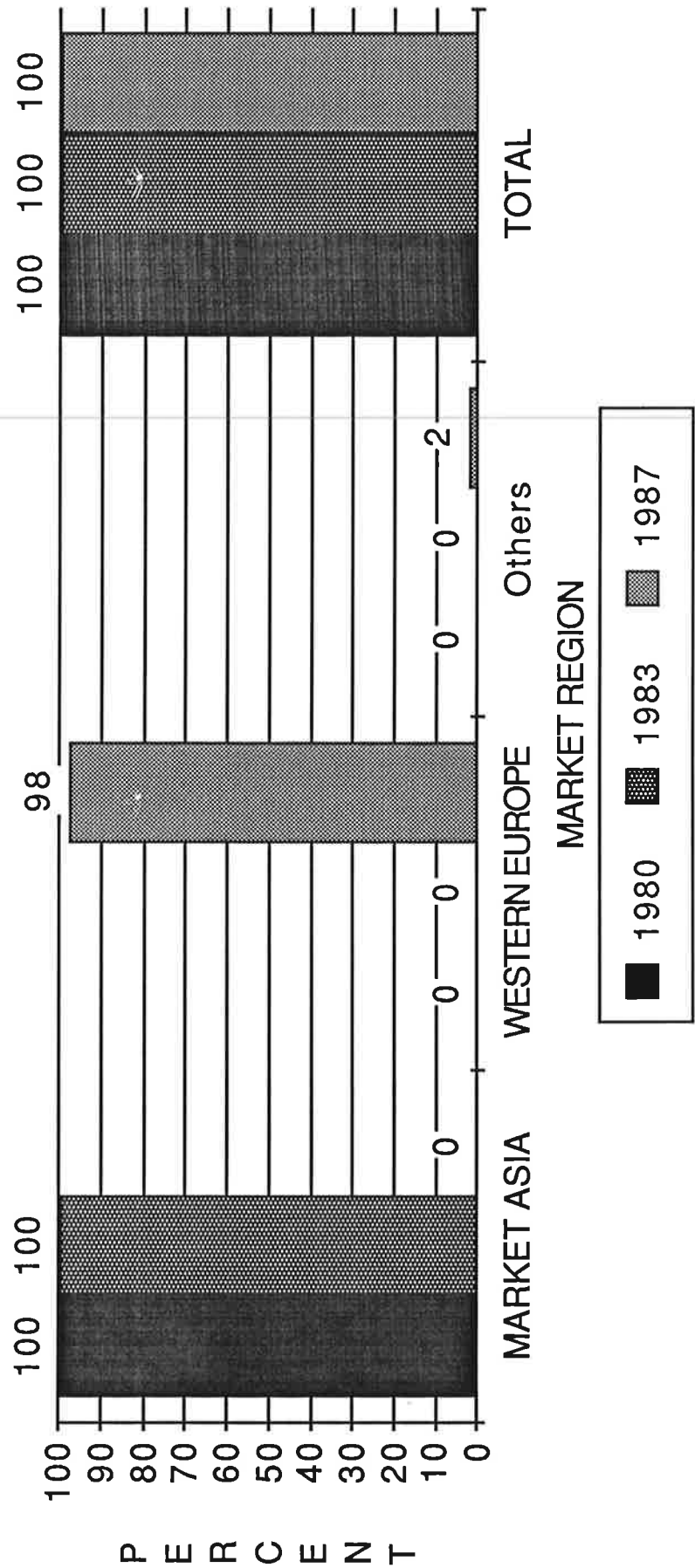
Export of chips, particles, and residues fluctuated between 1977 and 1987. From a volume of 1.7 million cubic meters in 1977, sales decreased to 1.07 million cubic meters in 1987. The trough was reached in 1985 when sales of chips and particles were 0.6 million cubic meters. Since chip exports are not identified in the Soviet trade statistics, it has not been possible to clearly identify major markets for the this category of forest product. However, the FAO does provide direction of trade statistics for the sub-product category of chips.

In 1986 and 1987, the Soviet Union exported 389 and 445 thousand cubic meters of chips, primarily to West Europe where the principal importers were Norway (95 percent of the market) and Finland with 4 percent of the Soviet exports.

In 1987, the USSR supplied 60 percent of the Norwegian import market and 9 percent of the Finnish import market. Figures 4.50 and 4.51 show the distribution of chip sales by region on a percentage and volume basis respectively.

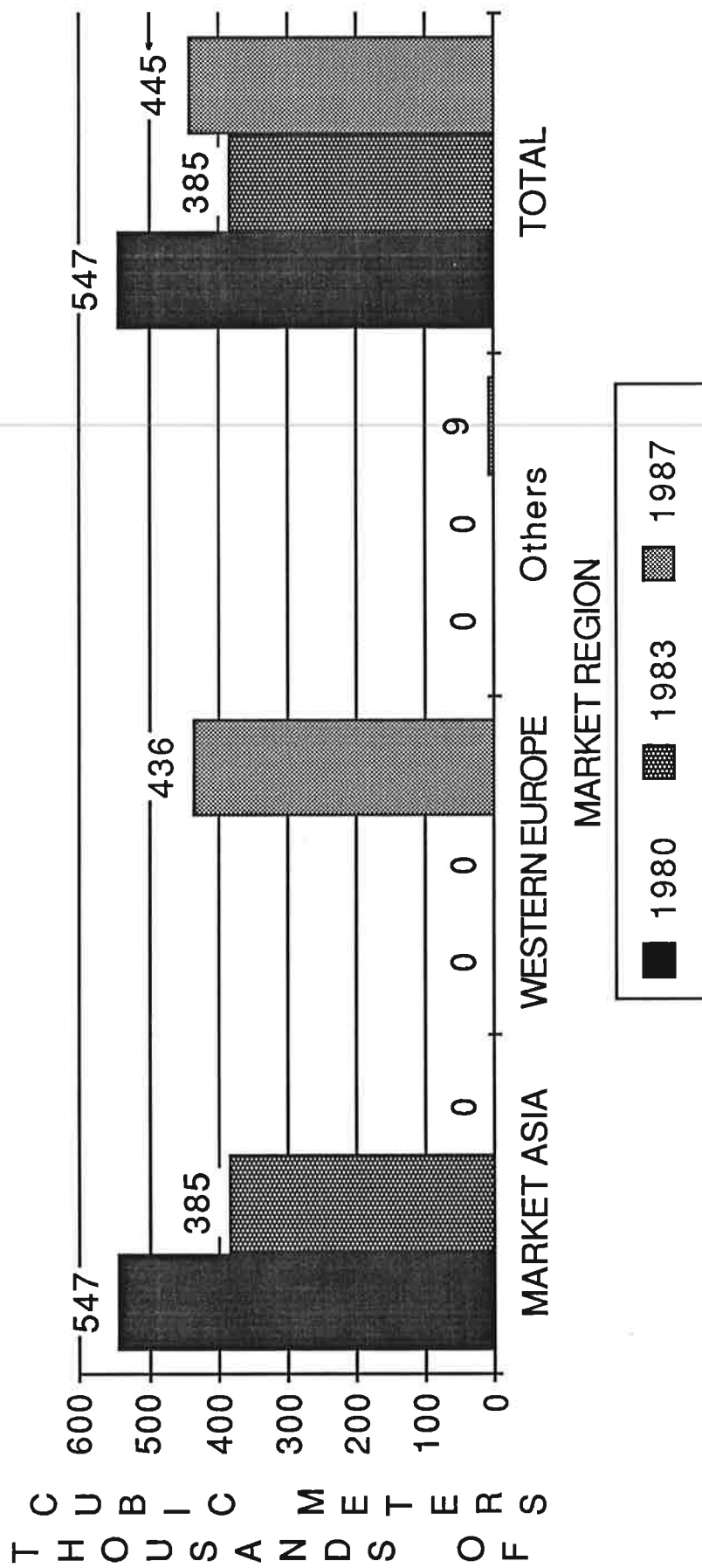
Lumber: The Soviet Union is a major exporter of lumber to world markets. It consistently contributed between 8 and 11 percent of the exports between 1977 and 1987, and has been consistently the largest exporter. A close second exporter of lumber has been Sweden which in 1987 captured 8 percent of the market. Figures 4.52 and 4.53 show the share of world lumber exports captured by the Soviet Union and a comparison

FIGURE 4-50 * USSR: EXPORT OF CHIPS AND PARTICLES
(Percent)
1980-87



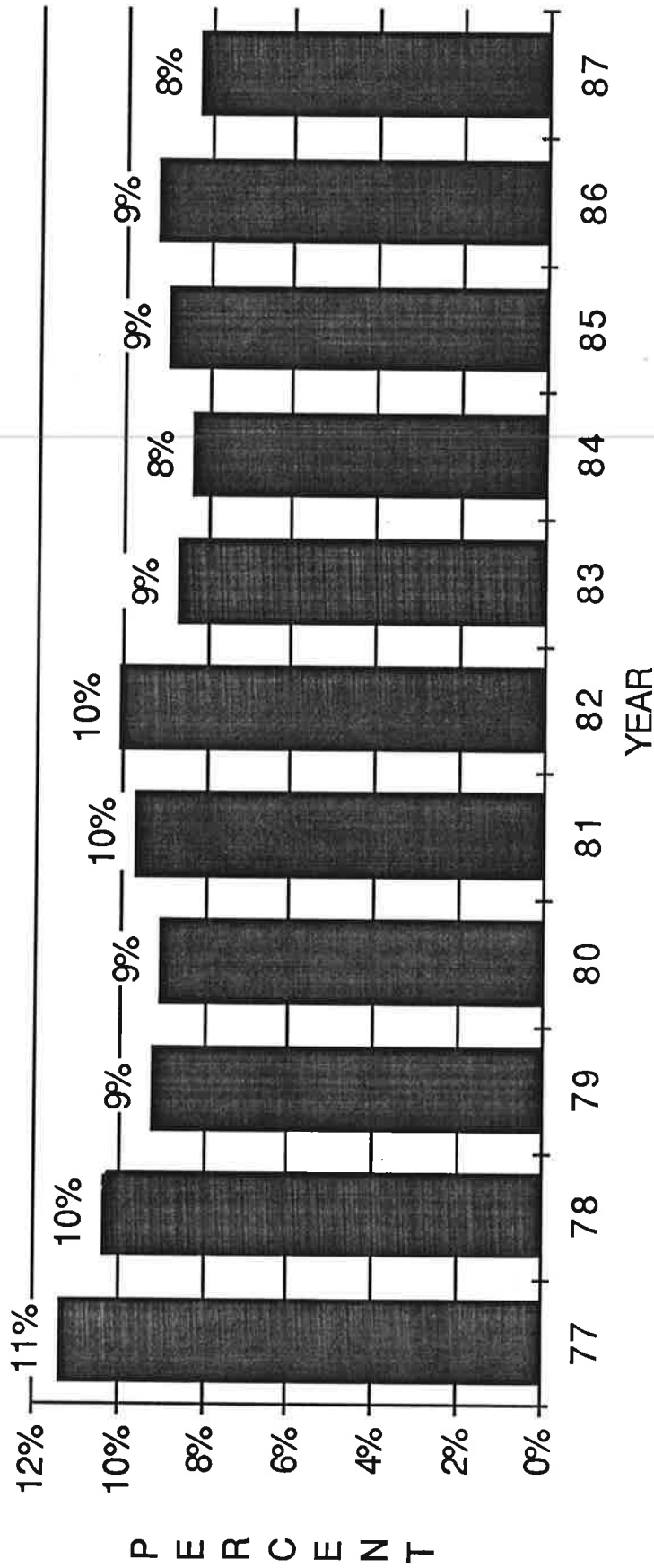
SOURCE: FAO Forest Products Annual Year Book, various years

FIGURE 4-51 * USSR: WOOD CHIP AND PARTICLE EXPORTS
(Volume)
1980-87



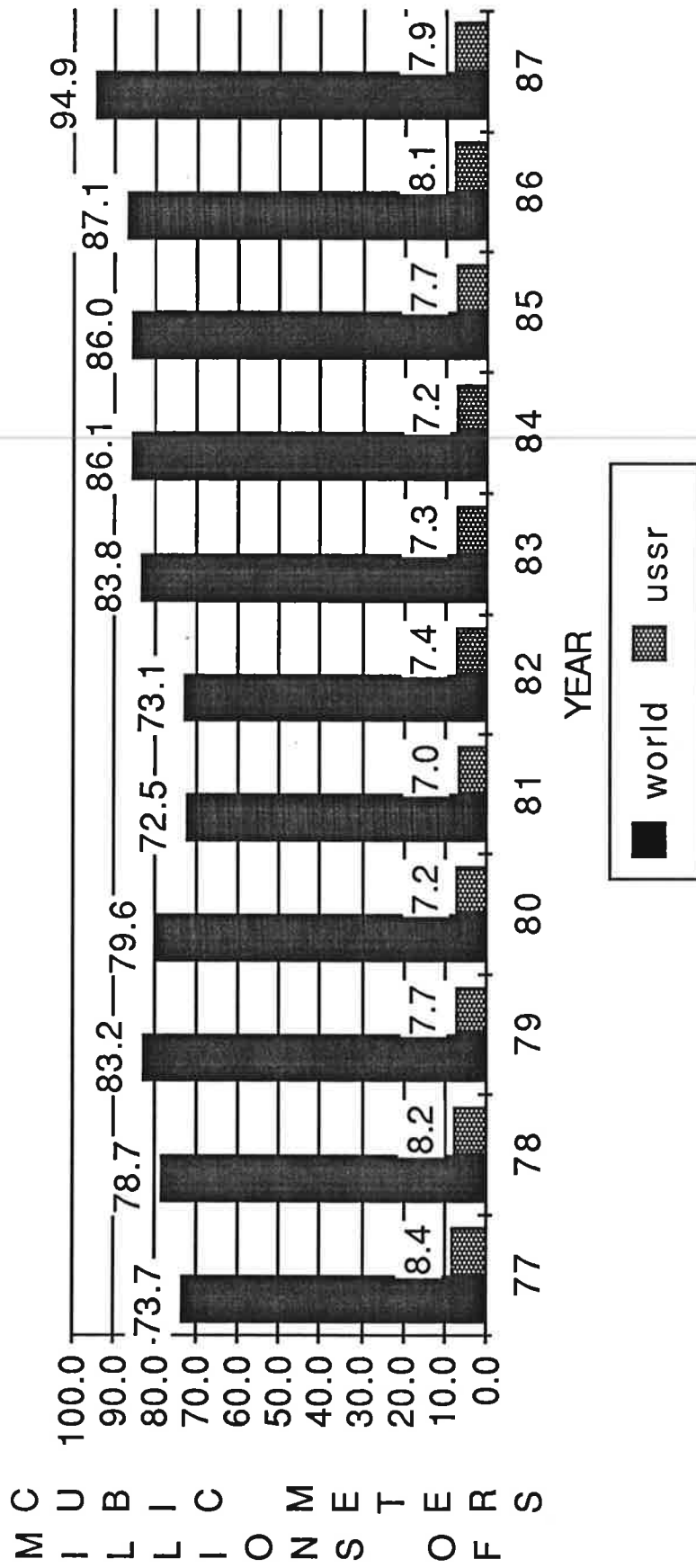
SOURCE: FAO Forest Products Annual Year Book, various years

FIGURE 4-52 * USSR: SHARE OF WORLD
LUMBER EXPORTS
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-53 * WORLD AND USSR EXPORTS
OF LUMBER (CONIFER AND HARDWOOD)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

of the Soviet exports to total world exports on a volume basis.

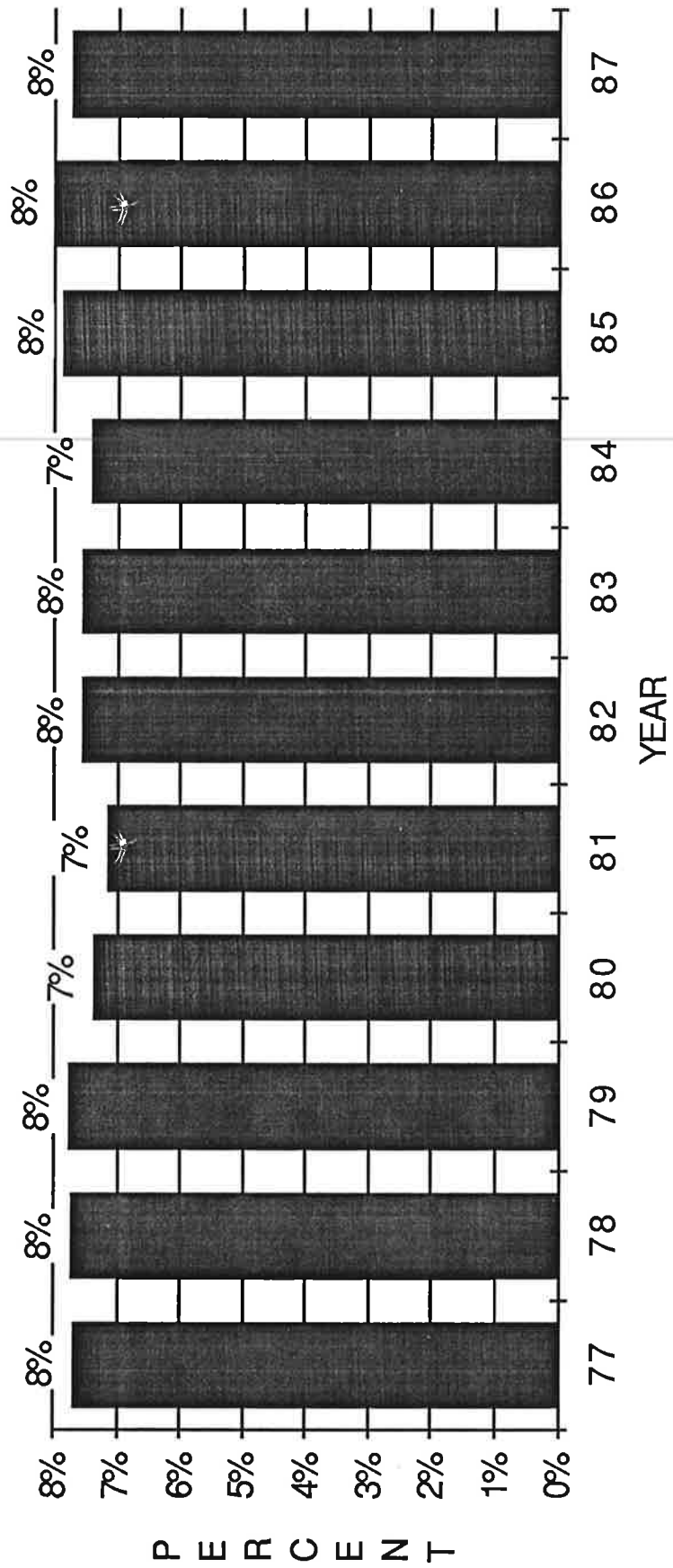
Sales of lumber have remained fairly constant between 1977 and 1987. In 1977, 8.2 million cubic meters were exported. In 1987, 7.9 million cubic meters were exported. The low volume year during this period occurred in 1981 when 6.9 million cubic meters was exported. Exports as a share of domestic production has never exceeded 8 percent. Figures 4.54 and 4.55 show Soviet exports as a share of domestic production and contrast domestic production to export volume for the period 1977 to 1987.

The major destination for Soviet lumber has been Western Europe which has consistently imported between 40 and 50 percent of the Soviet exports of lumber (the exceptions being in 1981 and 1985 when West Europe received 37 percent and 35 percent respectively). The major importing countries have been Great Britain followed by West Germany which together in 1987 received 25 percent of the total exports.

The second major export market has been East Europe which in 1987 imported 34 percent of the Soviet exports of lumber. The major recipient country was East Germany followed by Hungary which imported 14 percent and 9 percent respectively of the Soviet exports.

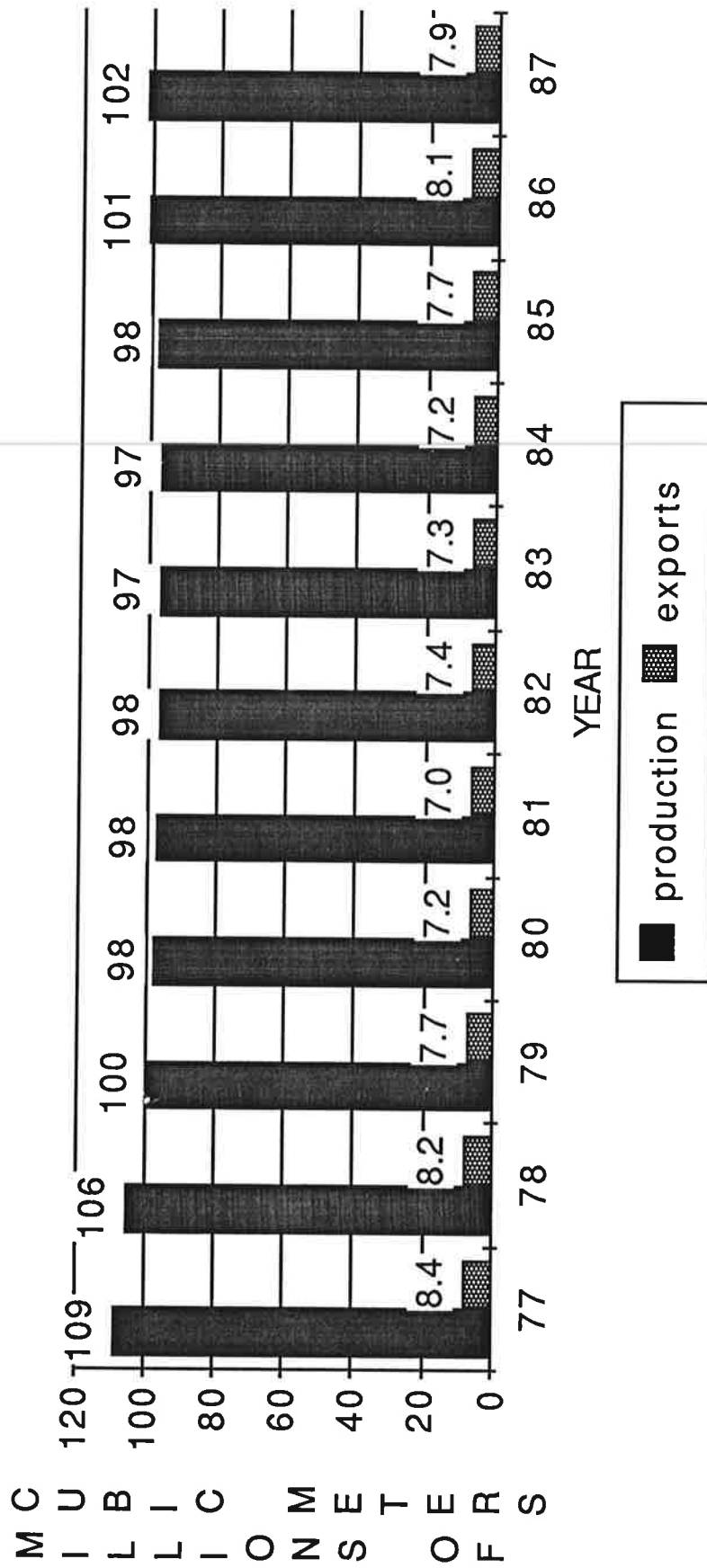
In 1987, the USSR held approximately 16 percent of the United Kingdom's import market and 16 percent of the FRG import market. In regards to East Europe, the USSR held an uncertain proportion of the total import market in GDR and

FIGURE 4-54 * USSR: SHARE OF DOMESTIC LUMBER
PRODUCTION EXPORTED
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-55 * USSR EXPORTS AND DOMESTIC PRODUCTION
OF LUMBER (CONIFER AND HARDWOOD)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

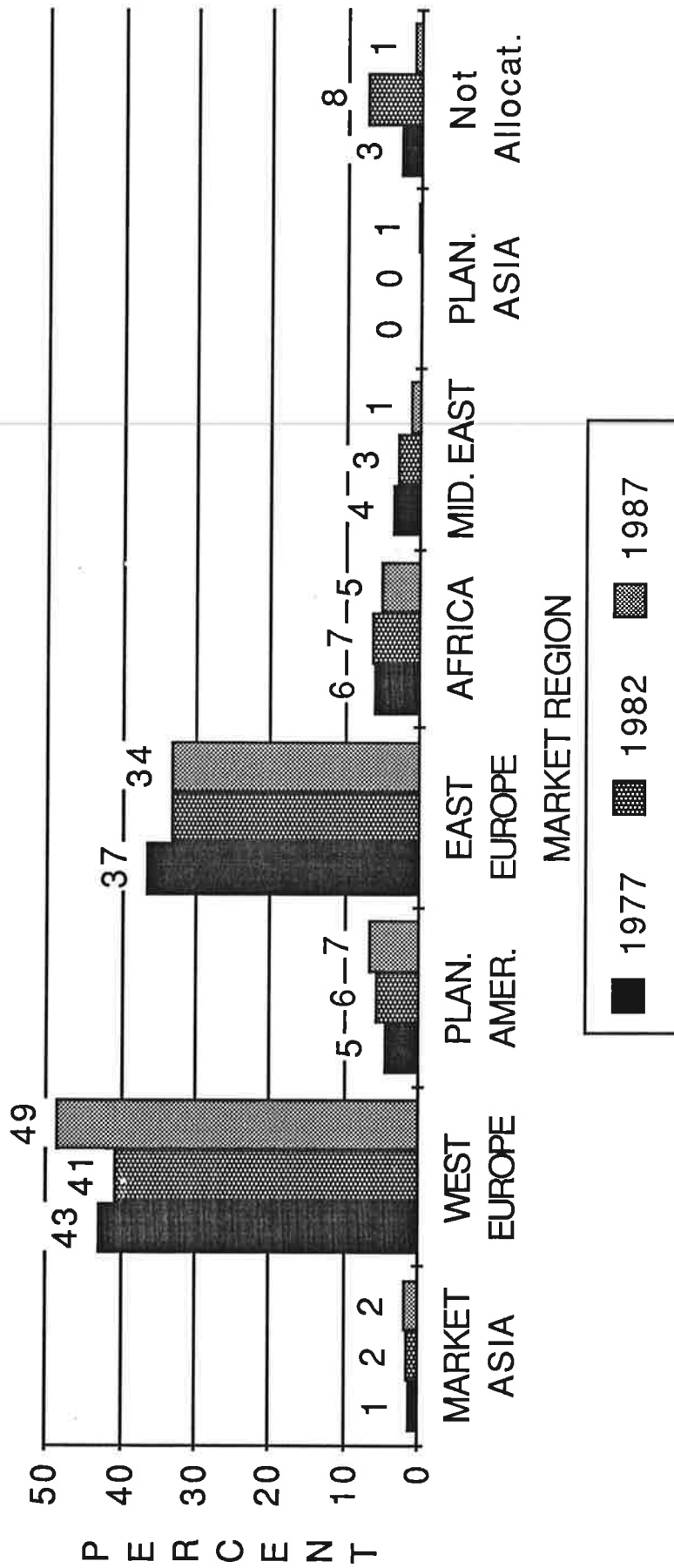
Hungary. Figures 4.56 and 4.57 delineate the distribution of Soviet lumber exports by region on a proportional basis and volume basis.

Plywood: The Soviet Union is a minor exporter of plywood to world markets. It consistently contributed between 4 and 5 percent of the exports between 1977 and 1987. The major world exporting country has been Indonesia, which in 1987 held close to 49 percent of the market. Figures 4.58 and 4.59 show the share of world plywood exports captured by the Soviet Union and a comparison of the Soviet exports to total world exports on a volume basis.

Exports of plywood have stayed constant during the period between 1977 and 1987. Sales volume in 1977 were 339 thousand cubic meters; while in 1987, sales were 485 thousand cubic meters. Exports as a share of domestic production has never exceeded 21 percent. Figures 4.60 and 4.61 show Soviet exports as a share of domestic production and contrast domestic production to export volume for the period 1977 to 1987.

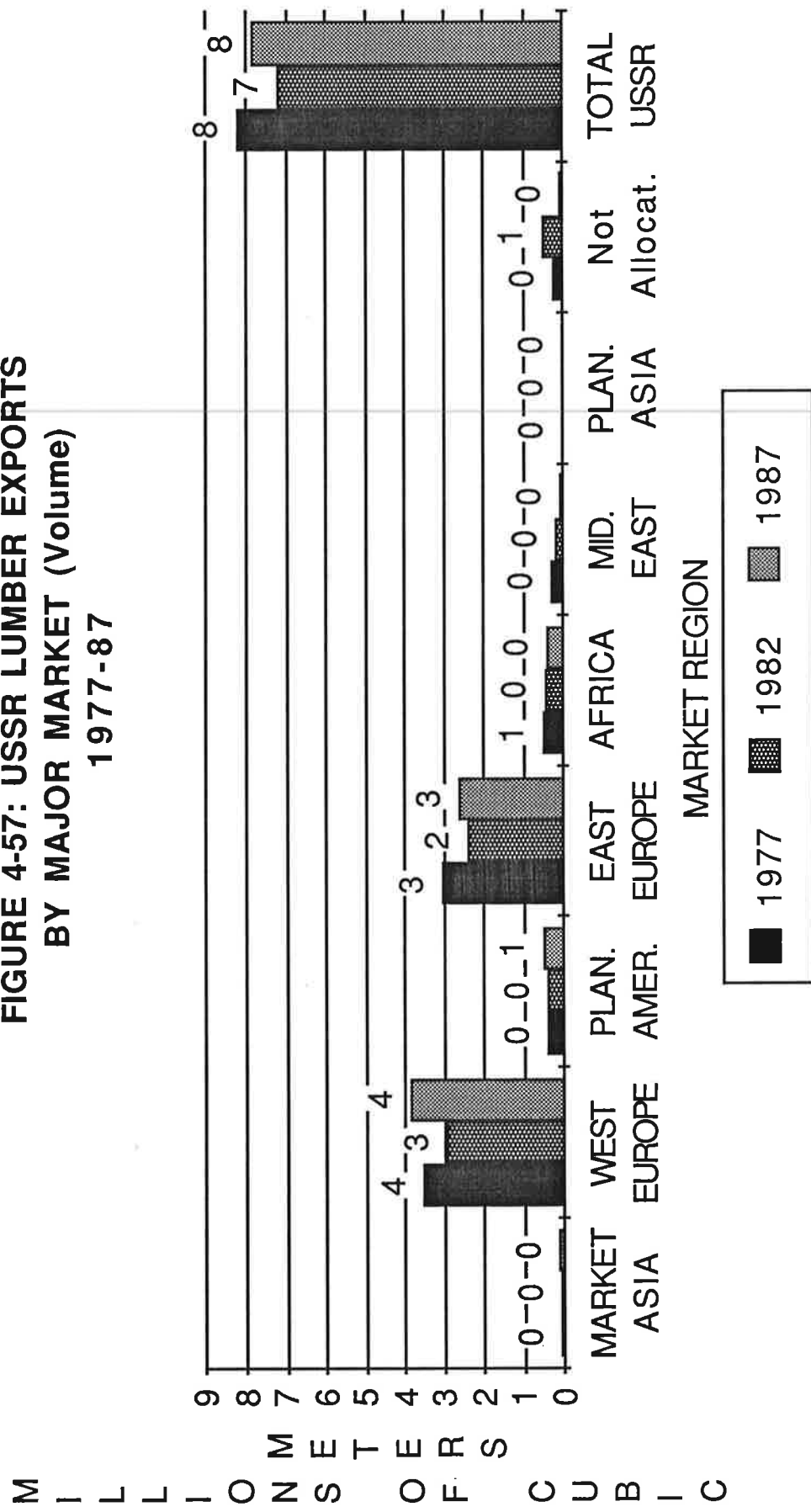
The major markets for Soviet plywood have been West Europe and East Europe. In 1987, West Europe received 46 percent and East Europe 33 percent of the total Soviet exports. The major importing countries in West Europe were Great Britain (24 percent) followed by Italy (8 percent). The major importing countries in East Europe were East Germany (19 percent) followed by Poland (12 percent).

**FIGURE 4-56: DISTRIBUTION OF USSR LUMBER EXPORTS
BY MAJOR MARKET (Percent)
1977-87**



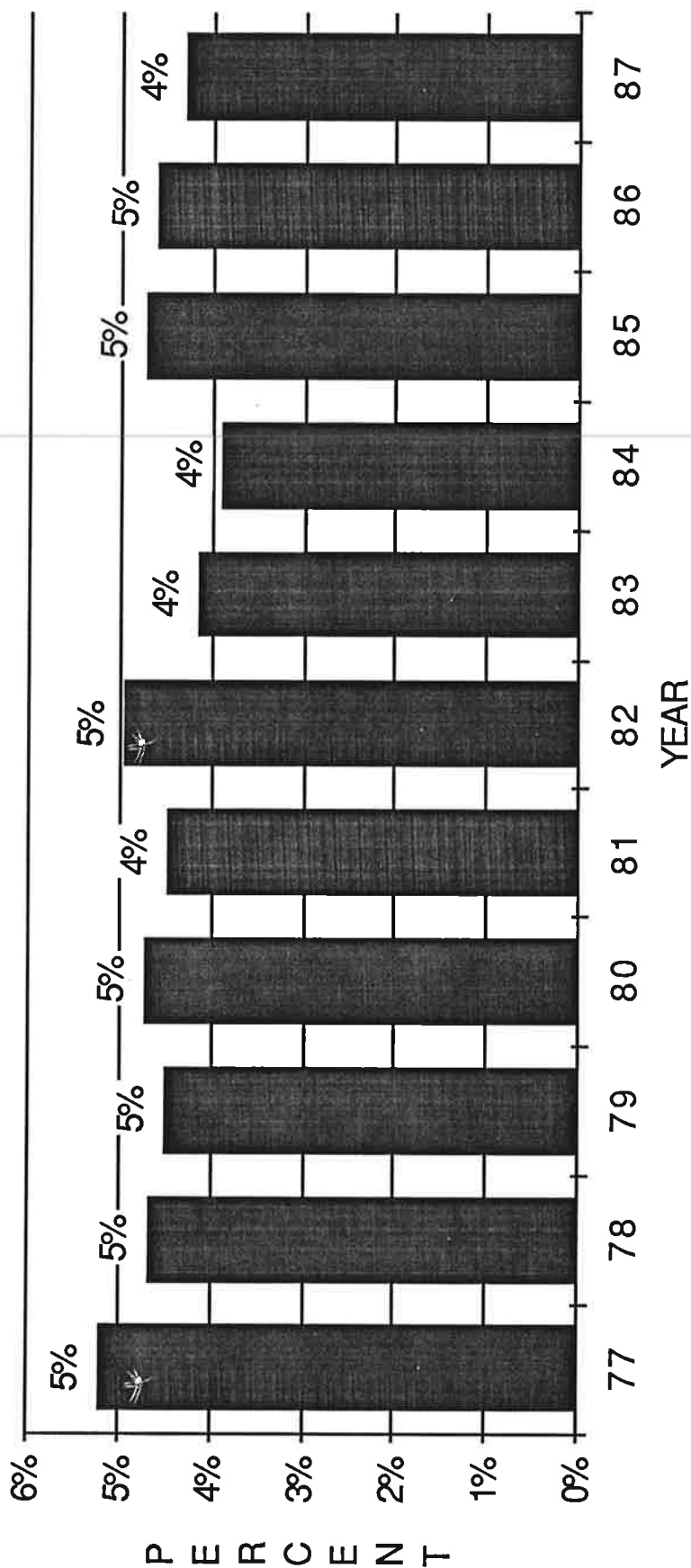
SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-57: USSR LUMBER EXPORTS
BY MAJOR MARKET (Volume)
1977-87**



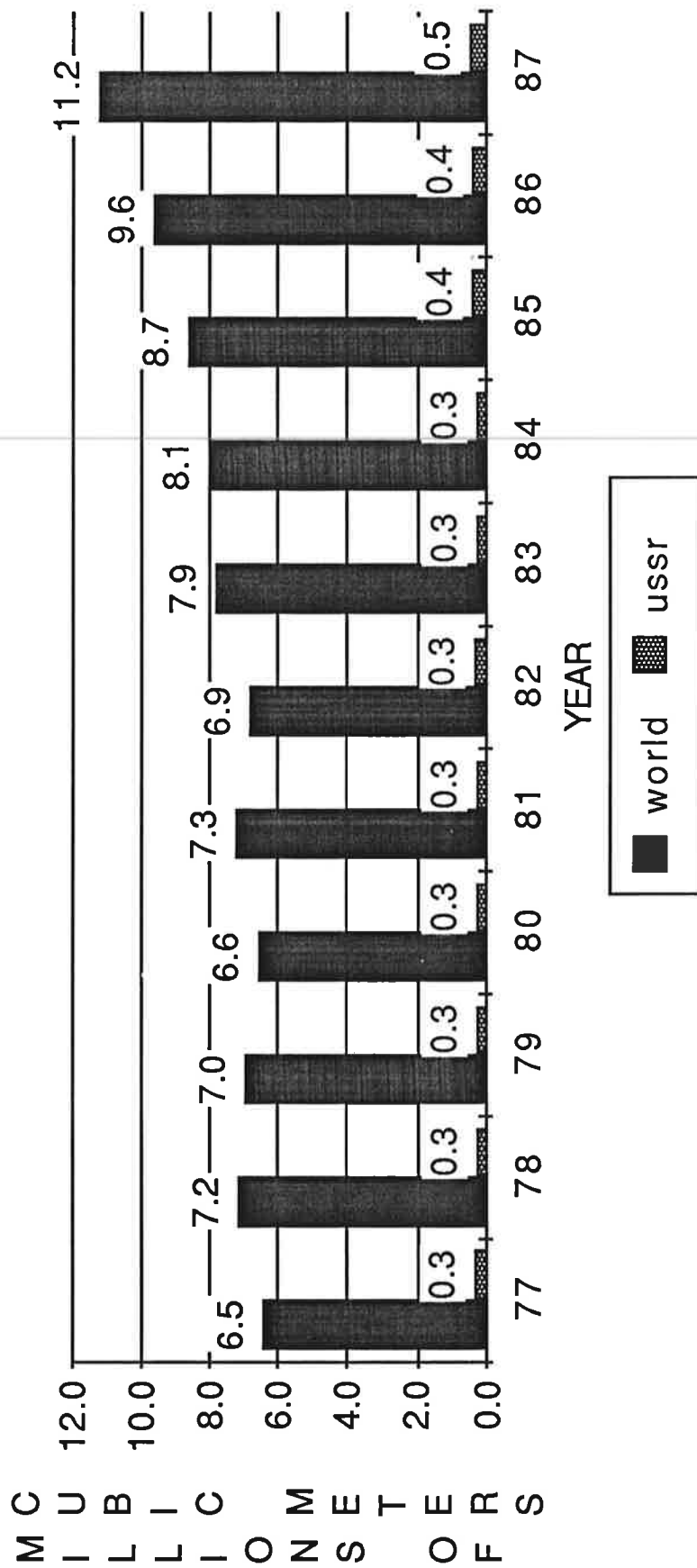
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-58 * USSR: SHARE OF WORLD PLYWOOD EXPORTS
1977-87



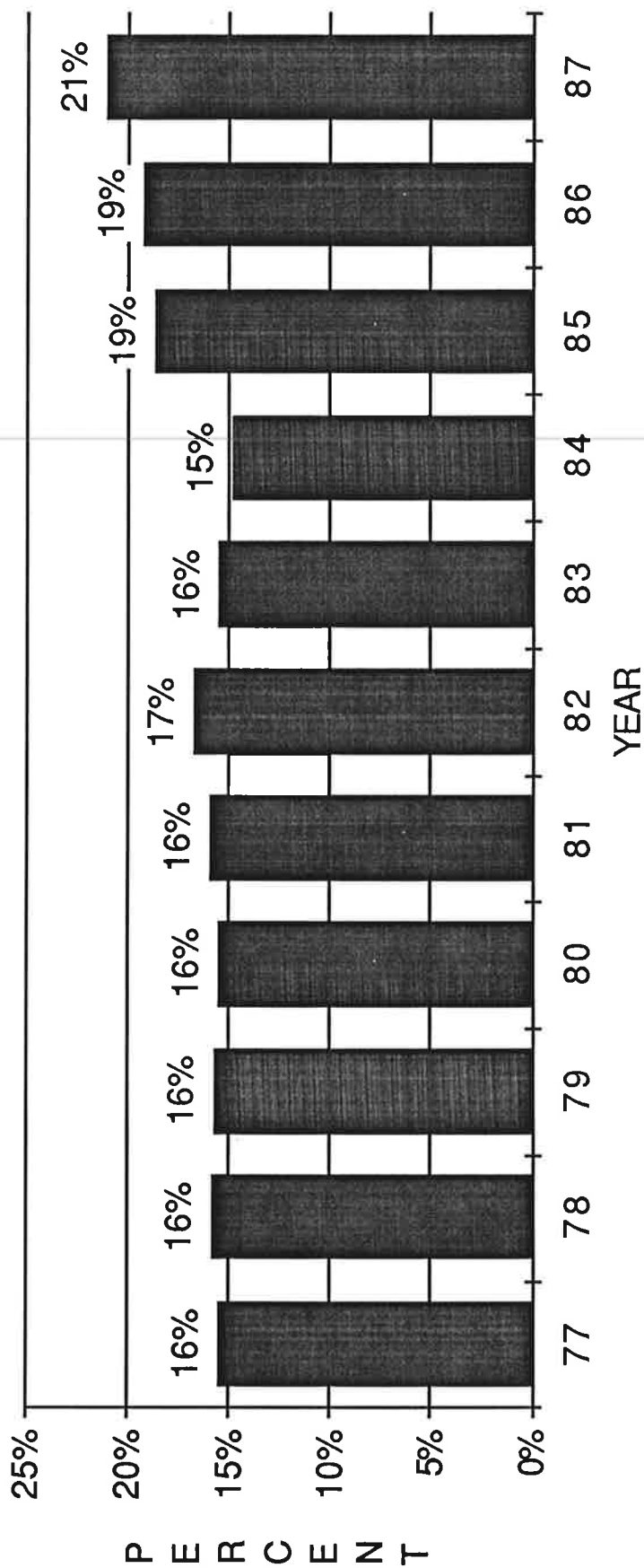
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-59 * WORLD AND USSR EXPORTS
OF PLYWOOD (CONIFER AND HARDWOOD)
1977-87



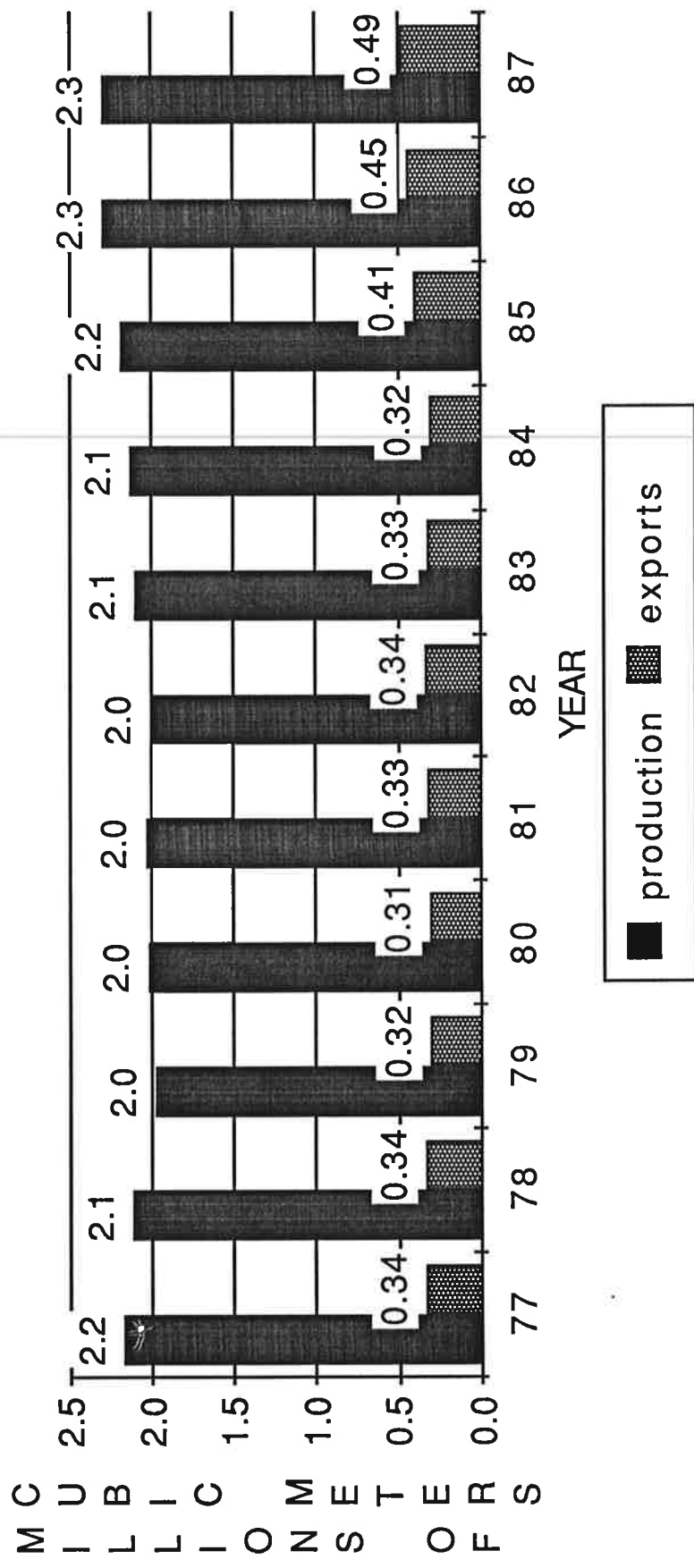
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-60 * USSR: SHARE OF DOMESTIC PLYWOOD
PRODUCTION EXPORTED
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-61 * USSR EXPORTS AND DOMESTIC PRODUCTION
OF PLYWOOD (CONIFER AND HARDWOOD)
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

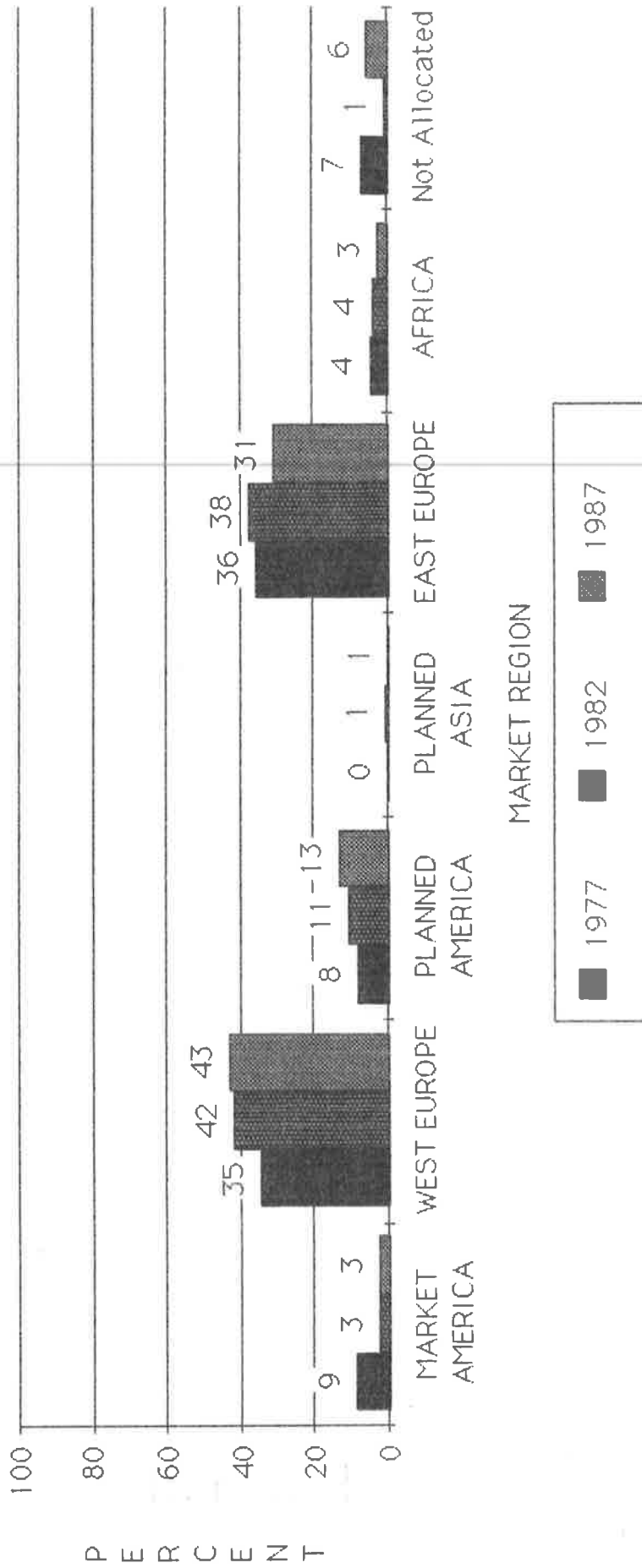
In 1987, the USSR held 8 percent of the UK import market and 30 percent of the Italian import market. In regards to GDR and Poland, the USSR held 100 percent of the imports of plywood into those countries. Figures 4.62 and 4.63 delineate the distribution of Soviet plywood exports on a proportional basis and on a volume basis.

Particleboard: The Soviet Union is also a minor exporter of particleboard to world markets. It contributed between 4 and 6 percent of the exports between 1977 and 1987. The major exporters have been the Benelux countries, Canada and Federal Germany which respectively captured 20 percent, 13 percent, and 14 percent of the world market in 1987. Figures 4.64 and 4.65 show the share of world lumber exports accounted for by the Soviet Union and a comparison of the Soviet exports to total world exports on a volume basis.

Exports of particle board increased during the period 1977 to 1987 from 307 thousand cubic meters to 389 thousand cubic meters. Exports as a share of domestic production has averaged about 7 percent. Figures 4.66 and 4.67 show Soviet exports as a share of domestic production and contrast domestic production to export volume for the period 1977 to 1987.

The major market area for Soviet particleboard exports has been East Europe followed by West Europe. Together, these two regions have consistently accounted for more than 80 percent of Soviet exports.

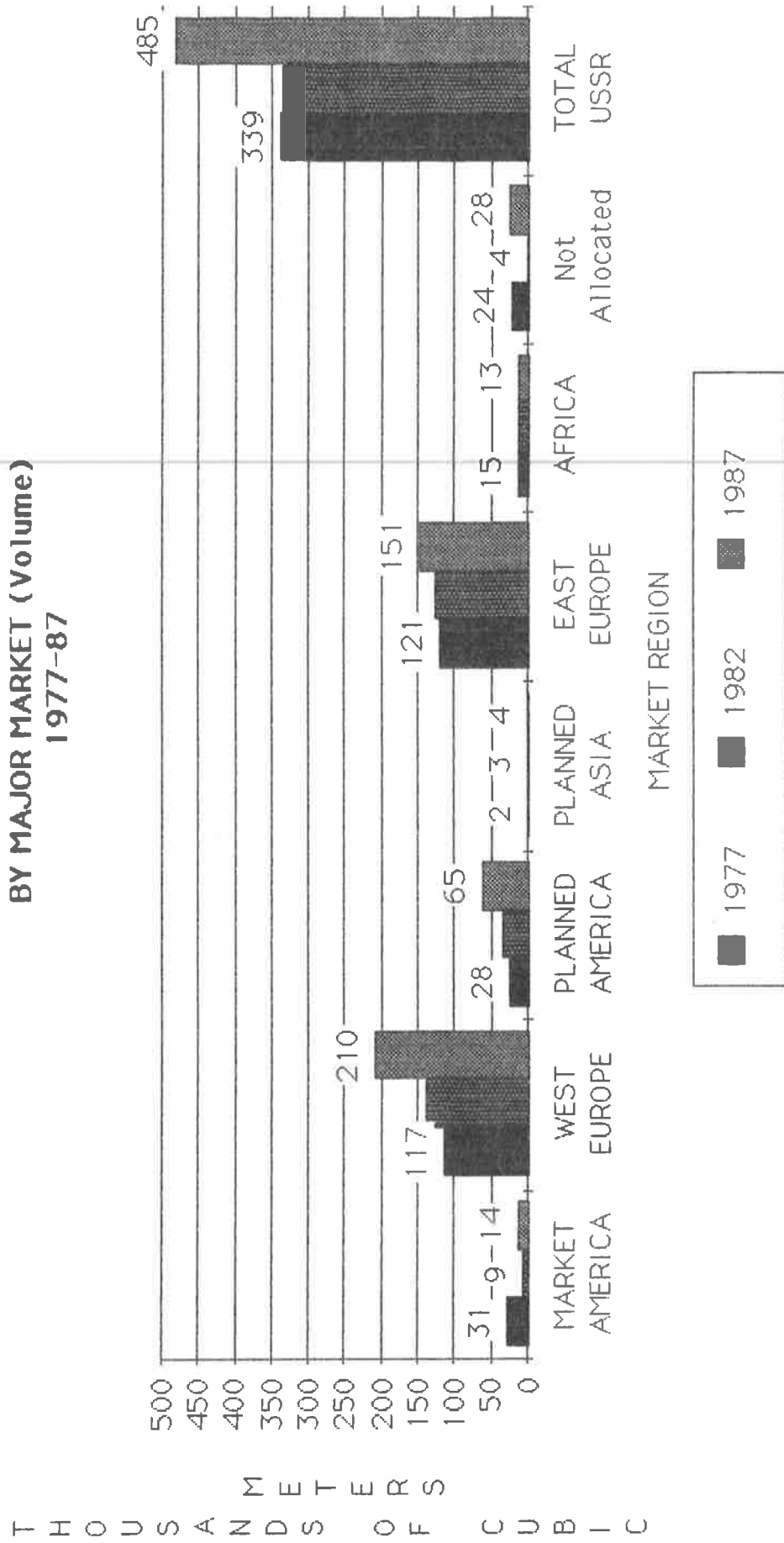
FIGURE 4-62: DISTRIBUTION OF USSR PLYWOOD EXPORTS
BY MAJOR MARKET (Percent)
1977-87



Revised: July 26/90

SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-63: USSR PLYWOOD EXPORTS
BY MAJOR MARKET (Volume)
1977-87



Revised: July 26/90

SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-64 * USSR: SHARE OF WORLD
PARTICLEBOARD EXPORTS
1977-87

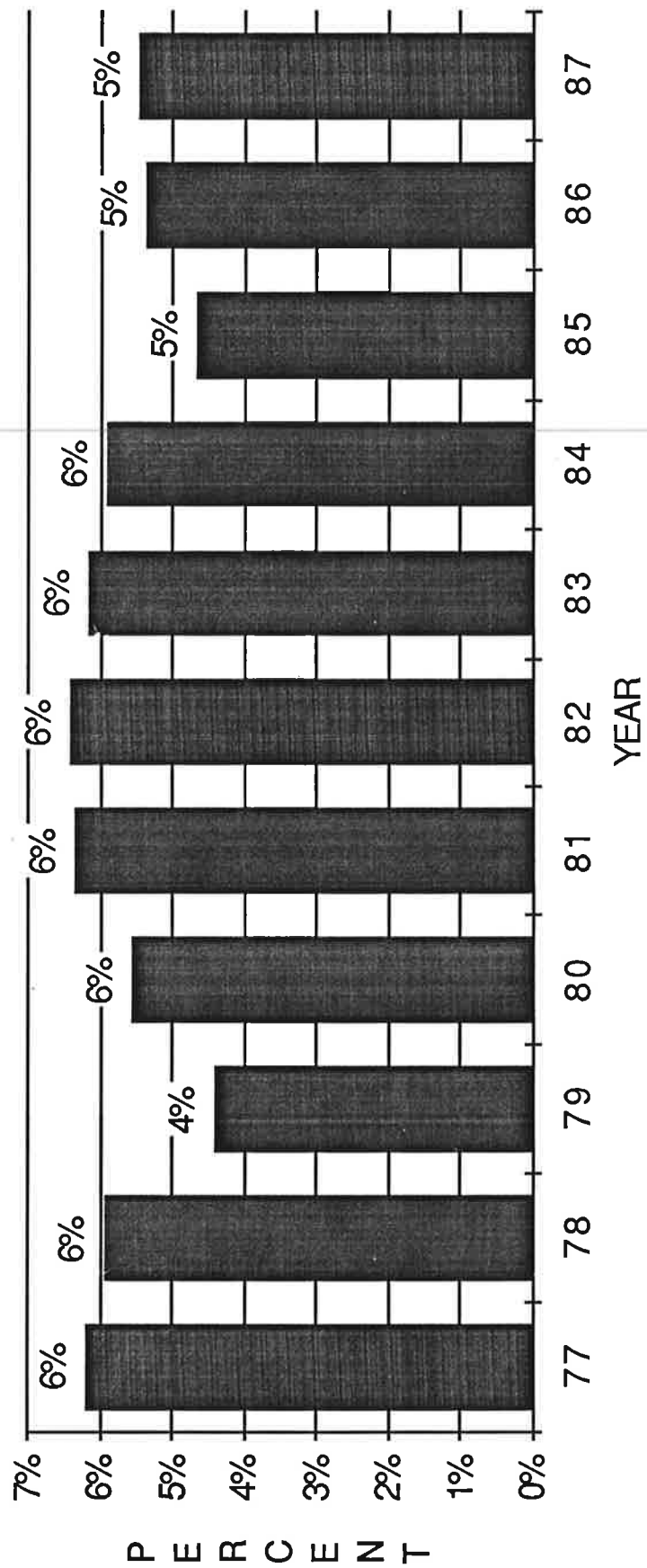
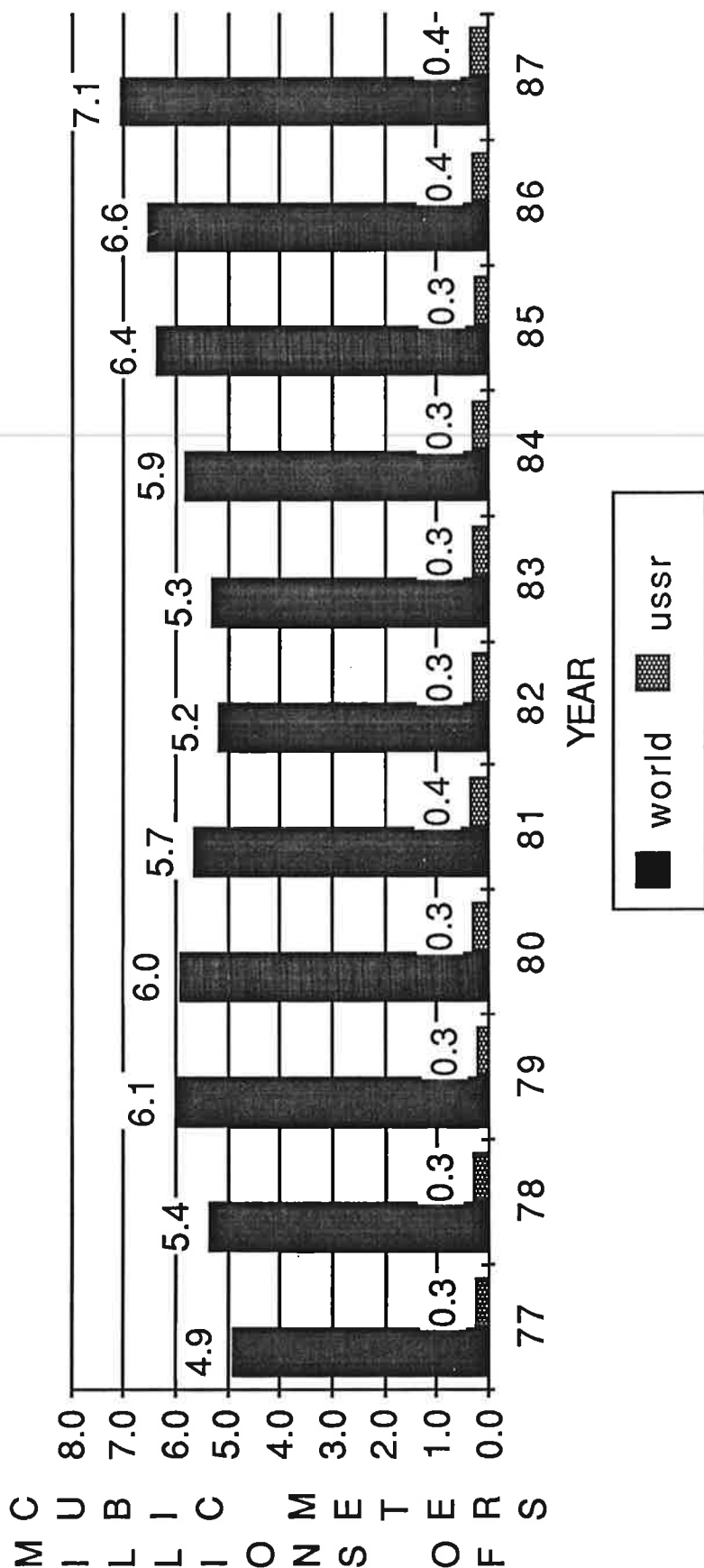
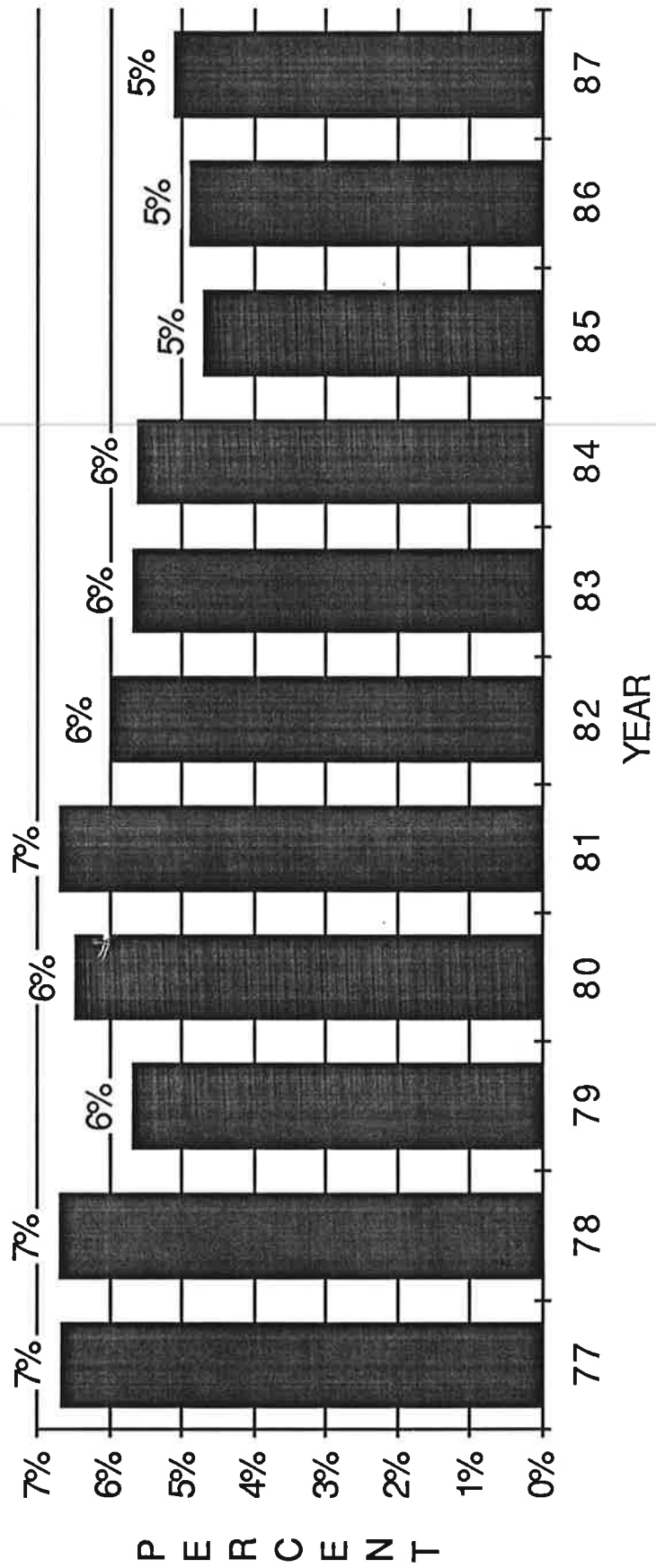


FIGURE 4-65 * WORLD AND USSR EXPORTS
OF PARTICLEBOARD
1977-87



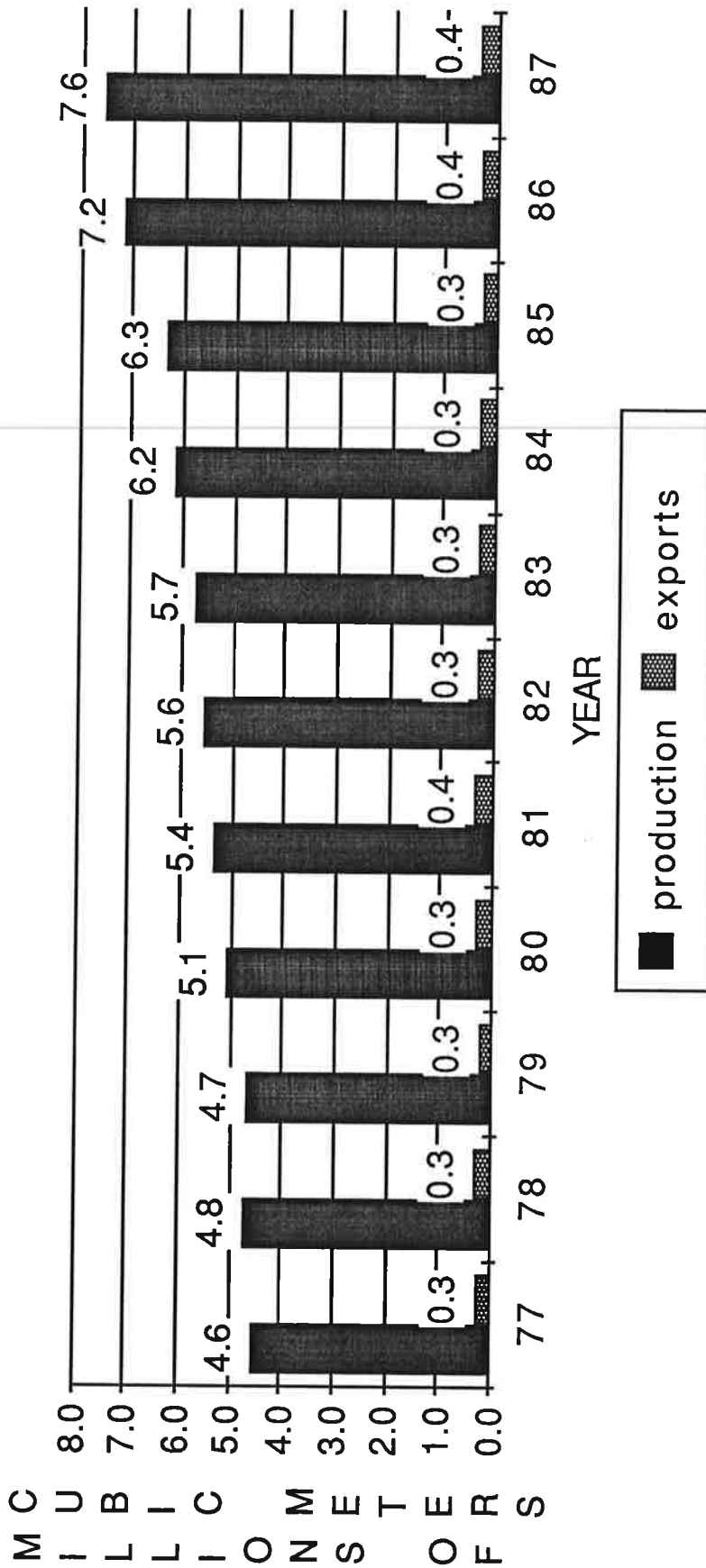
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-66 * USSR: SHARE OF DOMESTIC PARTICLEBOARD
PRODUCTION EXPORTED
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-67 * USSR EXPORTS AND DOMESTIC PRODUCTION
OF PARTICLEBOARD
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

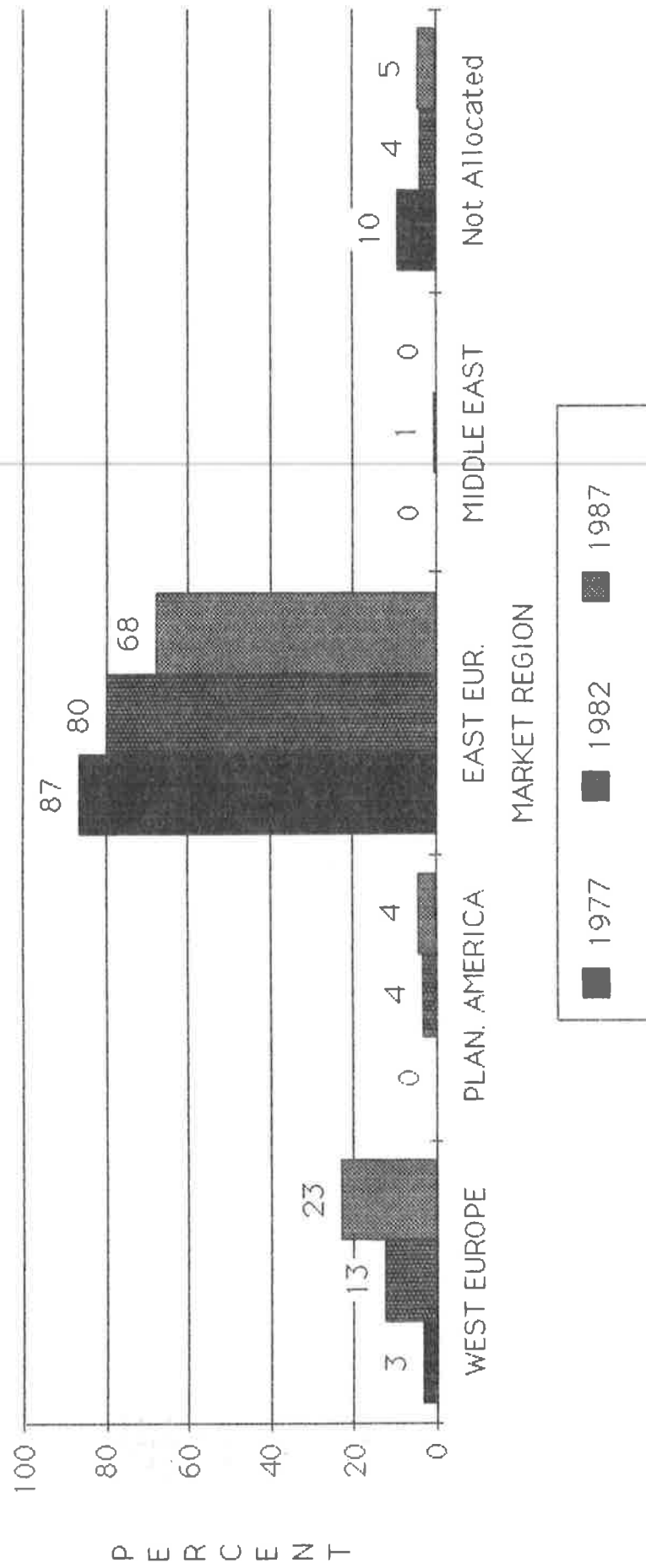
The fastest growing Soviet Market has been Western Europe which increased its share of Soviet exports from 4 percent in 1977 to 24 percent in 1987. The major markets in West Europe have been Great Britain (15 percent) and France (9 percent). In 1987 the major importing countries in East Europe were GDR and Poland with 29 percent and 27 percent of Soviet exports respectively. In 1987, the USSR supplied 72 percent of the GDR import market and 100 percent of the Polish import market. In West Europe, the USSR supplied 3 percent of UK imports and 5 percent of French imports of particleboard.

Figures 4.68 and 4.69 delineate the distribution of Soviet particleboard exports on a percentage and volume basis respectively.

Fiberboard: The Soviet Union has been a major exporter of fibreboard. It contributed between 11 and 13 percent of the global exports between 1977 and 1987, and has been consistently the second largest volume exporter. The primary exporter has been the United States, which held 15 percent of the export market in 1987. Figures 4.70 and 4.71 show the share of world lumber exports accounted for by the Soviet Union, and a comparison of Soviet exports to total world exports on a volume basis.

Exports of fiber board also increased between 1977 and 1987, from 84 thousand square meters to 103 thousand square meters. Exports as a share of Soviet domestic production has not exceeded 10 percent. Figures 4.72 and 4.73d show Soviet exports as a share of domestic production and contrast

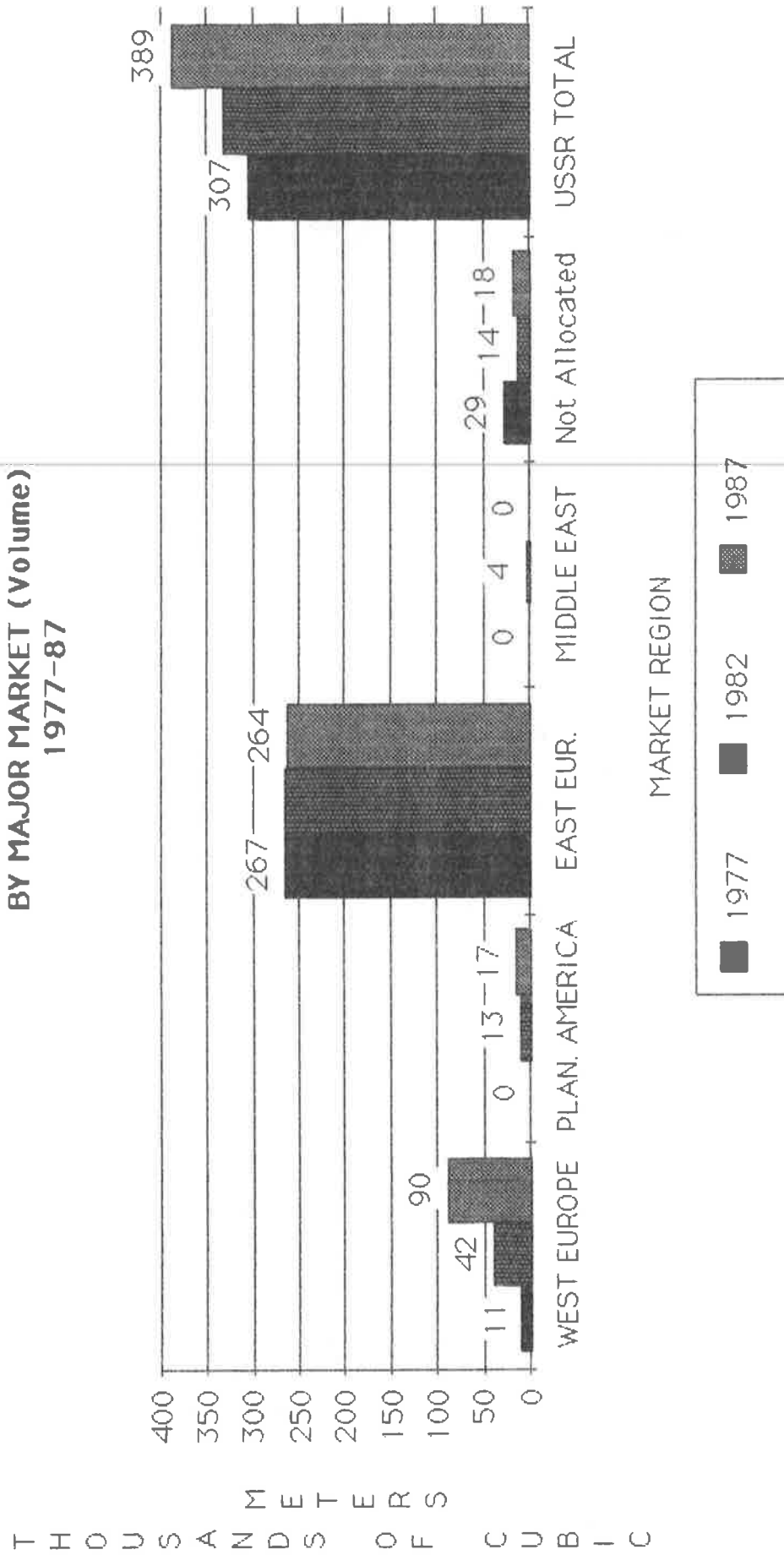
FIGURE 4-68: DISTRIBUTION OF USSR PARTICLEBOARD EXPORTS BY MAJOR MARKET (Percent) 1977-87



Revised: July 26/90

SOURCE: Vneshnyaya Torgovlya, various years

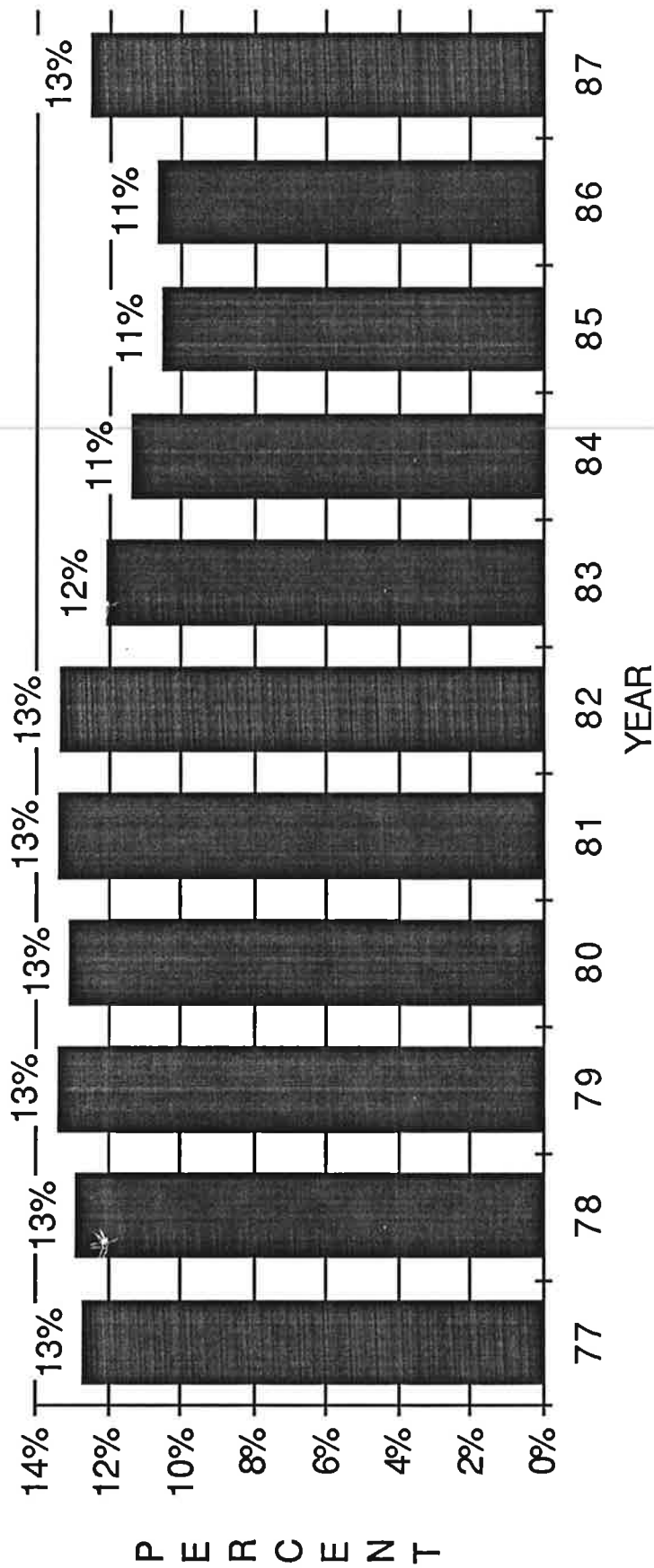
FIGURE 4-69: USSR PARTICLE BOARD EXPORTS
BY MAJOR MARKET (Volume)
1977-87



Revised: July 26/90

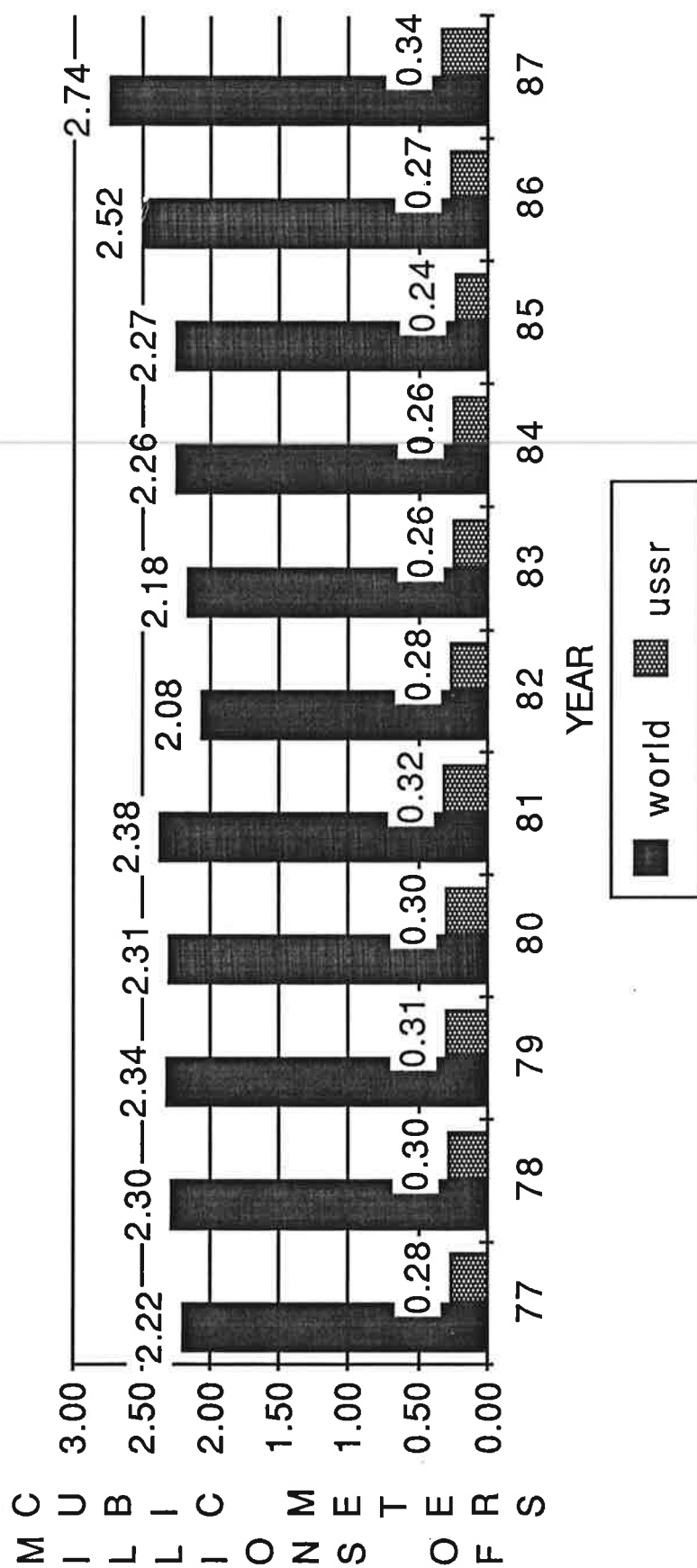
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-70 * USSR: SHARE OF WORLD
FIBREBOARD EXPORTS
1977-87



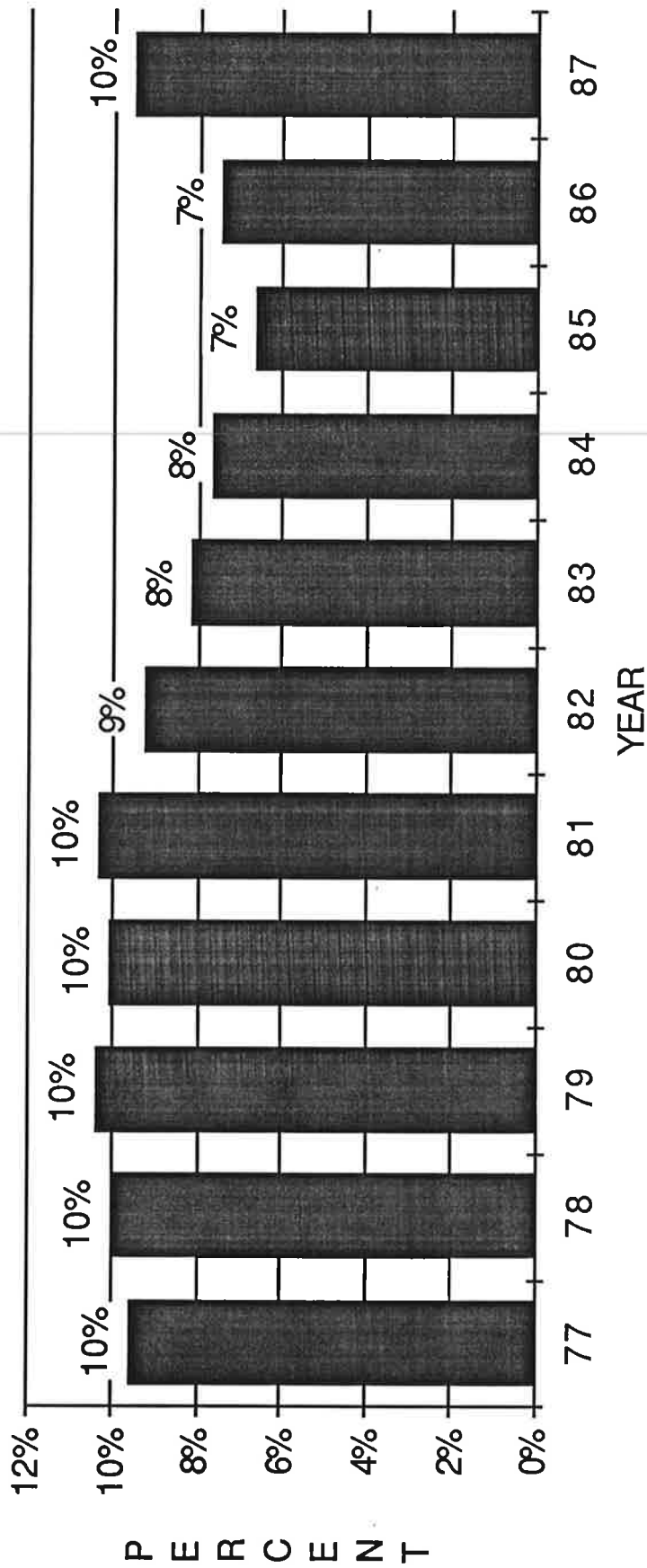
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-71 * WORLD AND USSR EXPORTS
OF FIBREBOARD
1977-87



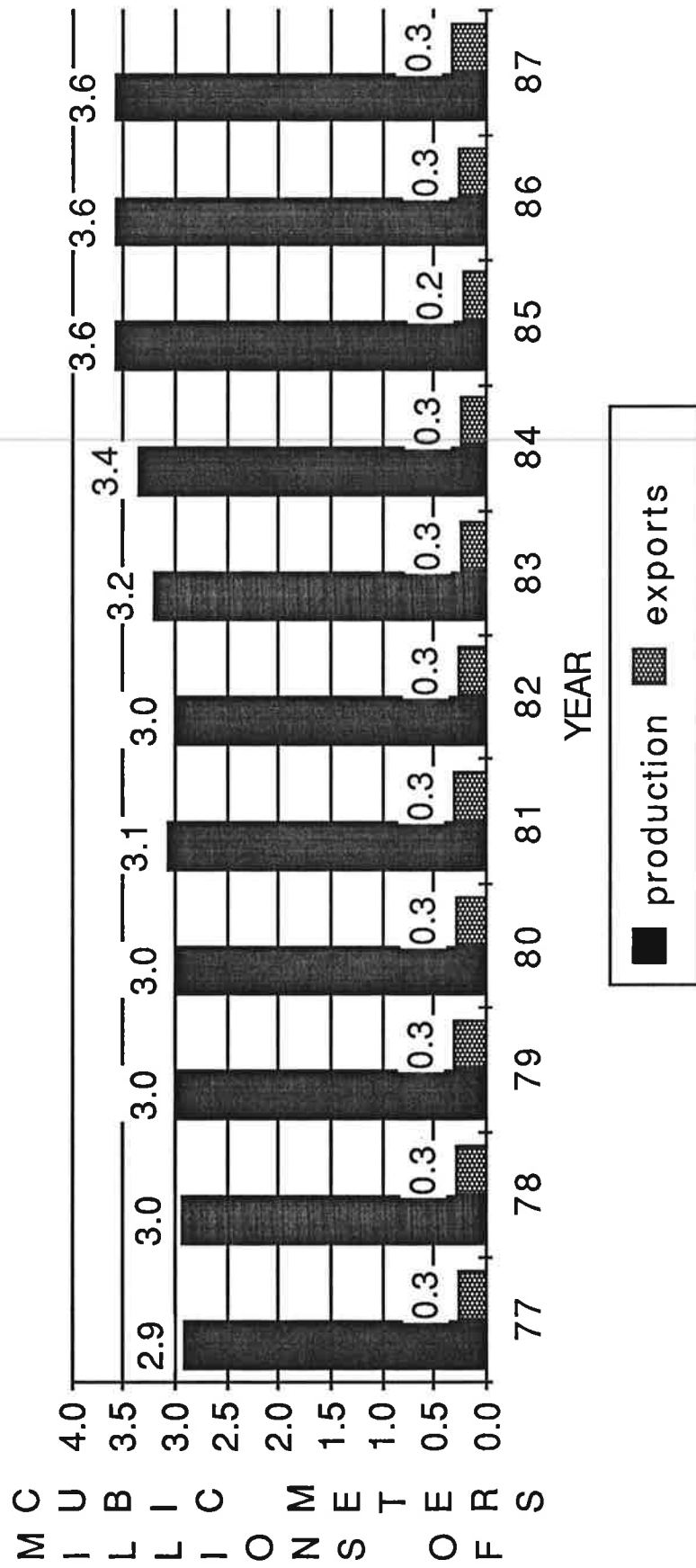
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-72 * USSR: SHARE OF DOMESTIC
FIBREBOARD PRODUCTION EXPORTED
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-73 * USSR EXPORTS AND DOMESTIC PRODUCTION OF FIBREBOARD 1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

domestic production to export volume for the period 1977 to 1987.

The major markets for Soviet exports have been East Europe, Market America, and Planned America (Cuba) which in 1987 accounted for 54, 19, and 15 percent of total Soviet exports. The major countries within East Europe were Poland and GDR with 27 percent and 17 percent respectively. The United States received 19 percent while Cuba received 15 percent of the Soviet exports.

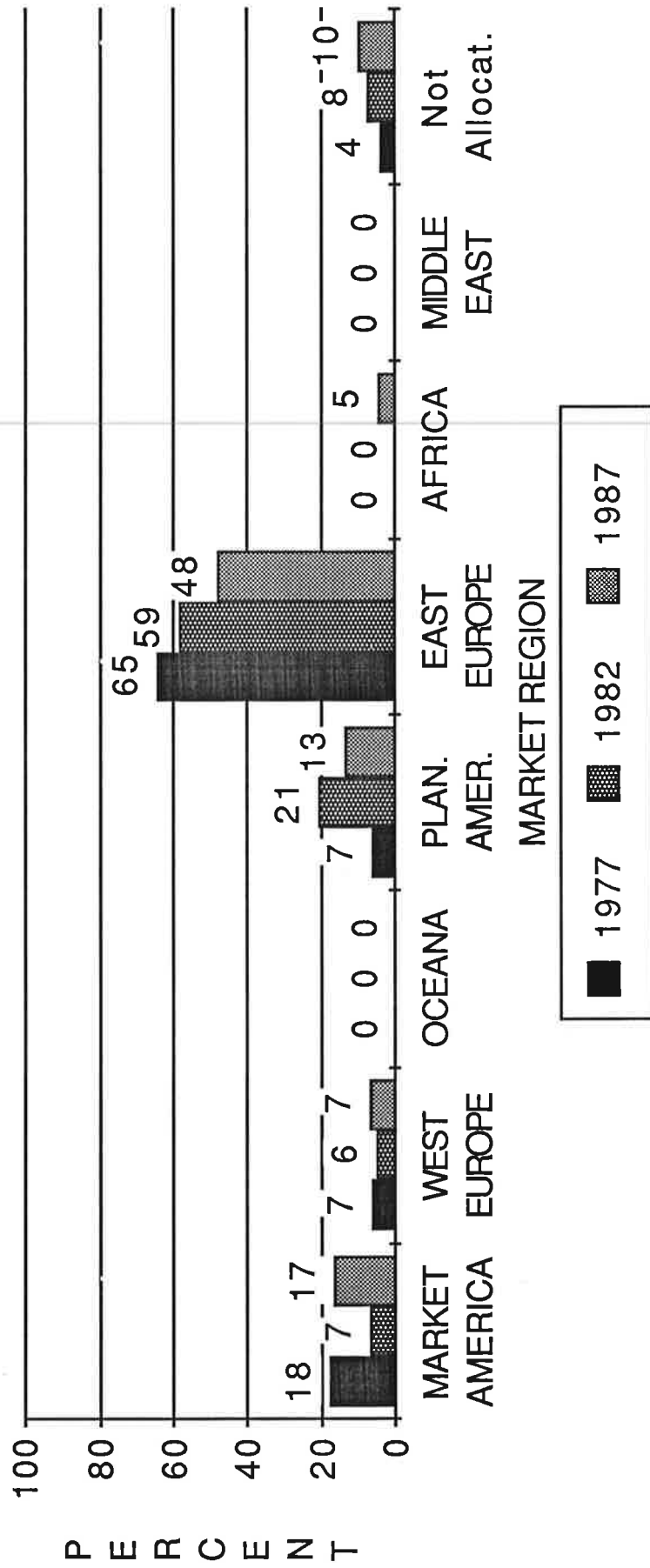
In 1987, the USSR supplied 62 percent of the Polish fiberboard market, 95 percent of the East German market, 7 percent of the US market and 100 percent of the Cuban market.

Figures 4.74 and 4.75 show the distribution of Soviet fiberboard exports on a proportional and volume basis respectively.

Sulfite Pulp: The Soviet Union has been an important exporter of sulfite pulp to world markets. It contributed between 43 percent and 53 percent of the global exports between 1982 and 1987, and has consistently been the largest exporter. Sweden has been a distant second, accounting for 13 percent of the exports in 1987. Figures 4.76 and 4.77 show the share of world lumber exports captured by the Soviet Union and a comparison of the Soviet exports to total world exports on a volume basis.

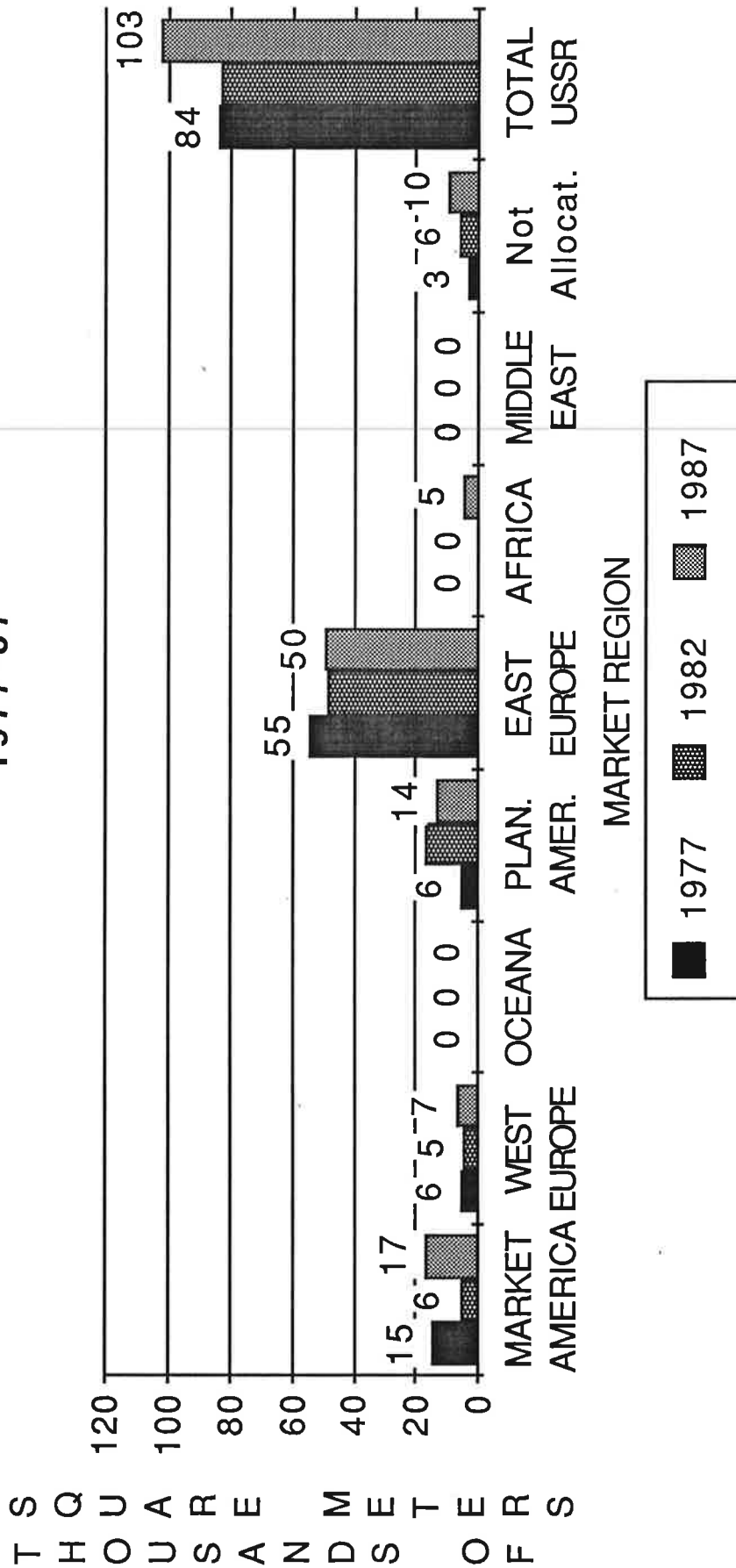
Soviet exports of sulfite pulp have remained constant at about 200 thousand tons per year. In 1977, exports were 206 thousand tons while 1987 exports were 196 thousand tons.

**FIGURE 4-74: DISTRIBUTION OF USSR FIBERBOARD EXPORTS
BY MAJOR MARKET (Percent)
1977-87**



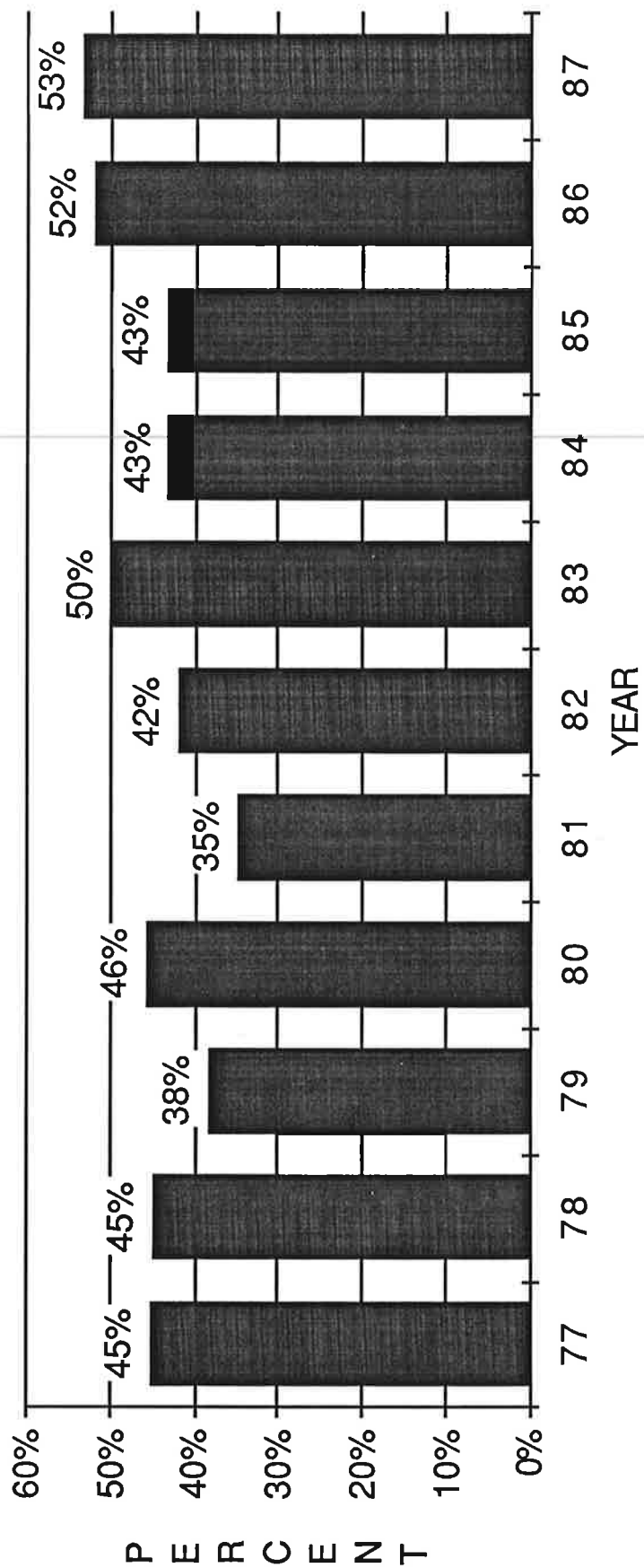
SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-75: USSR FIBREBOARD EXPORTS
BY MAJOR MARKET (Volume)
1977-87**



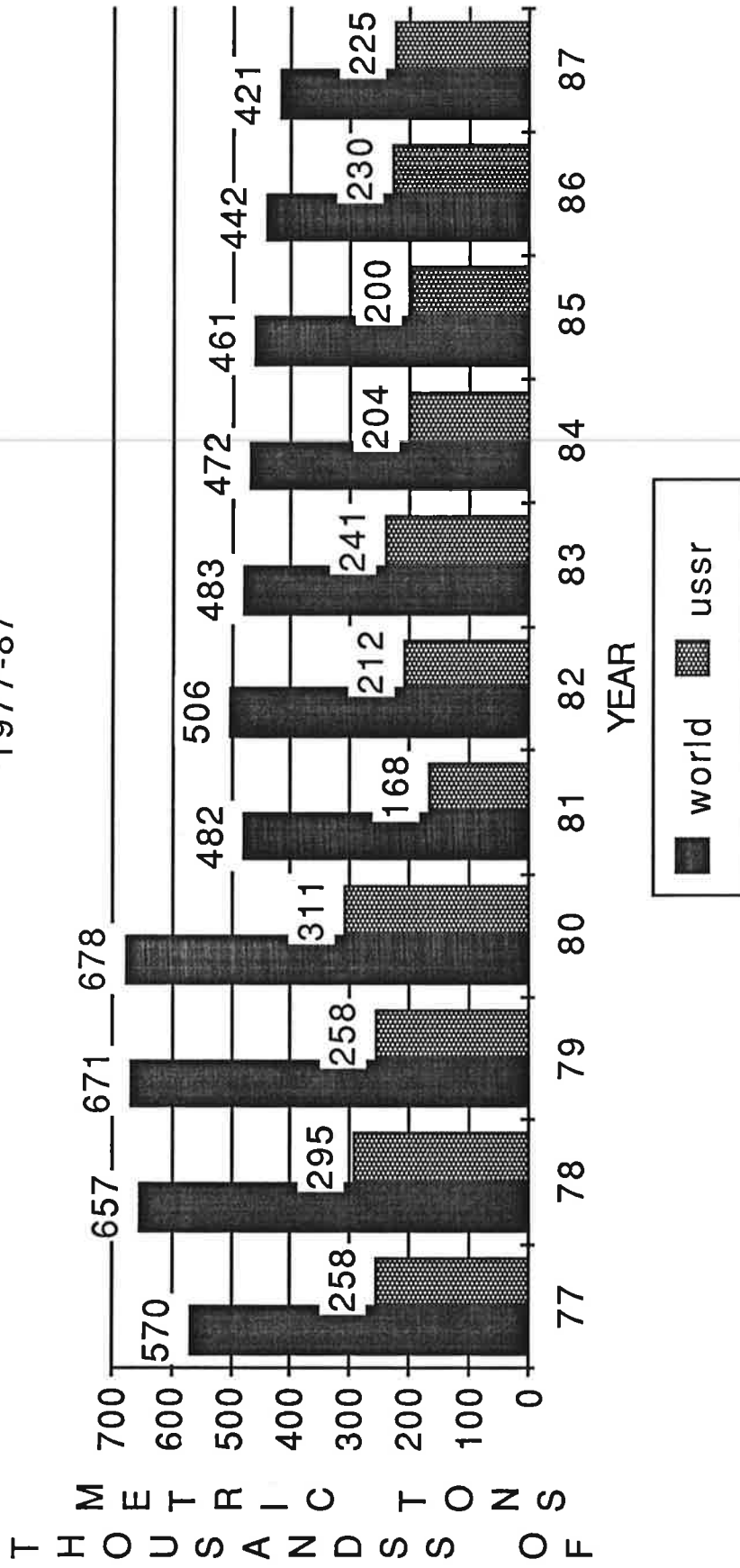
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-76 * USSR: SHARE OF WORLD
UNBLEACHED SULFITE PULP EXPORTS
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-77 * WORLD AND USSR EXPORTS OF
UNBLEACHED SULFITE PULP
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

Exports as a share of domestic production has never exceeded 8 percent. Figures 4.78 and 4.79 show Soviet exports as a share of domestic production and compares domestic production to export volume for the period 1977 to 1987.

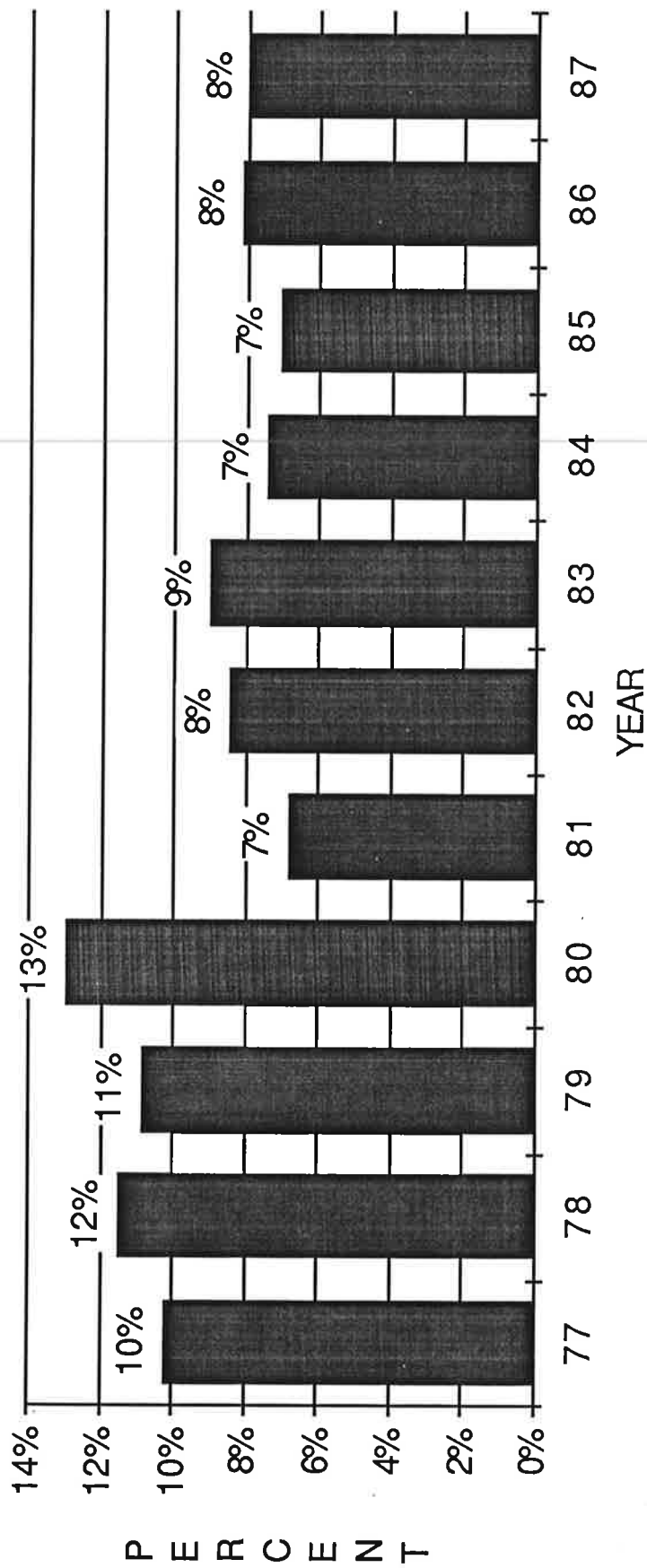
The major Soviet export market for sulfite pulp in 1987 was East Europe, which represented 70 percent of export volume followed by West Europe which accounted for 13 percent of the export volume. The major importing countries within East Europe were Poland (22 percent), Hungary (18 percent) and Bulgaria (13 percent). In West Europe, the major importer was FRG with 5 percent of the Soviet export volume.

From FAO import data, the share of each of the above countries imports which originated from the USSR is not identified. Figures 4.80 and 4.81 delineate the distribution of Soviet sulfite pulp exports on a percentage and volume basis respectively.

Sulfate Pulp: The Soviet Union is also a significant exporter of unbleached sulfate pulp to world markets. It contributed between 30 and 34 percent of global exports between 1977 and 1987, and has consistently been the largest exporter. Canada has been a distant second leading exporter, accounting for 18 percent of the market in 1987. Figures 4.82 and 4.83 show the share of world unbleached sulfate pulp exports accounted for by the Soviet Union, and a comparison of the Soviet exports to total world exports on a volume basis.

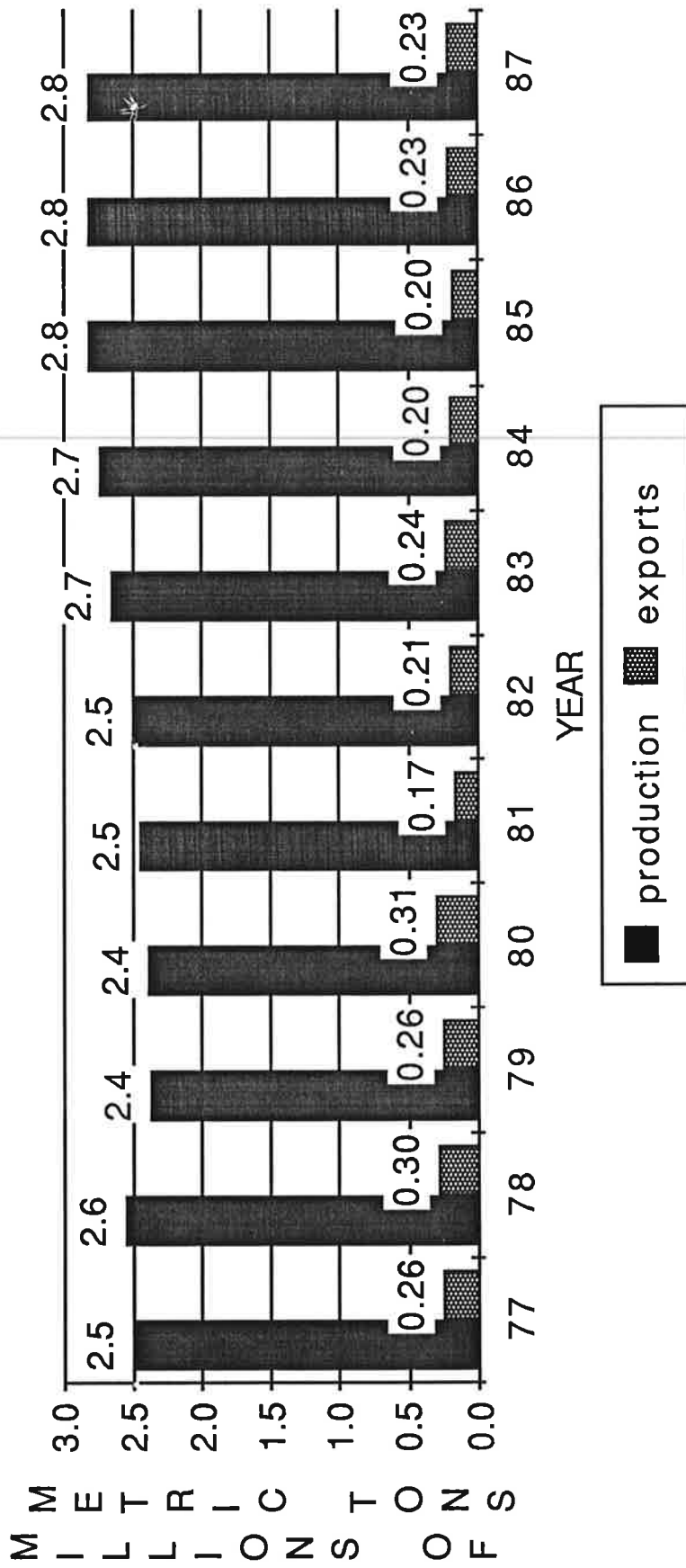
Sulfate pulp exports have increased from 474 thousand tons to 892 thousand tons annually between 1977 and 1987.

FIGURE 4-78 * USSR: SHARE OF DOMESTIC UNBLEACHED
SULFITE PULP PRODUCTION EXPORTED
1977-87



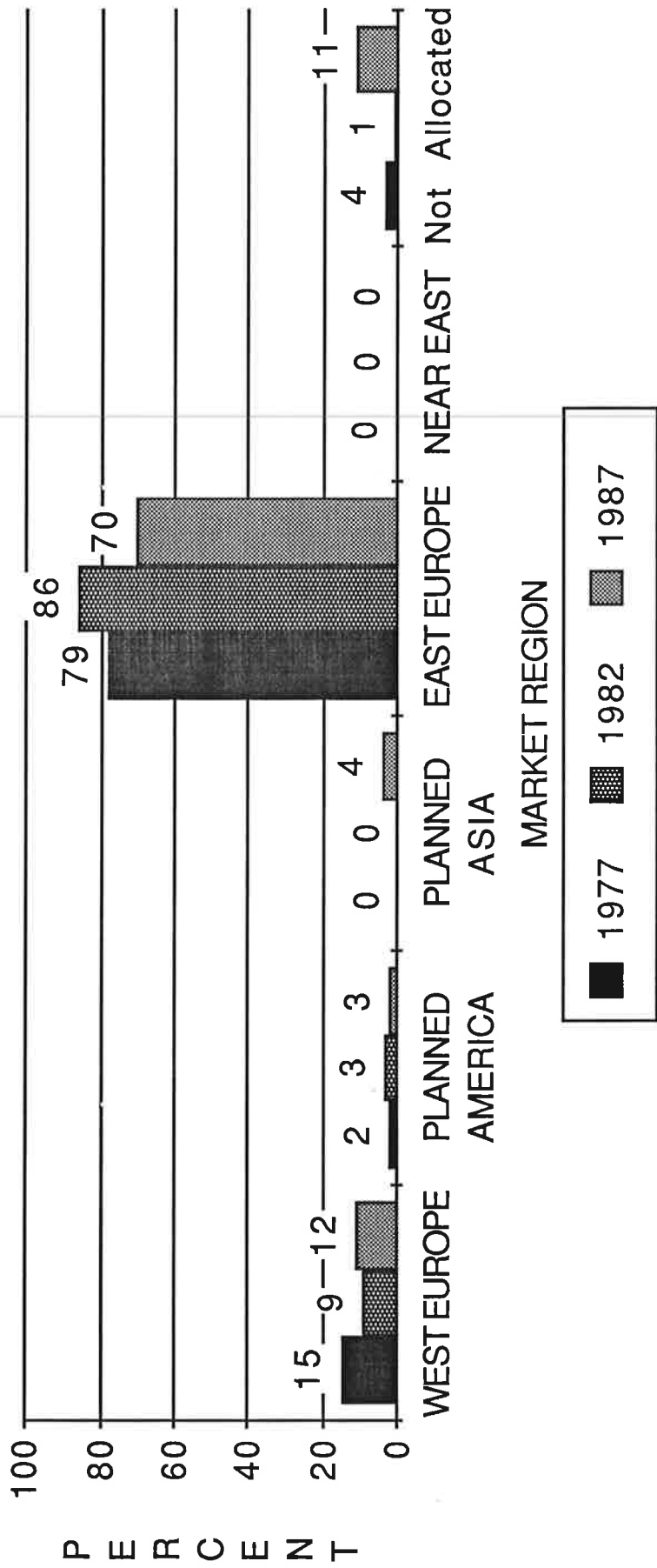
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-79 * USSR EXPORTS AND DOMESTIC PRODUCTION
OF UNBLEACHED SULFITE PULP
1977-87



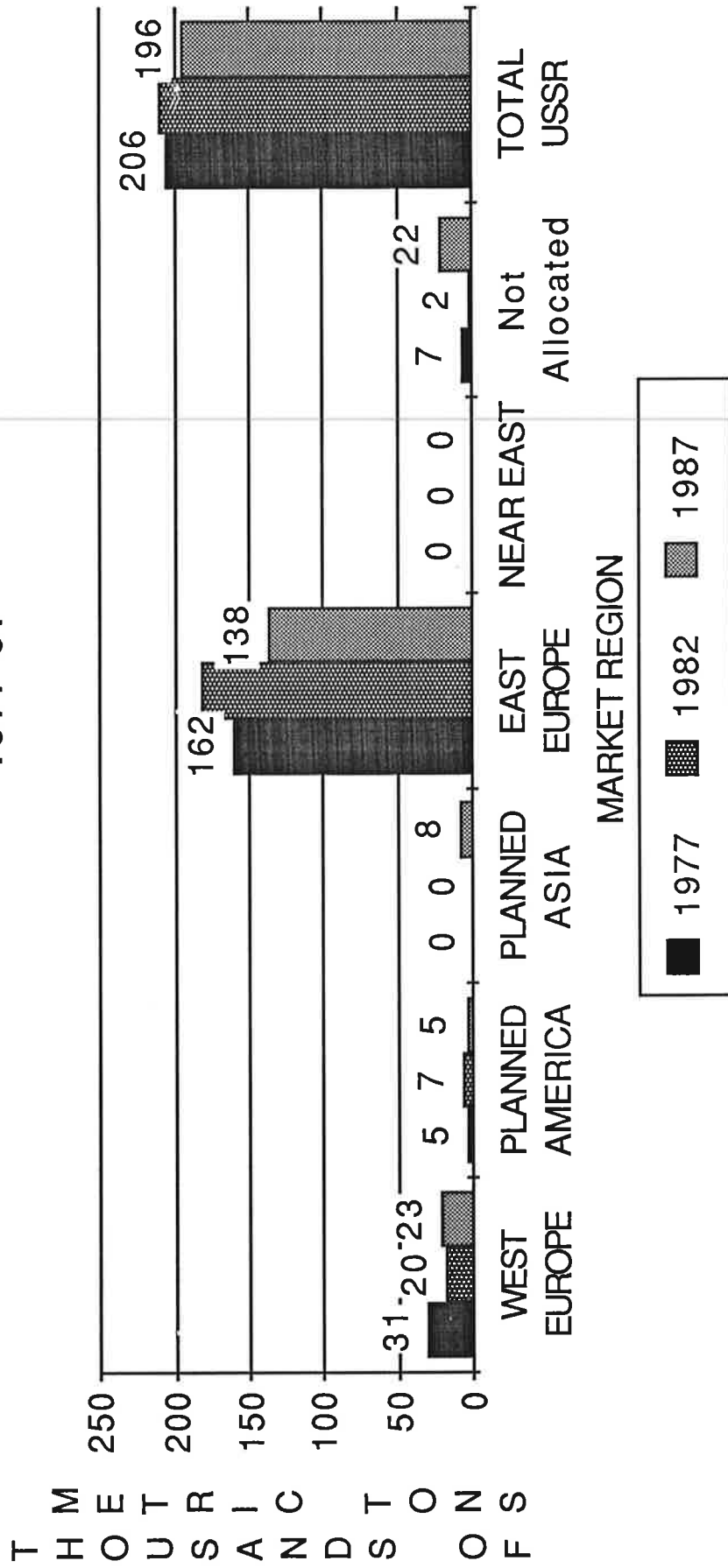
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-80: DISTRIBUTION OF USSR SULFITE PULP EXPORTS BY MAJOR MARKET (Percent) 1977-87



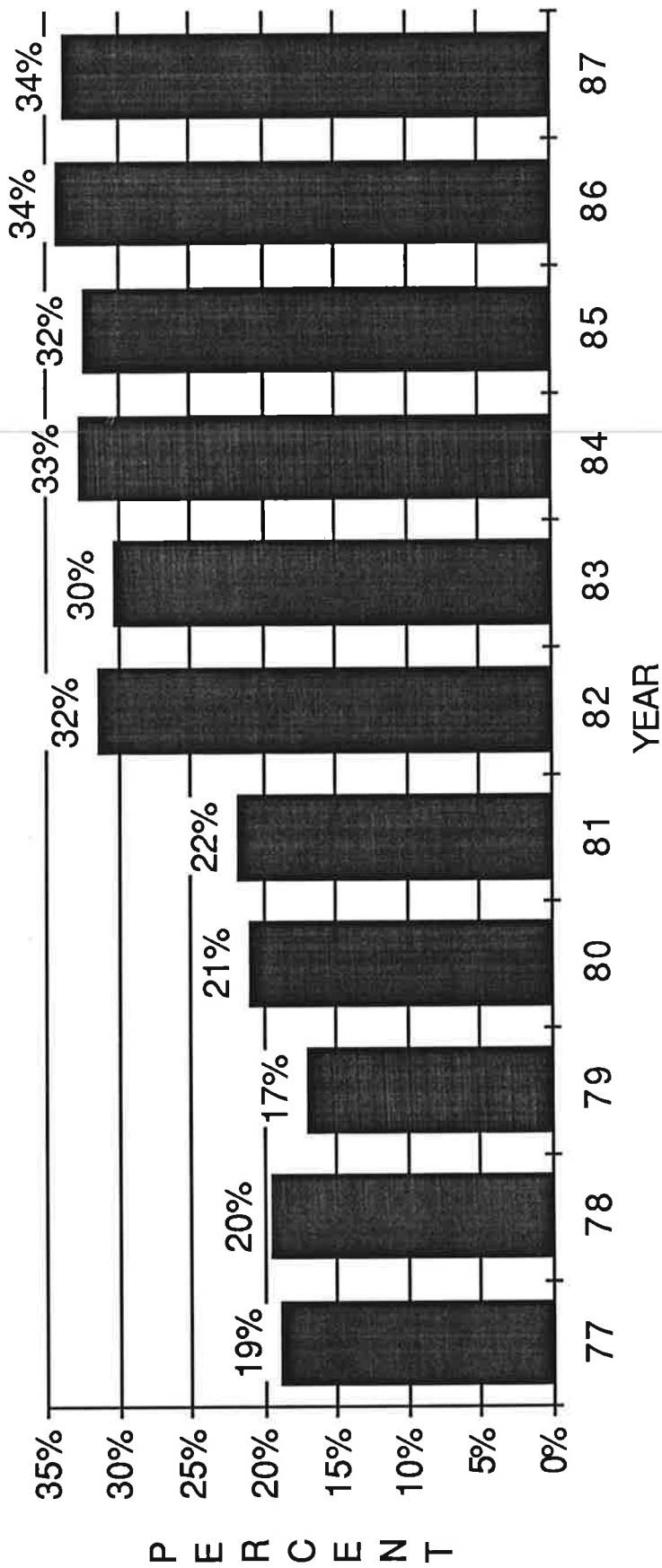
SOURCE: Vneshnyaya Torgoviya, various years

**FIGURE 4-81: USSR SULFITE PULP EXPORTS
BY MAJOR MARKET (Volume)
1977-87**



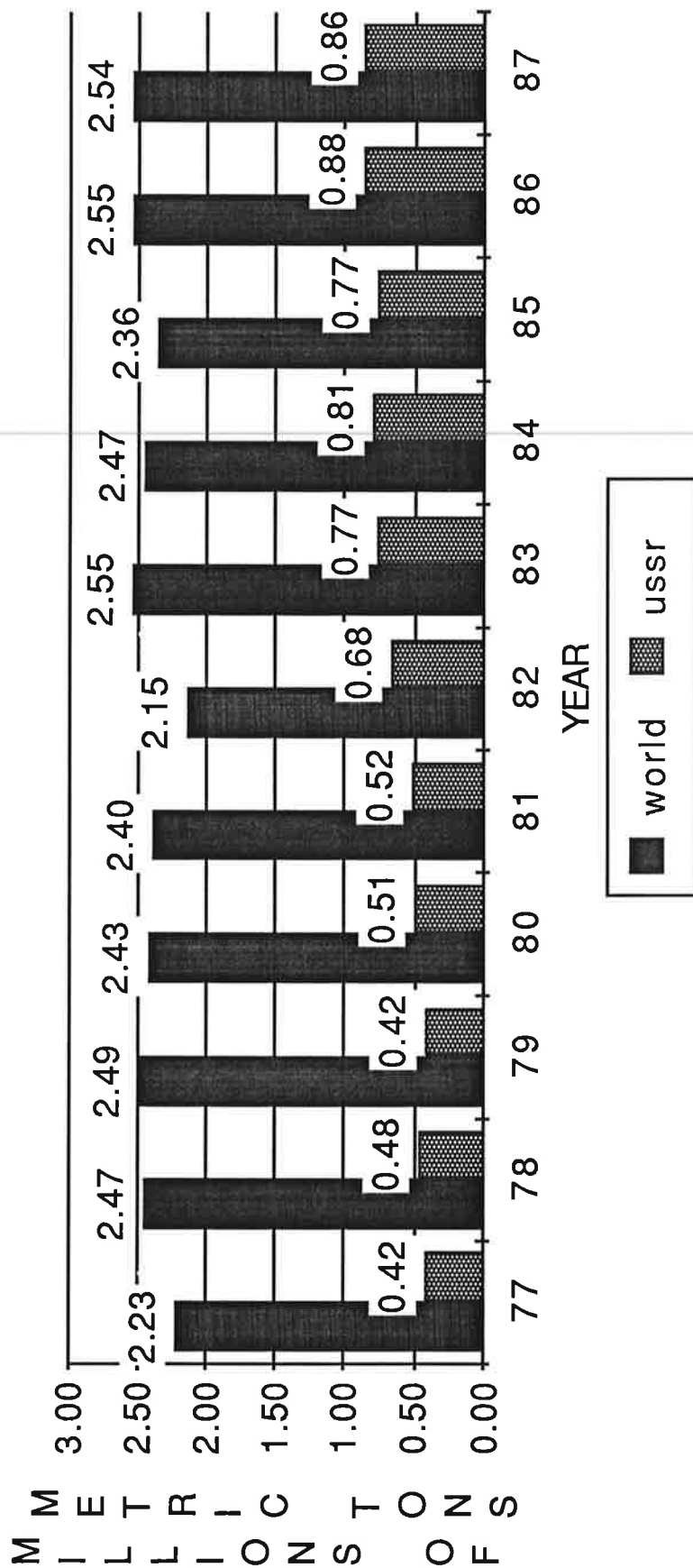
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-82 * USSR: SHARE OF WORLD
UNBLEACHED SULFATE PULP EXPORTS
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-83 * WORLD AND USSR EXPORTS OF
UNBLEACHED SULFATE PULP
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

Exports as a share of domestic production has not exceeded 21 percent. Figures 4.84 and 4.85 show Soviet exports as a share of domestic production and compare domestic production to export volume for the period 1977 to 1987.

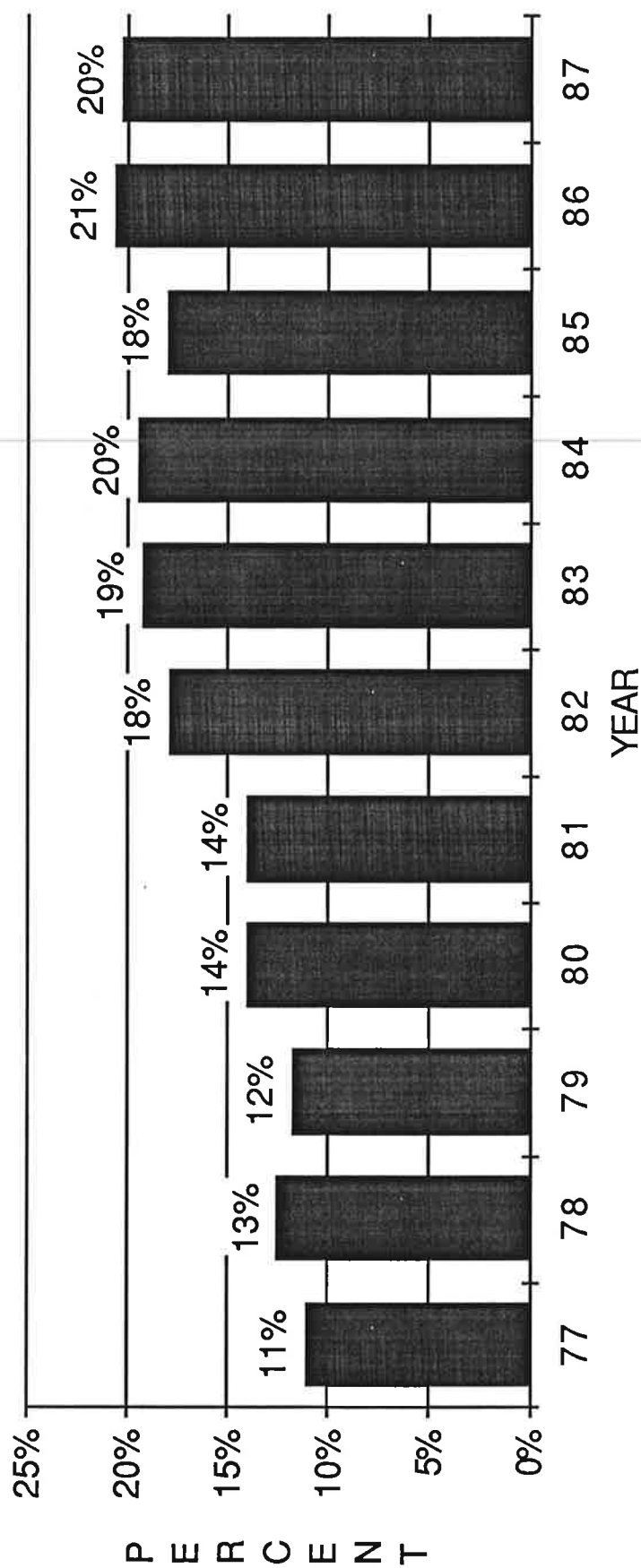
The major markets in 1987 were East Europe (59 percent) and West Europe (34 percent). Between 1977 and 1987, the share of share of Soviet exports to Western Europe increased from 27 percent to 34 percent, while exports to Eastern Europe decreased from 67 percent to 59 percent.

Within Eastern Europe, Soviet exports were allocated relatively evenly among Poland, GDR, Hungary, and Bulgaria which had respectively, 12, 11, 10 and 9 percent of the exports from the USSR. In Western Europe, the major markets were France, FRG, and Italy with 9, 8 and 7 percent of the total exports from the USSR respectively. Cuba received 5 percent of the Soviet exports of sulfate pulp. Figures 4.86 and 4.87 illustrate Soviet sulfate pulp exports on a percentage and volume basis respectively.

Market Share of Pulp

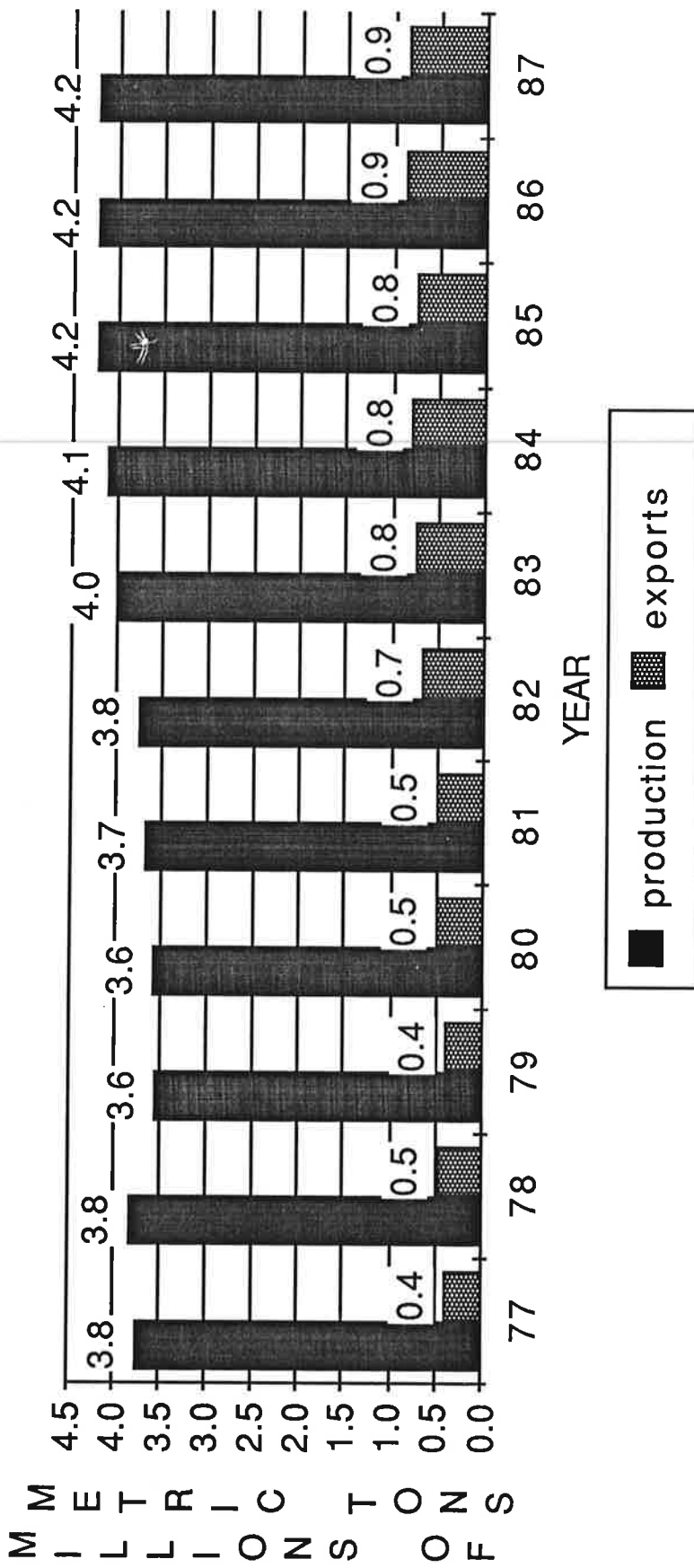
While it is difficult to determine the market share which is held by the USSR for pulp exports by type of pulp, it is possible to do so for wood pulp in general for a limited group of countries. According to FAO data for 1987, the USSR supplied 4 percent of the Italian imports, 5 percent of French imports, and 2 percent of the UK imports of all pulp grades.

FIGURE 4-84 * USSR: SHARE OF DOMESTIC UNBLEACHED
SULFATE PULP PRODUCTION EXPORTED
1977-87



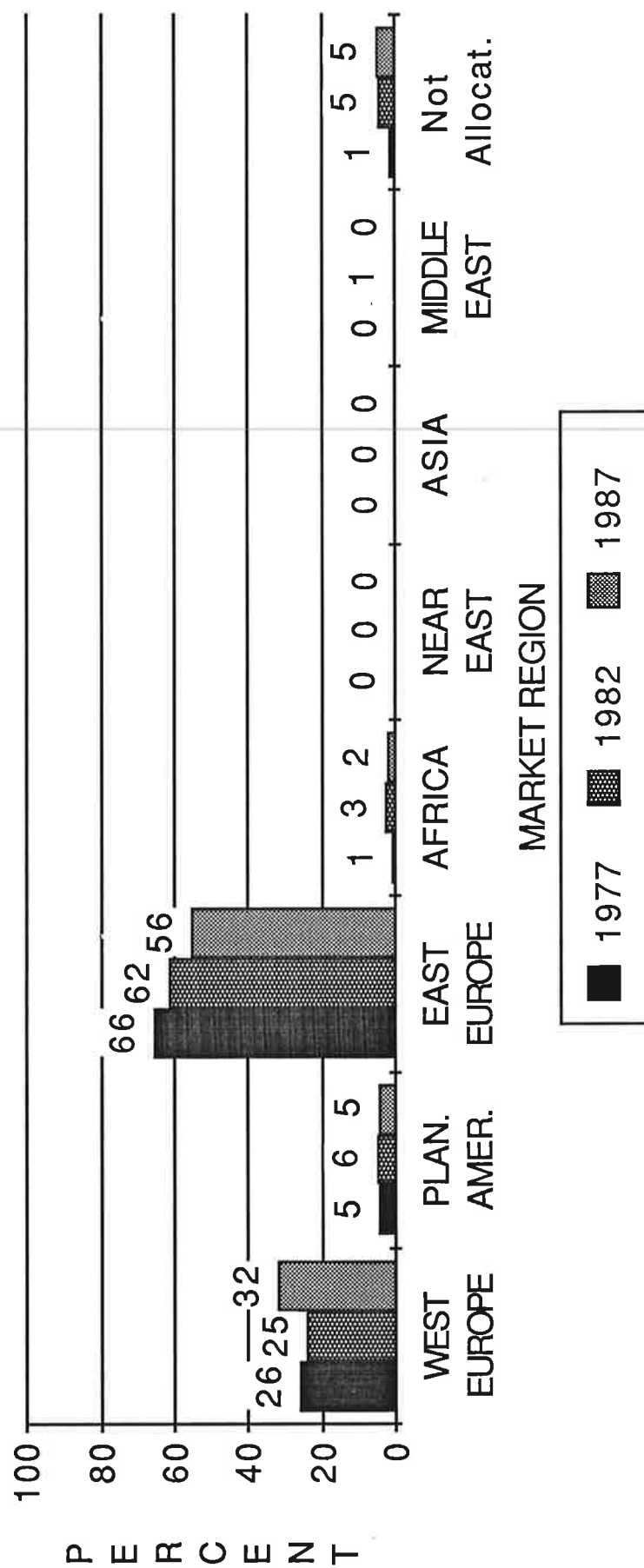
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-85 * USSR EXPORTS AND DOMESTIC PRODUCTION
OF UNBLEACHED SULFATE PULP
1977-87



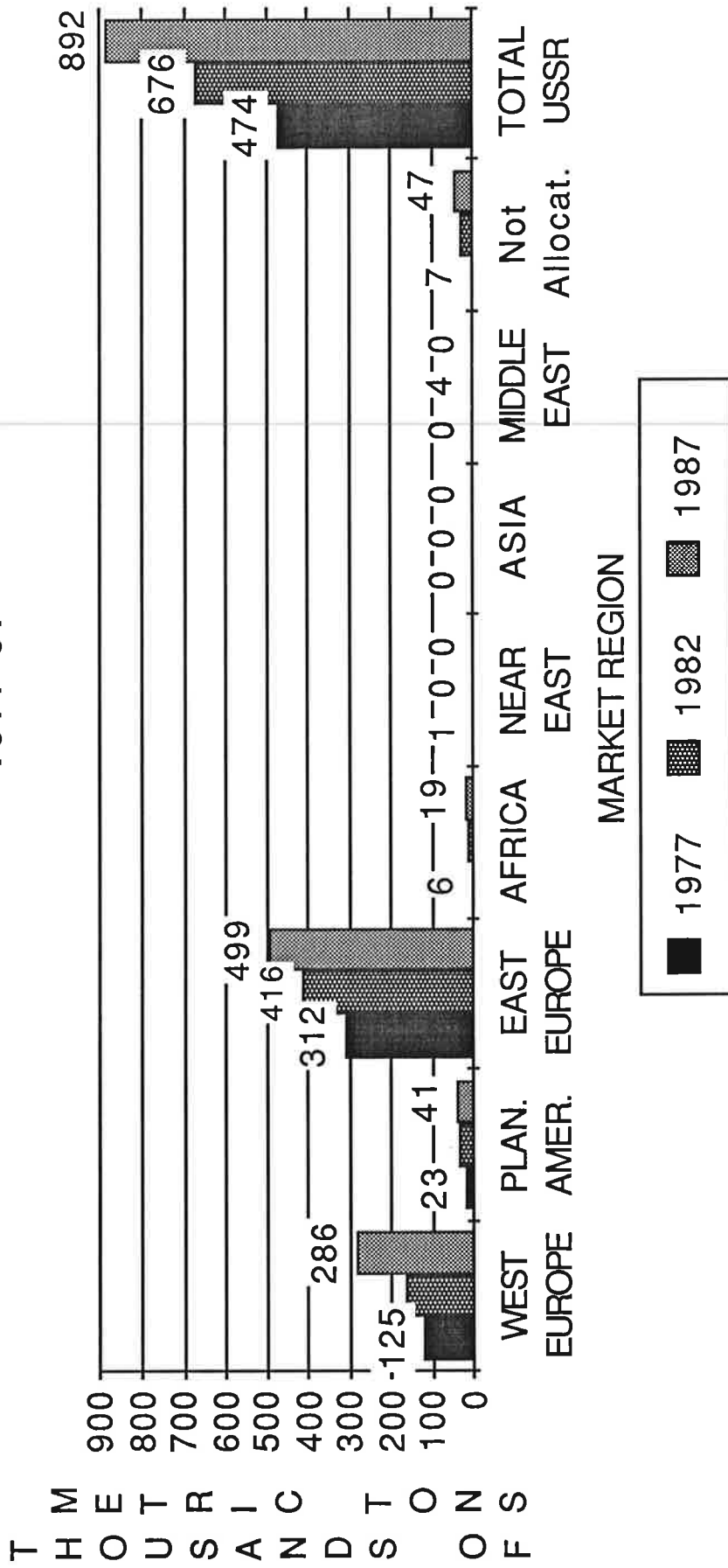
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-86: DISTRIBUTION OF USSR SULFATE PULP EXPORTS BY MAJOR MARKET (Percent) 1977-87



SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-87: USSR SULFATE PULP EXPORTS
BY MAJOR MARKET (Volume)
1977-87**



SOURCE: Vneshnyaya Torgovlya, various years

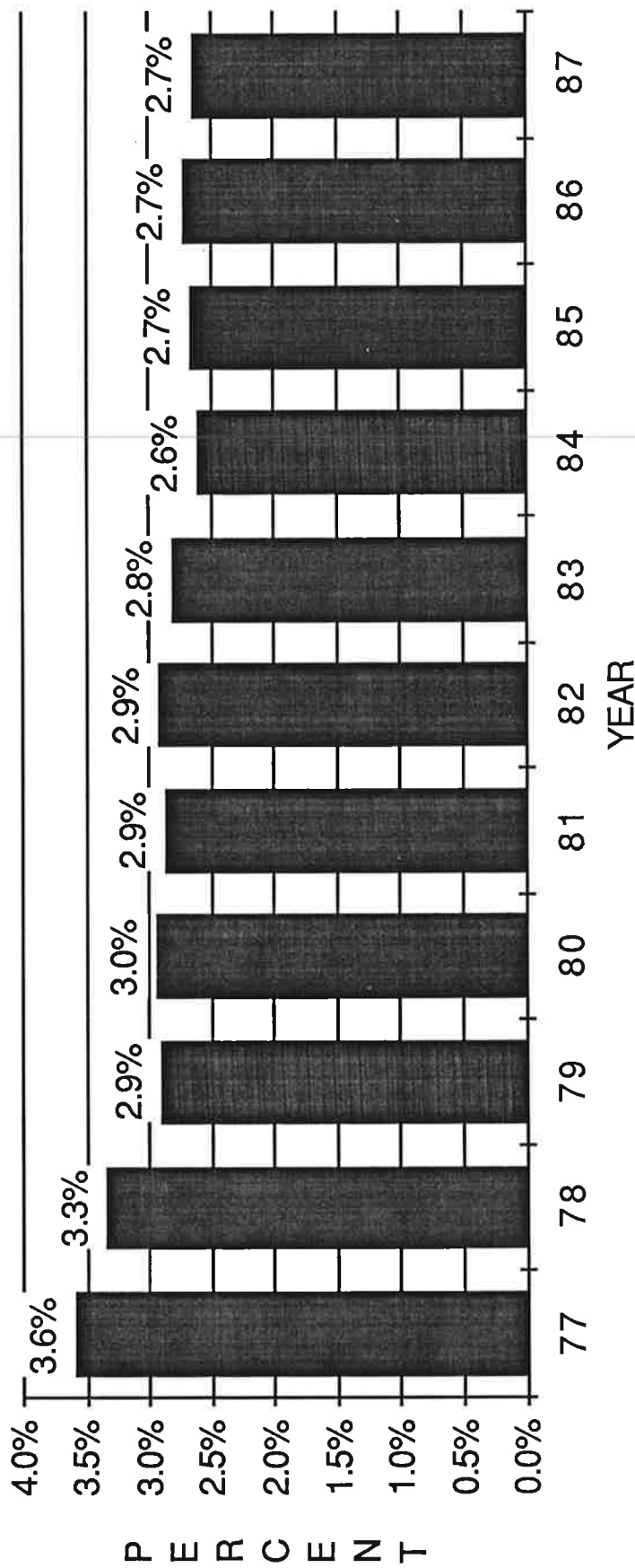
Paper: Paper and paperboard production is not clearly separated in the FAO trade statistics. Thus, the discussion of the share of world totals combines paper and paperboard into one aggregate category.

The Soviet Union plays a small role in the export of paper and paperboard to world markets. It contributed only 3 to 4 percent of exports between 1977 and 1987. The major exporting country has been Canada, followed by Finland and Sweden which respectively supplied 24 percent, 15 percent, and 13 percent of the export market in 1987. Figures 4.88a and 4.89 show the share of world paper and paperboard exports accounted for by the Soviet Union and compare Soviet exports to total world exports on a volume basis.

Exports of paper and paperboard have shown modest growth between 1977 and 1987. In 1977, 1 million metric tons were exported. In 1987, 1.3 million metric tons were sold. Exports as a share of Soviet domestic production has not exceeded 12 percent. Figures 4.90 and 4.91 show Soviet exports as a share of domestic production and contrast domestic production to the export volume over the period 1977 to 1987.

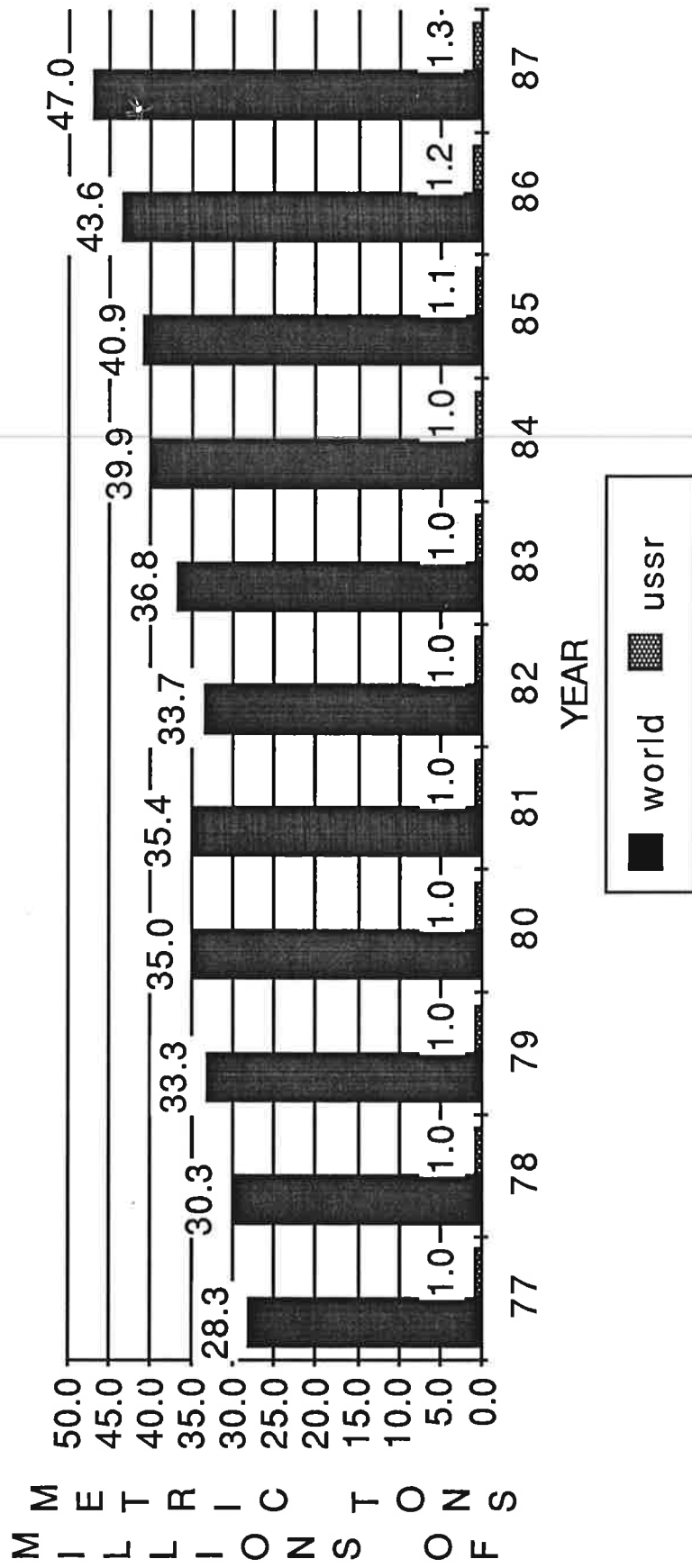
Exports of paper products, excluding paperboard, are obtainable directly from Soviet sources. Exports as a share of domestic production has not exceeded 12 percent. Figures 4.92 and 4.93 show Soviet exports as a share of domestic production and contrast domestic production to export volume for selected years in the period 1980 to 1987.

FIGURE 4-88 * USSR: SHARE OF WORLD PAPER
AND PAPERBOARD EXPORTS
1977-87



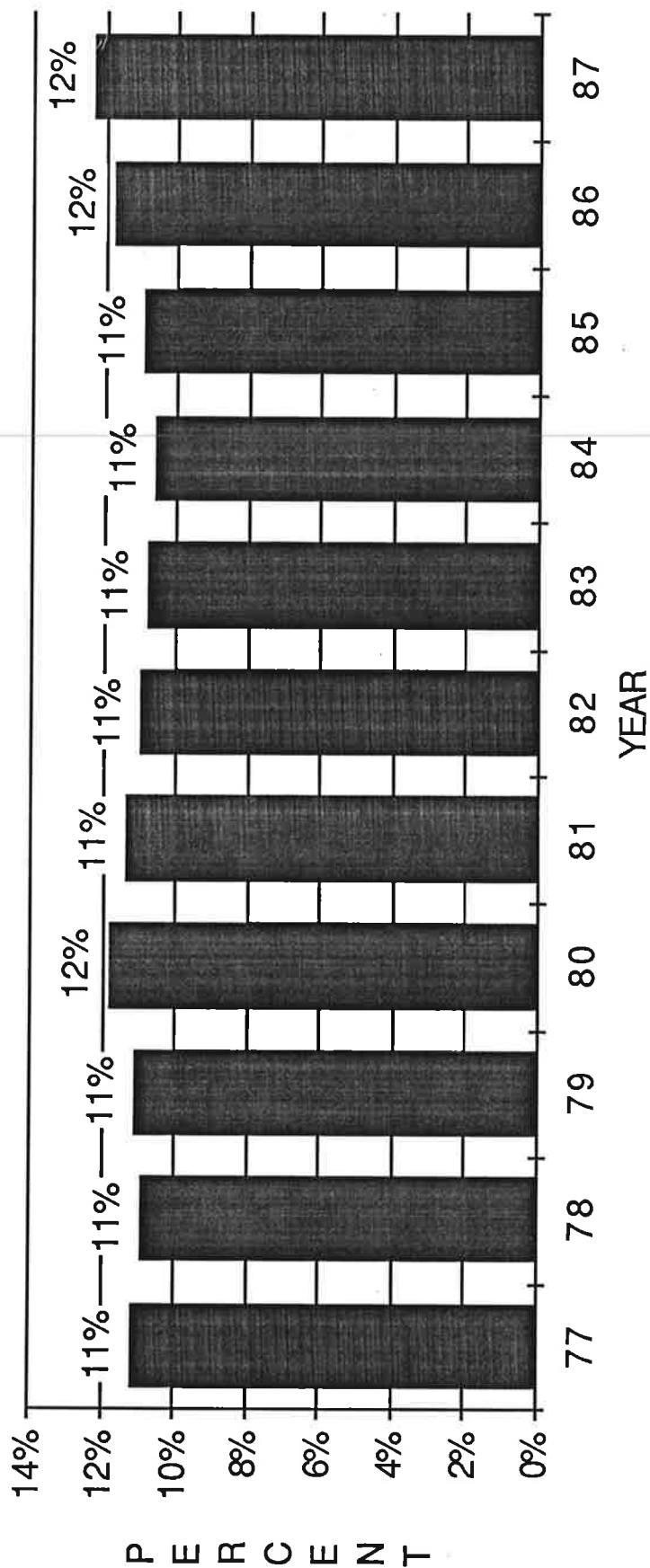
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-89 * WORLD AND USSR EXPORTS OF PAPER
AND PAPERBOARD
1977-87



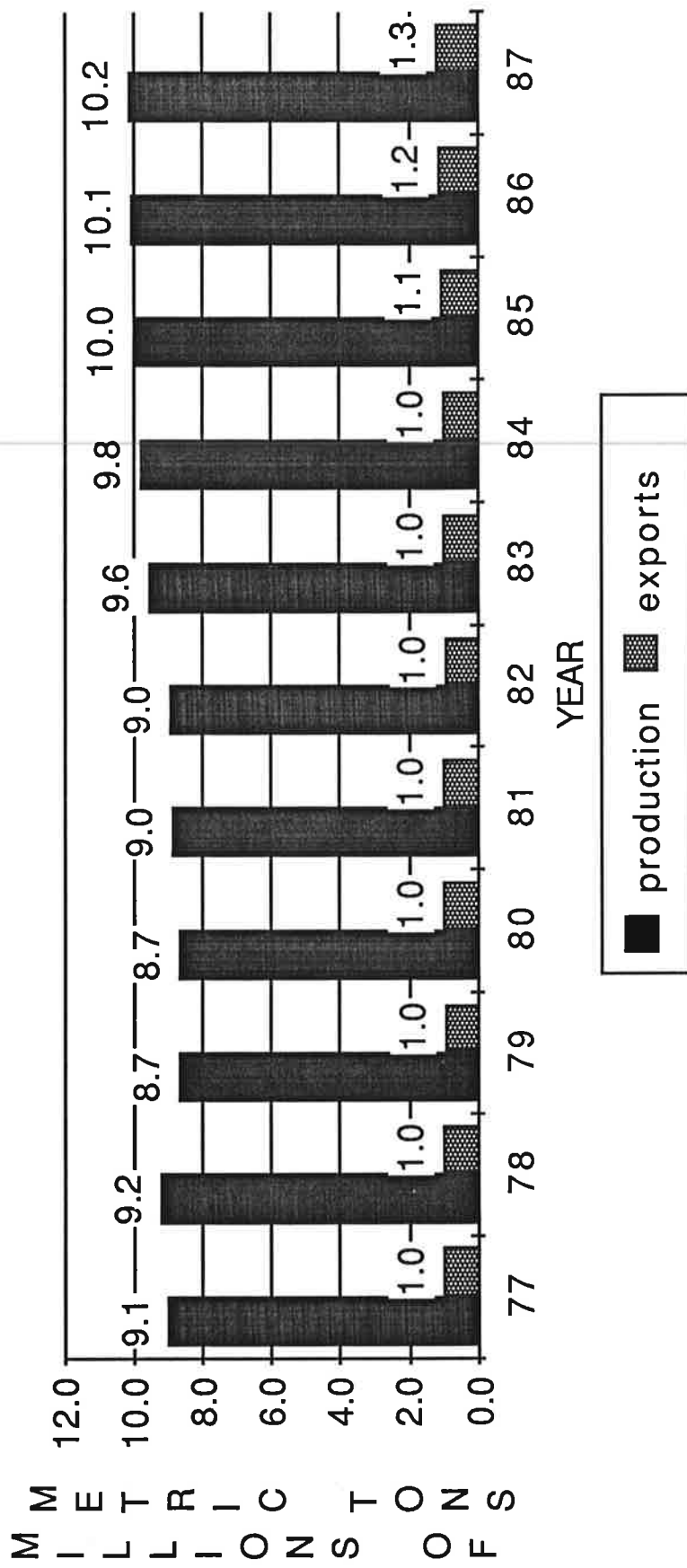
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-90 * USSR: SHARE OF DOMESTIC PAPER
AND PAPERBOARD PRODUCTION EXPORTED
1977-87



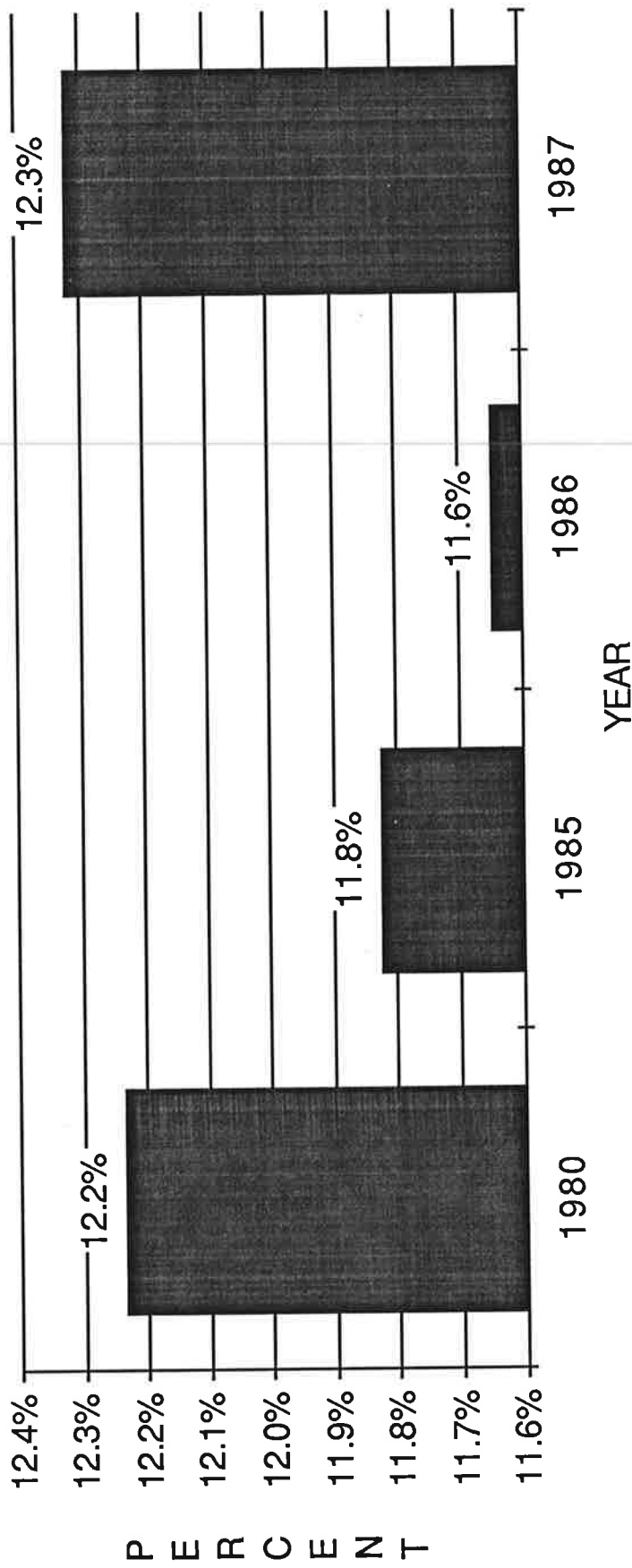
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-91 * USSR EXPORTS AND DOMESTIC PRODUCTION OF
PAPER AND PAPERBOARD
1977-87



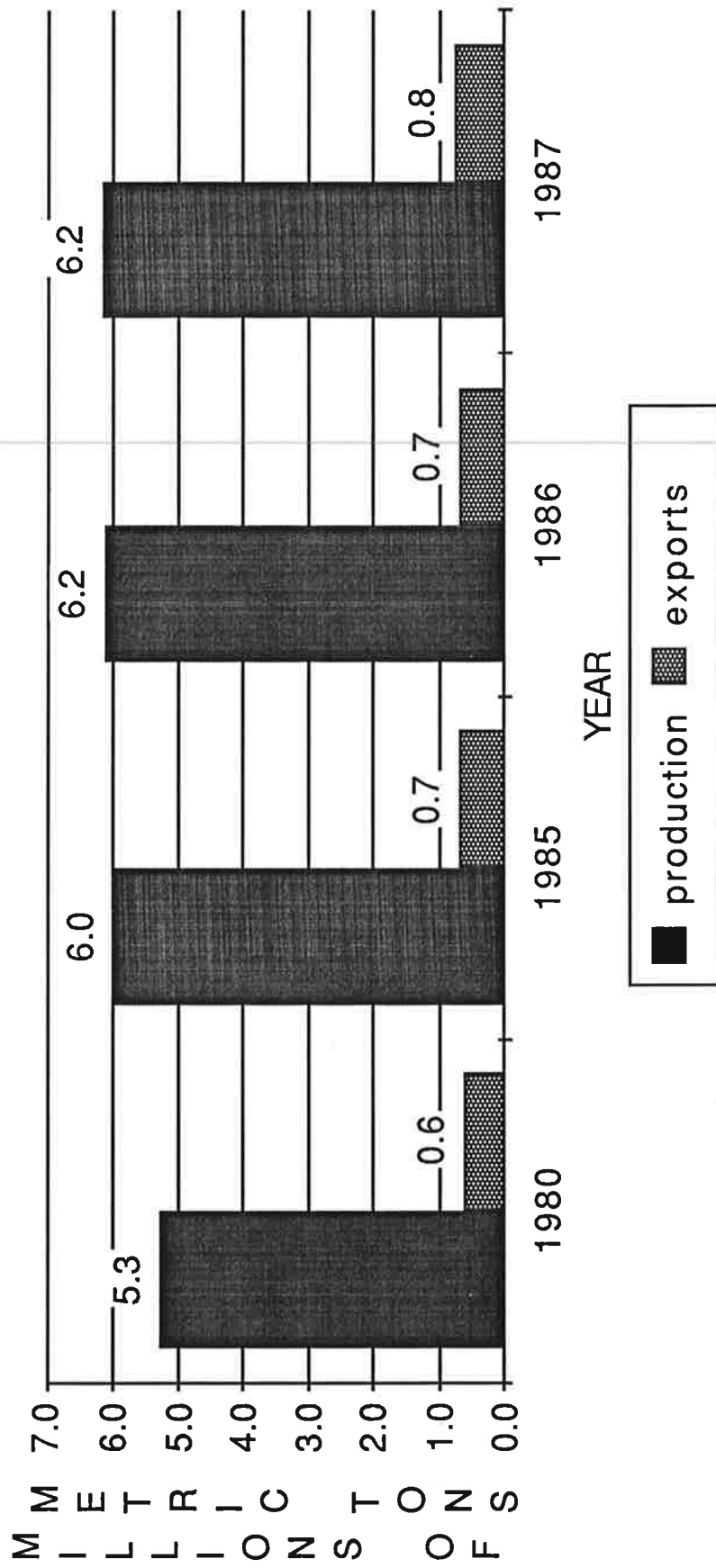
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-92 * USSR: SHARE OF DOMESTIC
PAPER PRODUCTION EXPORTED
1977-87



SOURCE: Narodnoye Khozaistvo SSSR v 1987 g, Vneshnyaya Torgovlya, various years

FIGURE 4-93 * USSR EXPORTS AND DOMESTIC PRODUCTION OF PAPER
1977-87



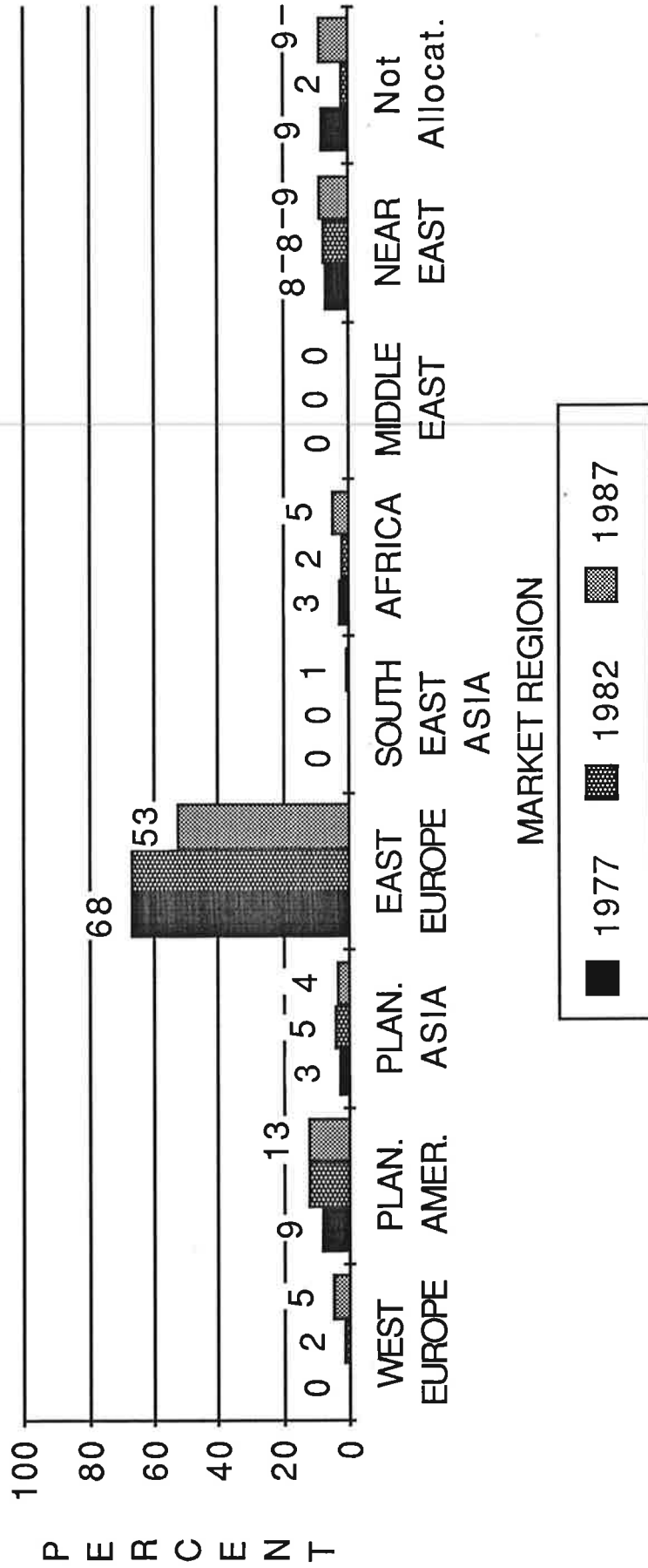
Paper exports have shown modest growth, increasing from 622 thousand tons in 1977 to 763 thousand tons in 1987. This increase has primarily come from increasing sales to Cuba and India.

Major geographic markets for Soviet paper products have historically been in East Europe whose share has declined from 73 percent in 1977 to 54 percent in 1987. The decline has been offset by increasing sales to South East Asia (Thailand) and West Europe (FRG and UK). In East Europe (for 1987), the major importing countries were GDR and Hungary with 19 percent and 12 percent of the Soviet exports. The major markets in West Europe in 1987 were FDG and the United Kingdom, with 3 percent each of the Soviet exports. Thailand received 6 percent.

While FAO data does not provide direction of trade statistics for all paper products, they do so for newsprint. In 1987, the USSR exported 363 thousand tons of newsprint with the largest identified share exported to India (57 thousand tons). The Soviet Union supplied 33 percent of Indian imports in 1987. Figures 4.94 and 4.95 indicate the distribution of Soviet paper exports on a percentage and volume basis respectively.

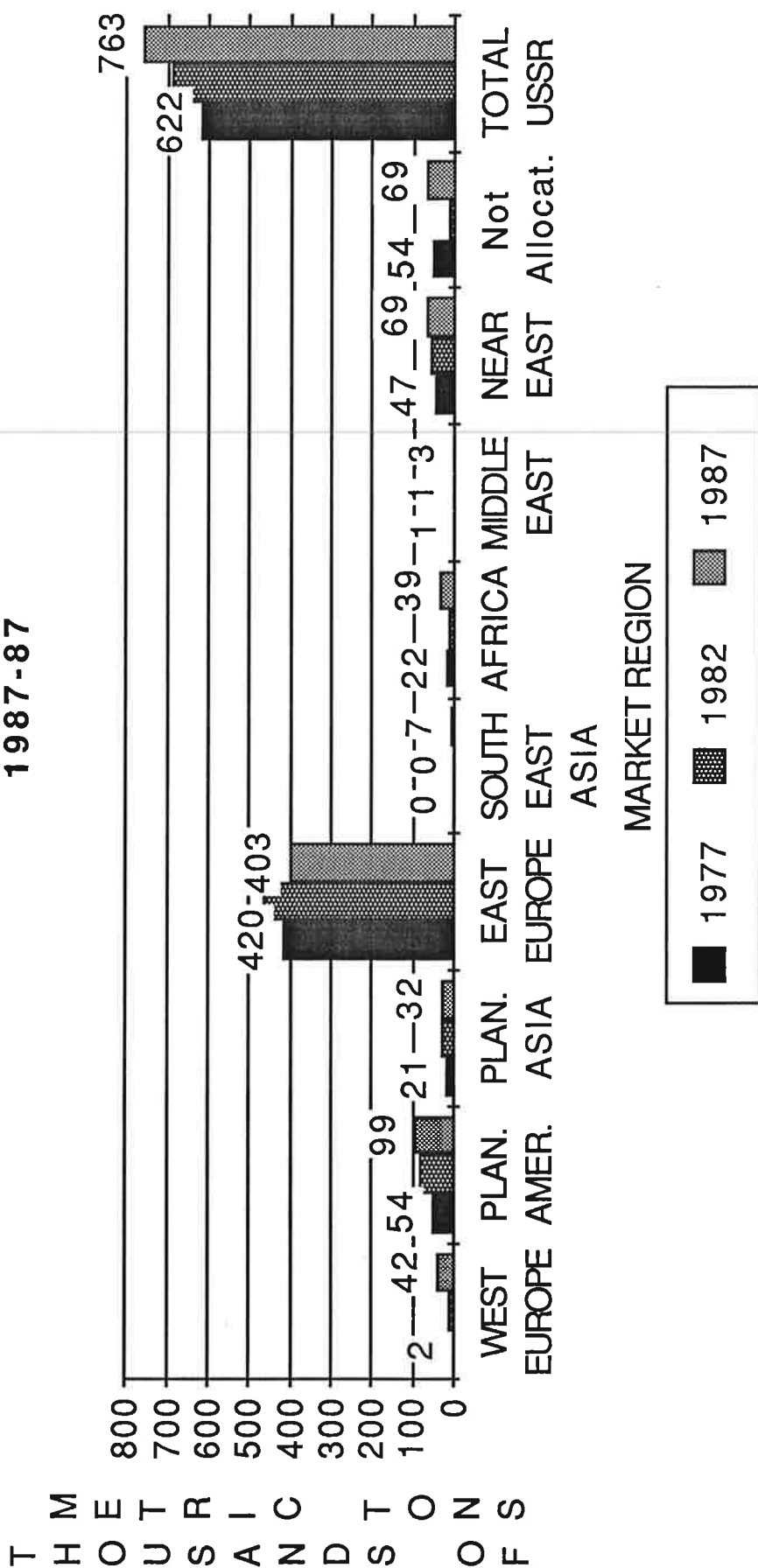
Paperboard: Data on the export of paperboard are obtainable from Soviet sources. Exports as a share of domestic production has not exceeded 11 percent. Figures 4.96 and 4.97 show Soviet exports as a share of domestic production and contrast domestic production to exports for the period 1977 to 1987.

FIGURE 4-94: DISTRIBUTION OF USSR PAPER EXPORTS BY MAJOR MARKET (Percent) 1977-87



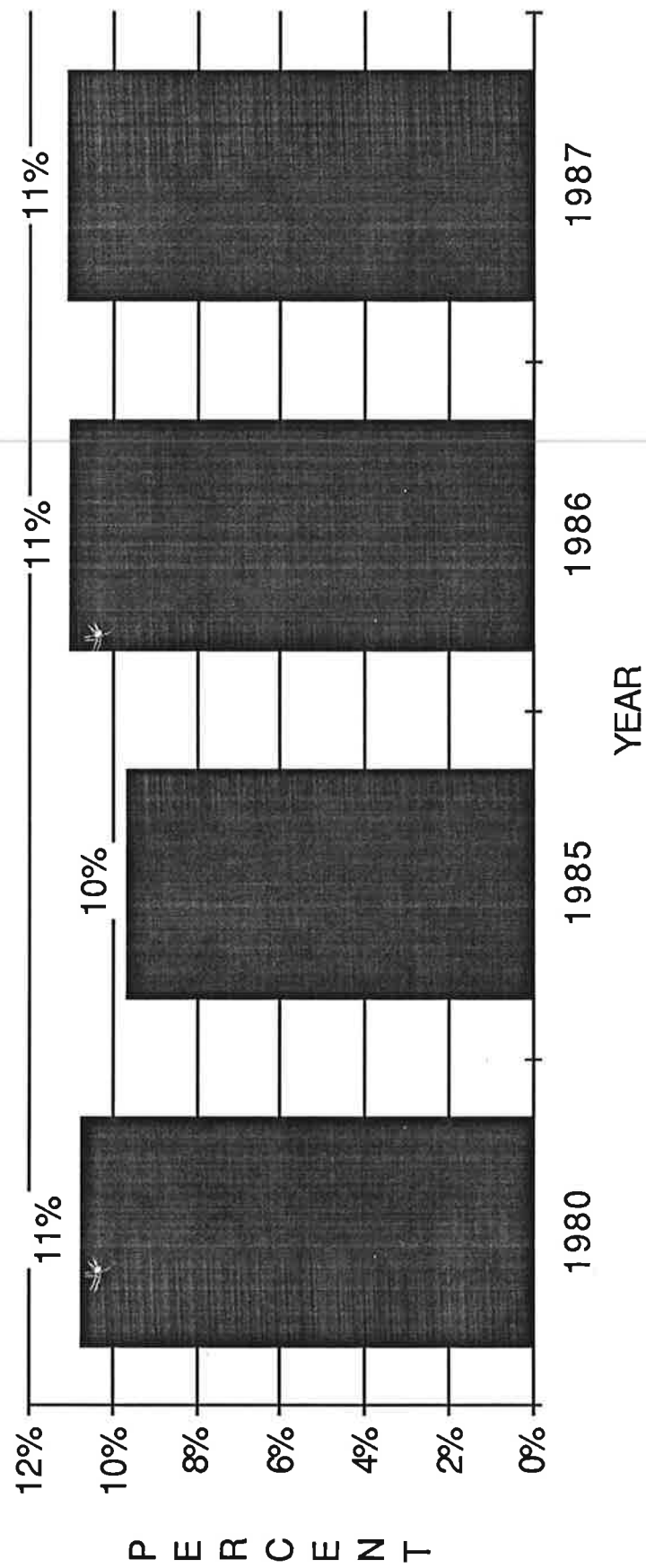
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-95: DISTRIBUTION OF USSR PAPER EXPORTS BY MAJOR MARKET (Volume) 1987-87



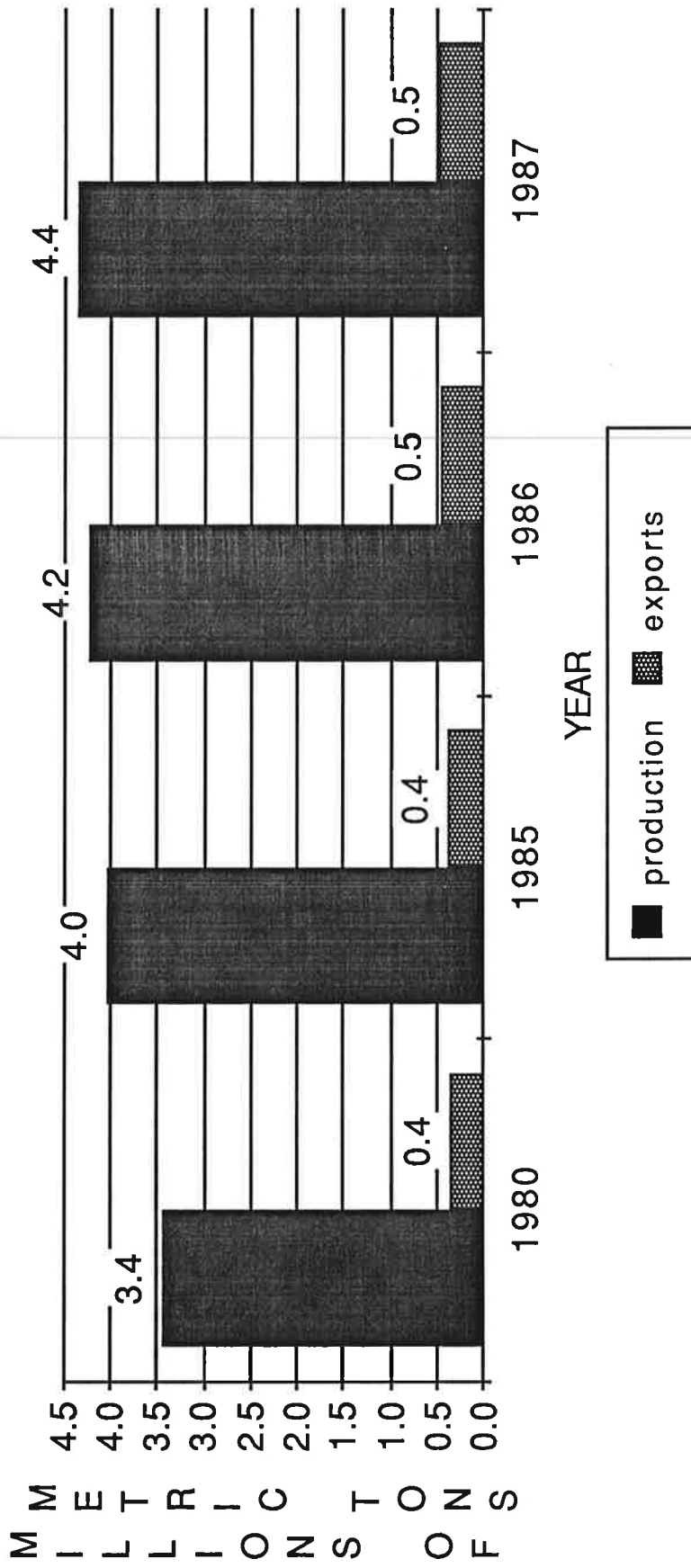
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-96 * USSR: SHARE OF DOMESTIC PAPERBOARD
 PRODUCTION EXPORTED
 1977-87



SOURCE: Harodnoye Khozaustvo SSSR v 1987 g, Vneshnyaya Torgovlya, various years

FIGURE 4-97 * USSR EXPORTS AND DOMESTIC PRODUCTION OF
PAPERBOARD
1977-87



SOURCE: Narodnoye Khozaustvo v SSSR v 1987 g, Vneshnyaya Torgovlya, various years

Sales of paperboard material have increased from 394 thousand tons in 1977 to 489 thousand tons in 1987. The principal market for Soviet exports has been East Europe with almost two-thirds of the total imports and West Europe with approximately one-fifth of total imports. Increases in Soviet exports have primarily resulted from increasing exports to Planned America (Cuba) and Africa (Egypt).

The major importing countries in East Europe have been Hungary (19 percent) and the GDR (15 percent) while West Europe (FRG) accounted for 10 percent and Planned America (Cuba) 12 percent.

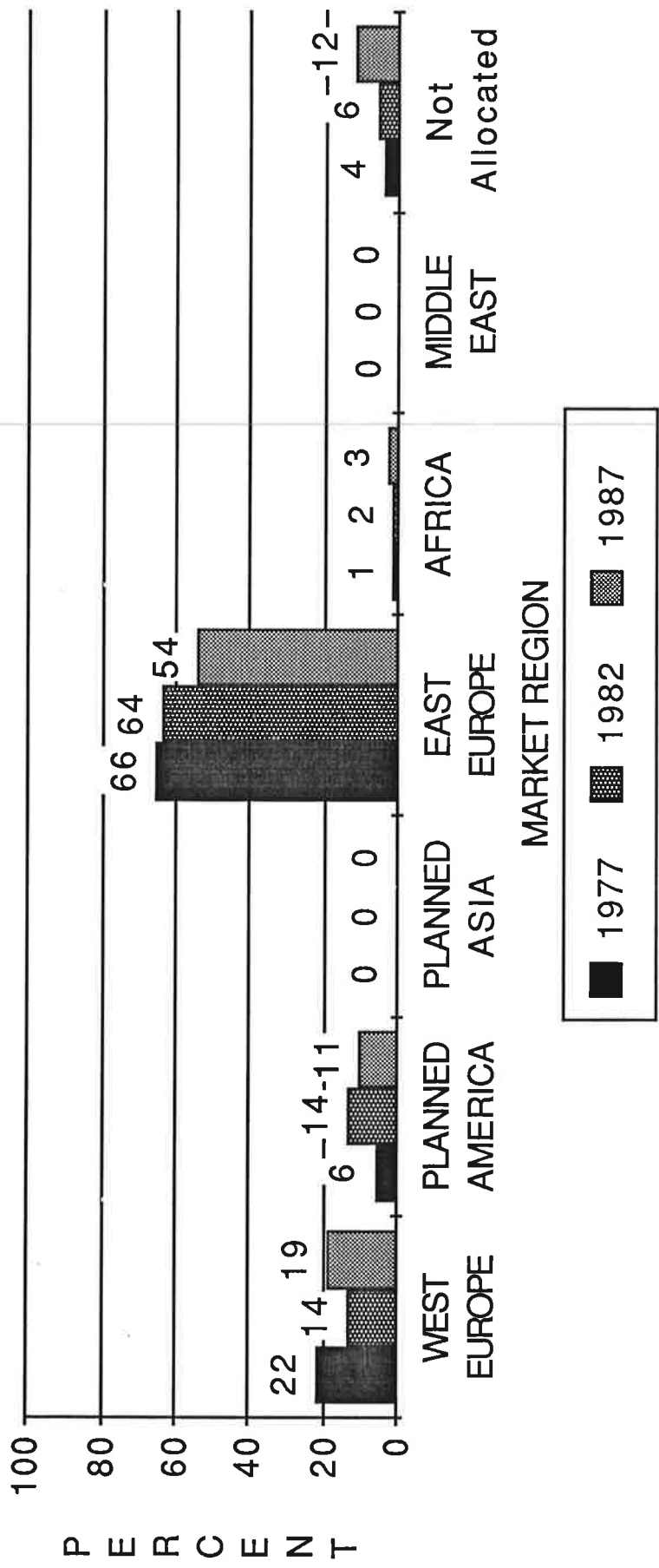
It is not possible to clearly determine the USSR share of import markets segmented into either paperboard or paper. However, some estimation can be made for the share of combined import markets for paper and paperboard in the aggregate.

In 1987, the USSR supplied 72 percent of imports by GDR and 63 percent of the Hungarian import market. In regards to FRG, the USSR had a market share of one percent of total imports. Figures 4.98 and 4.99 show the distribution of Soviet paperboard exports on a percentage and volume basis respectively.

Product Imports by Volume

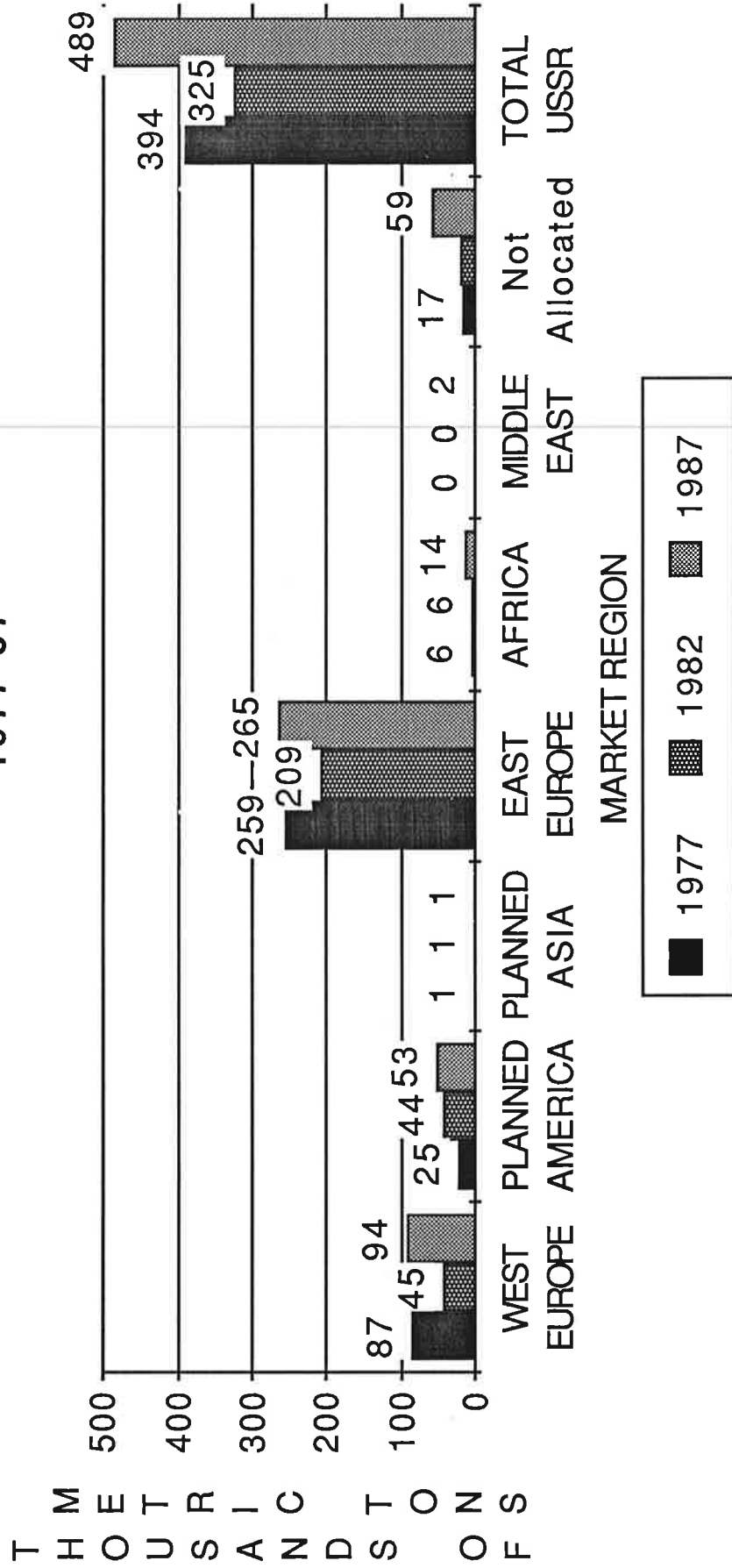
Logs: The Soviet Union is a minor importer of roundwood logs, accounting for less than 1 percent of imports between 1977 and 1987. The major importing nations have been Japan and China with 38 percent and 11 percent of world imports in 1987. Figures 4.100 and 4.101 show Soviet industrial log imports

**FIGURE 4-98: DISTRIBUTION OF USSR PAPERBOARD EXPORTS
BY MAJOR MARKET (Percent)
1977-87**



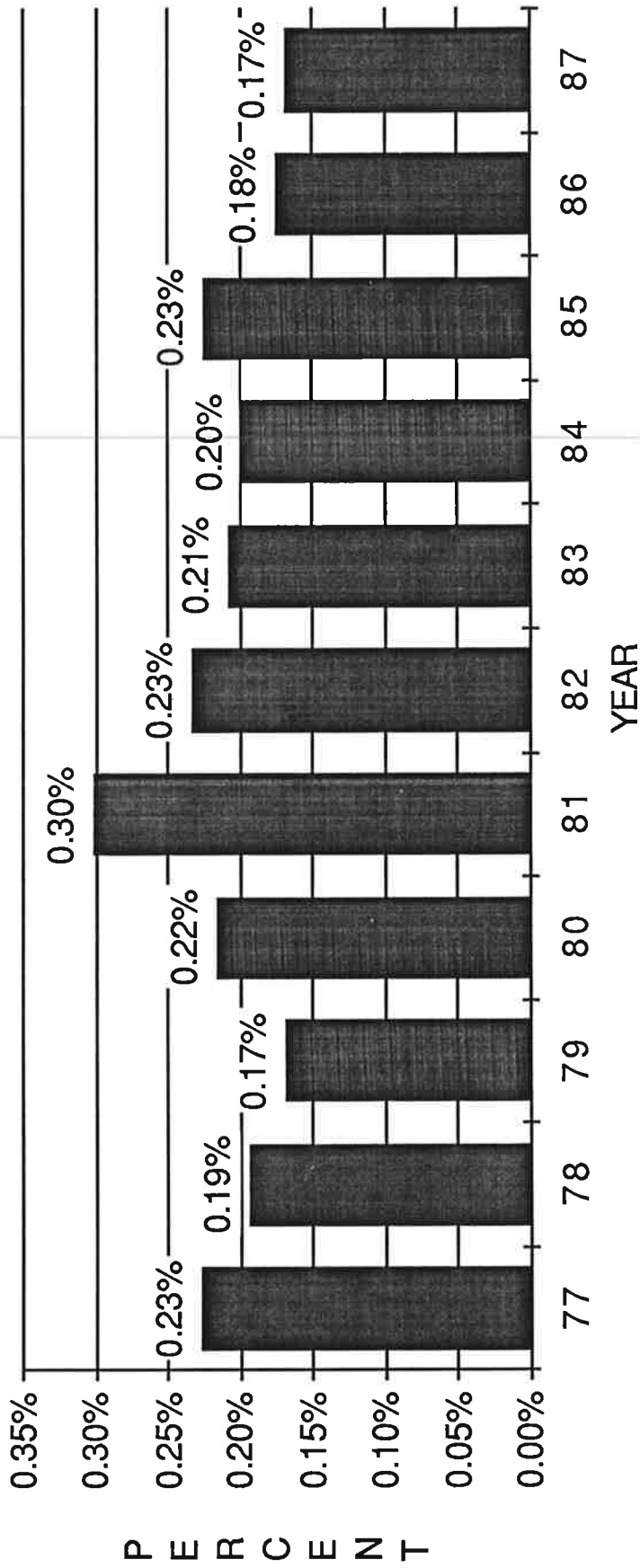
SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-99: USSR PAPER BOARD EXPORTS
BY MAJOR MARKET (Volume)
1977-87**



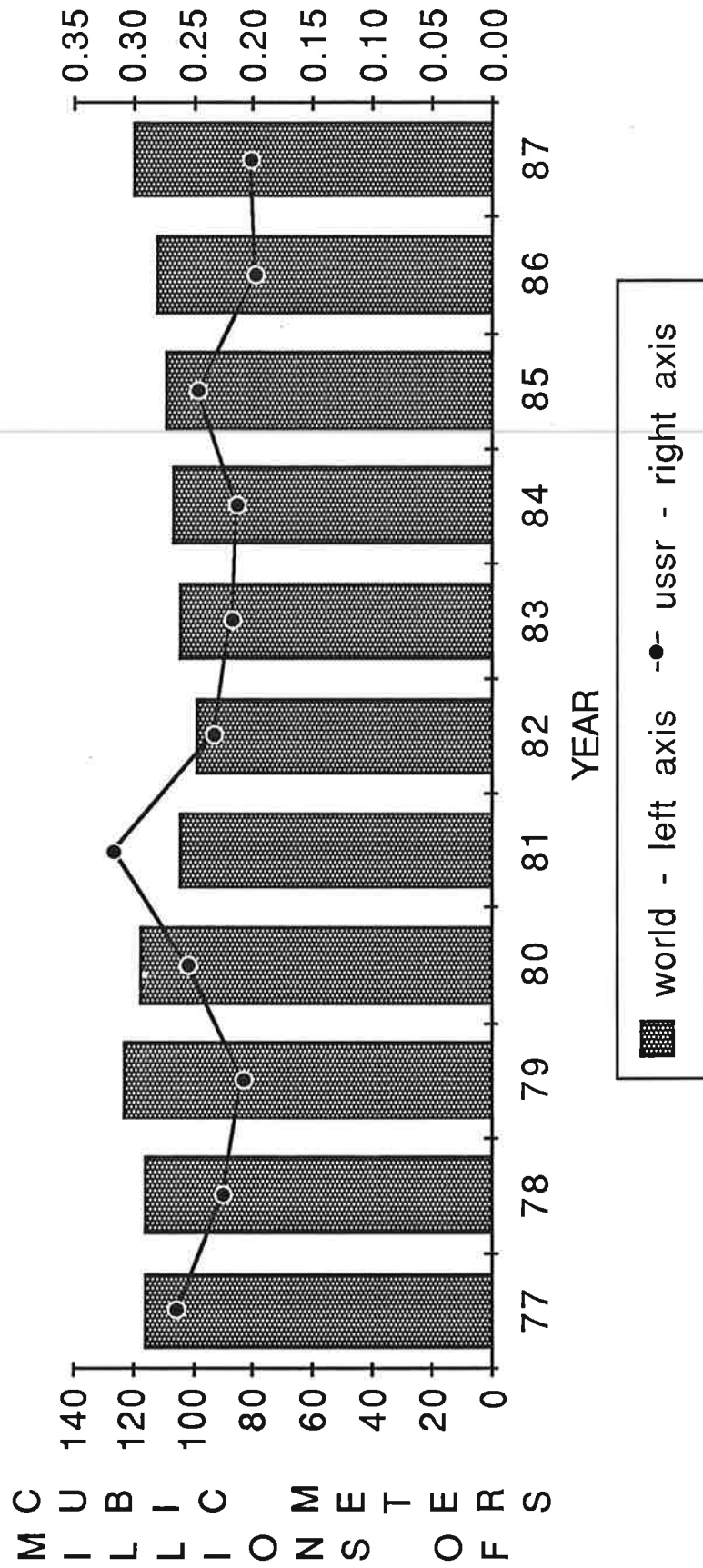
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-100 * USSR: SHARE OF WORLD
INDUSTRIAL ROUNDWOOD IMPORTS
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-101 * WORLD AND USSR IMPORTS OF INDUSTRIAL ROUNDWOOD 1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

in comparison of global imports and both Soviet and world imports on a volume basis.

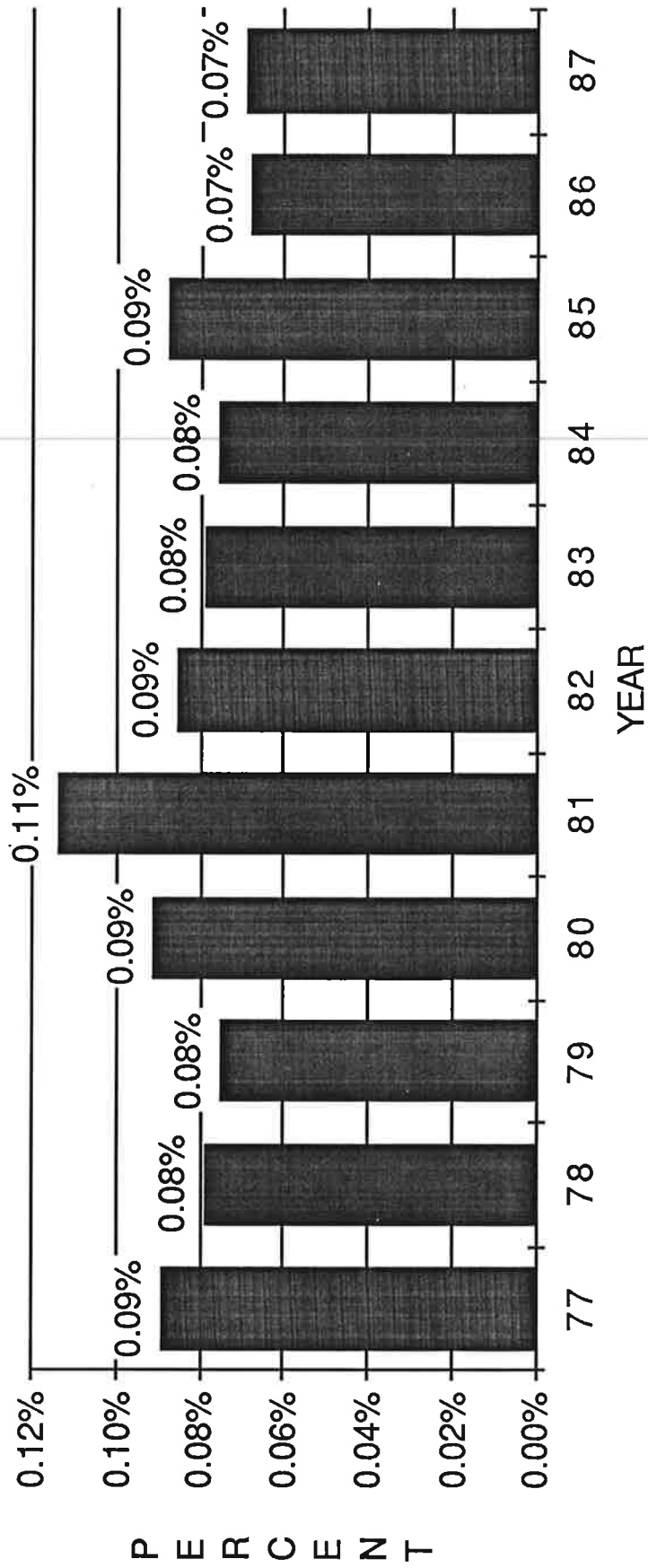
Industrial wood imports fluctuated between 1977 and 1987, from a high of 316 thousand cubic meters in 1981 to a low of 198 thousand cubic meters in 1986. Imports rebounded slightly to 203 thousand cubic meters in 1987. In 1977, imports were 235 thousand cubic meters. Imports as a share of domestic production have not exceeded 0.1 percent. Figures 4.102 and 4.103 show Soviet imports as a share of domestic production and compare domestic production to import volumes for the period 1977 to 1987.

The Soviet Union imports two types of unprocessed logs. First, tropical logs, which it does not produce, are imported from Central Africa. In recent years, this type of roundwood has been imported from the Ivory Coast, Ghana, and the Congo. Other types of logs imported are conifer sawlogs from Planned Asia (Mongolia).

The volume of round log imports declined between 1977 and 1987. This decline has occurred entirely in the import of tropical hardwoods. In part, this decline has been made up for by imports of other types of logs, unidentified in the Soviet Trade literature.

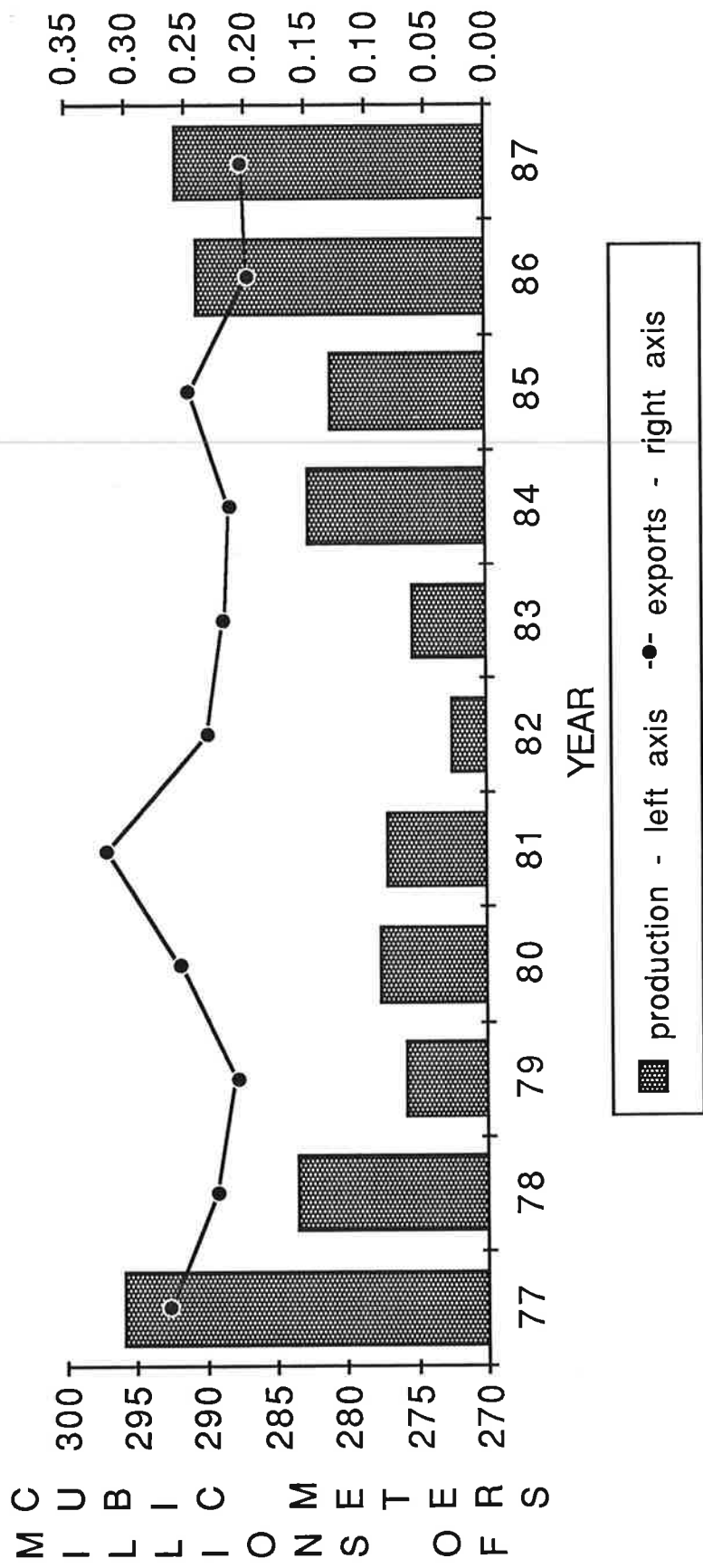
In 1977, log imports were 264 thousand cubic meters, of which 83 percent was tropical hardwood. By 1987, import volume had declined to 203 thousand meters, of which 51 percent was imported from Central Africa. Figures 4.104 and 4.105 illustrate the distribution of Soviet round log imports on a

FIGURE 4-102 * USSR: SHARE OF DOMESTIC INDUSTRIAL ROUNDWOOD
PRODUCTION IMPORTED
1977-87



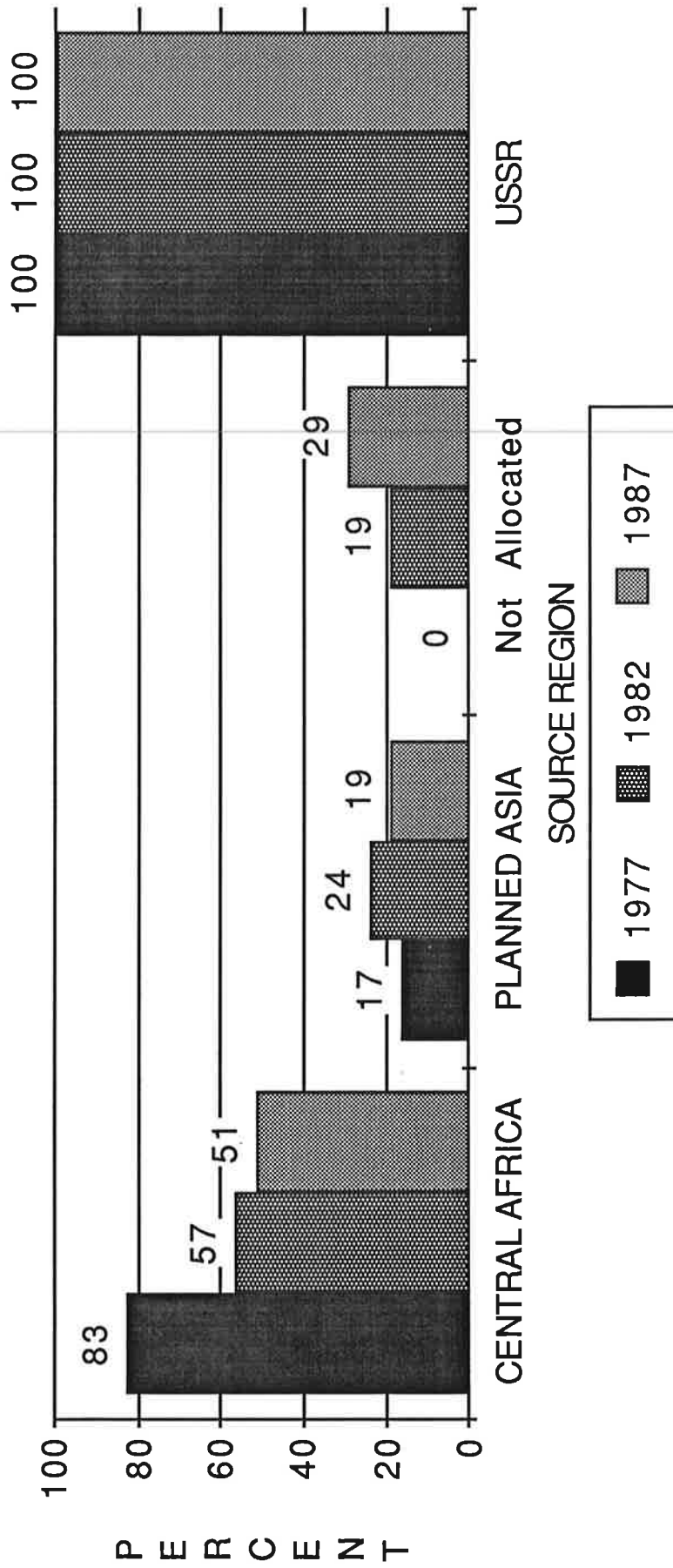
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-103 * USSR IMPORTS AND DOMESTIC PRODUCTION OF INDUSTRIAL ROUNDWOOD 1977-87



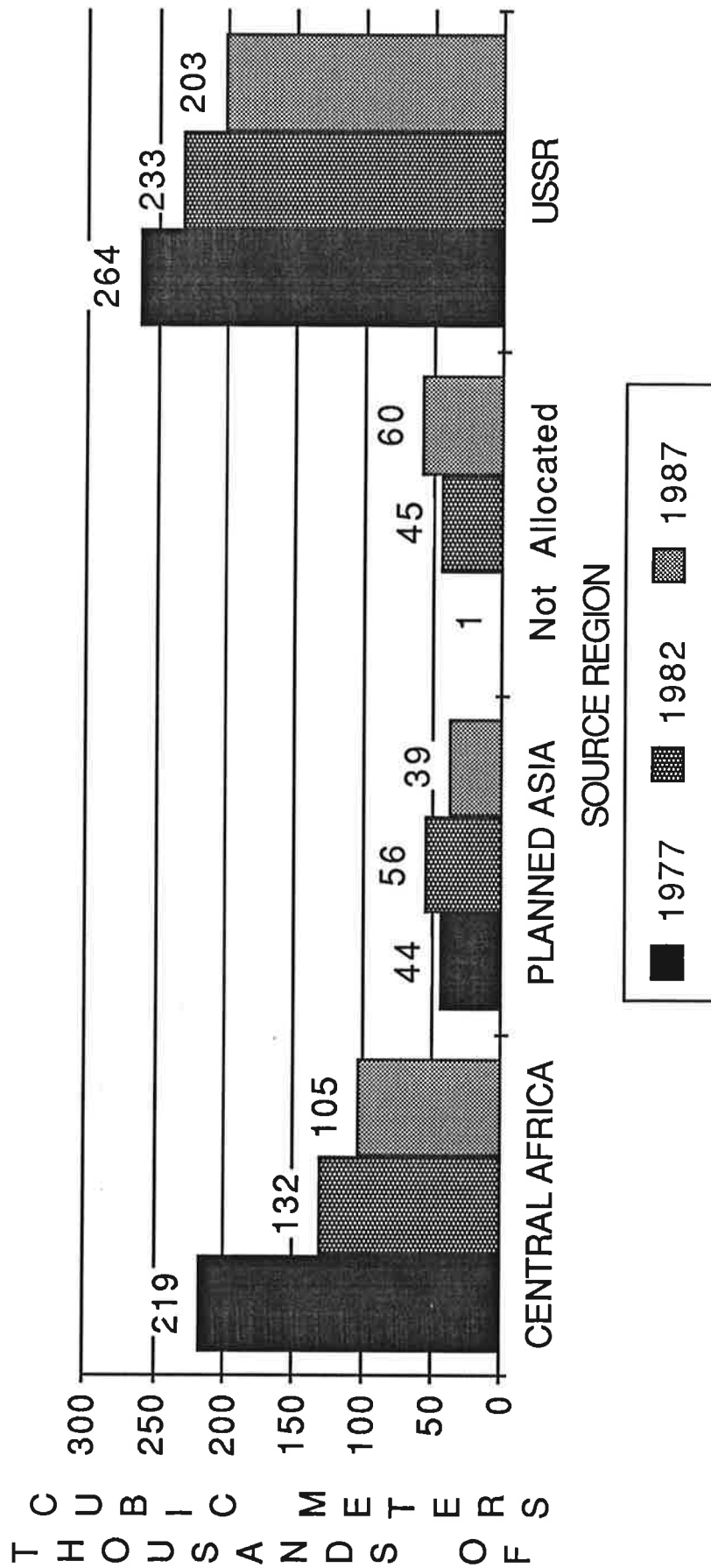
SOURCE: FAO Forest Products Annual Year Book for 1987

**FIGURE 4-104: DISTRIBUTION OF USSR ROUNDWOOD IMPORTS
BY MAJOR SOURCE (Percent)
1977-87**



SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-105: USSR ROUNDWOOD IMPORTS
BY MAJOR SOURCE (Volume)
1977-87**



SOURCE: Vneshnyaya Torgovlya, various years

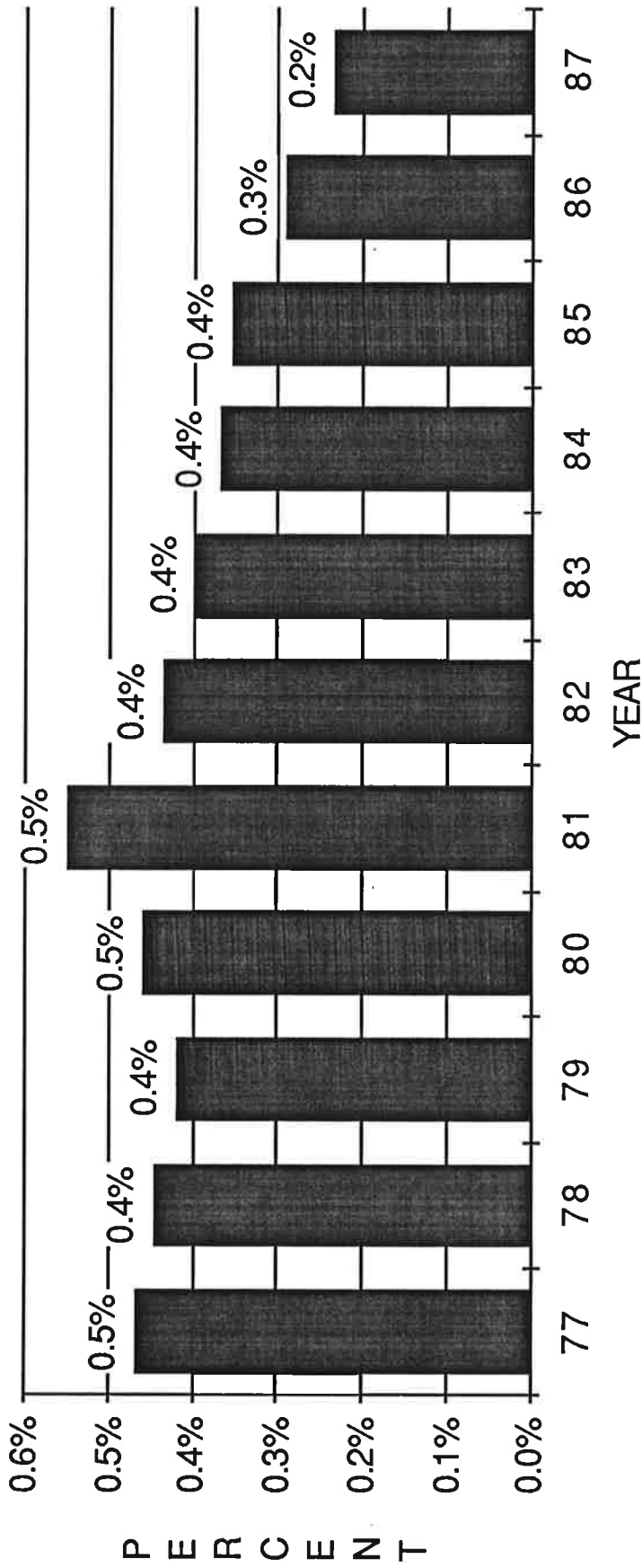
percentage and volume basis respectively.

Lumber: The Soviet Union is not a large importer of lumber from world markets. It has consistently accounted for less than 1 percent of the imports between 1977 and 1987. The major importing nations in 1987 were the United States, United Kingdom and Japan, accounting for 38 percent, 10 percent, and 8 percent of total imports. Figures 4.106 and 4.107 show the share of world lumber imports captured by the Soviet Union and a comparison of the Soviet imports to total world imports on a volume basis.

Lumber imports have fluctuated between 1977 and 1987. From a high of 388 thousand cubic meters in 1981, imports had sunk to a low of 216 thousand cubic meters by 1987. In 1977, imports were 334 thousand cubic meters. Imports as a share of domestic production has never exceeded 0.4 percent. Figures 4.108 and 4.109 show Soviet imports as a share of domestic production and contrast domestic production to import volume for the period 1977 to 1987.

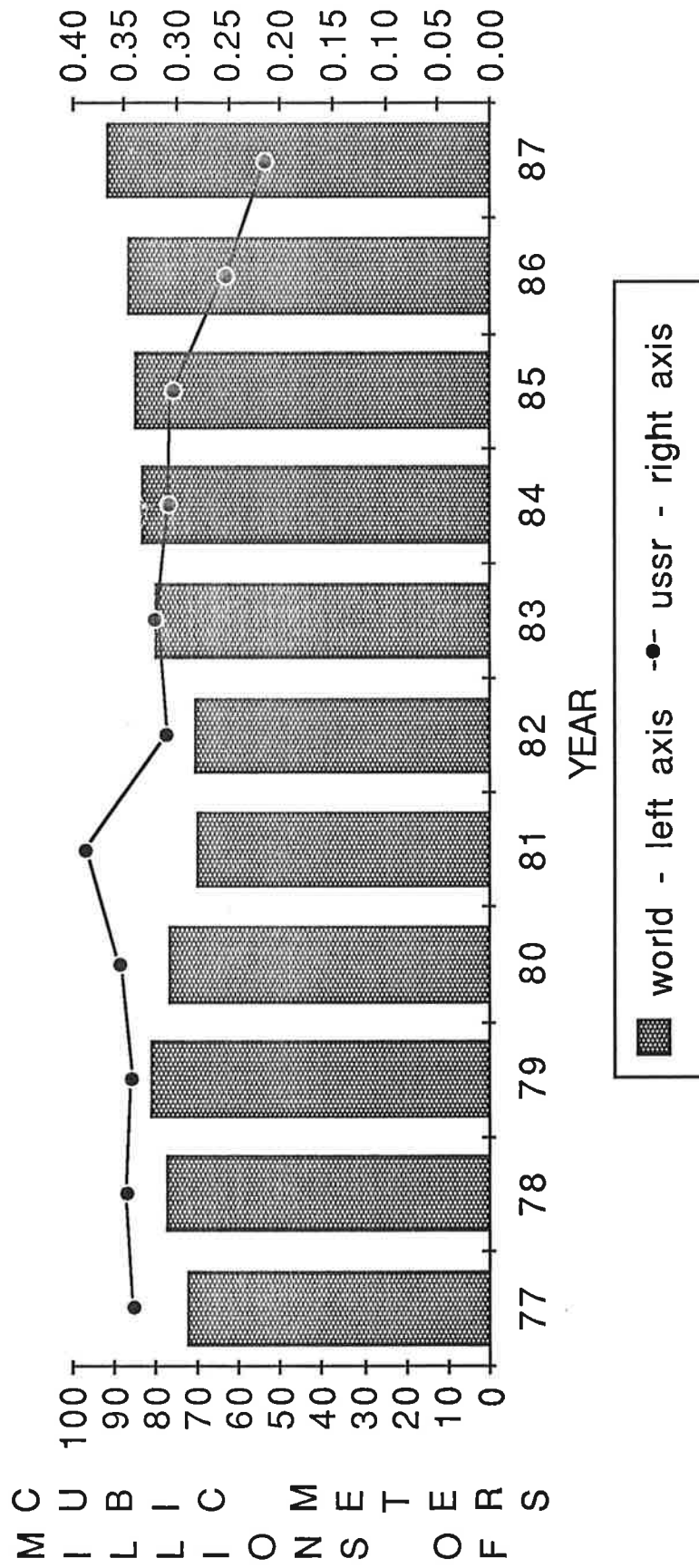
Lumber imports consist of both conifer and hardwood species. The hardwood species are imported from East Europe, principally Romania. The volume of hardwood lumber imported has declined substantially since 1977, when 250 thousand cubic meters were imported. By 1987, import volume had declined to 106 thousand cubic meters. The volume of conifer lumber has remained relatively constant, fluctuating between 88 thousand and 130 thousand cubic meters from 1977 to 1987. In 1987, 103 thousand cubic meters was imported. Conifer lumber is imported

FIGURE 4-106 * USSR: SHARE OF WORLD
LUMBER IMPORTS
1977-87



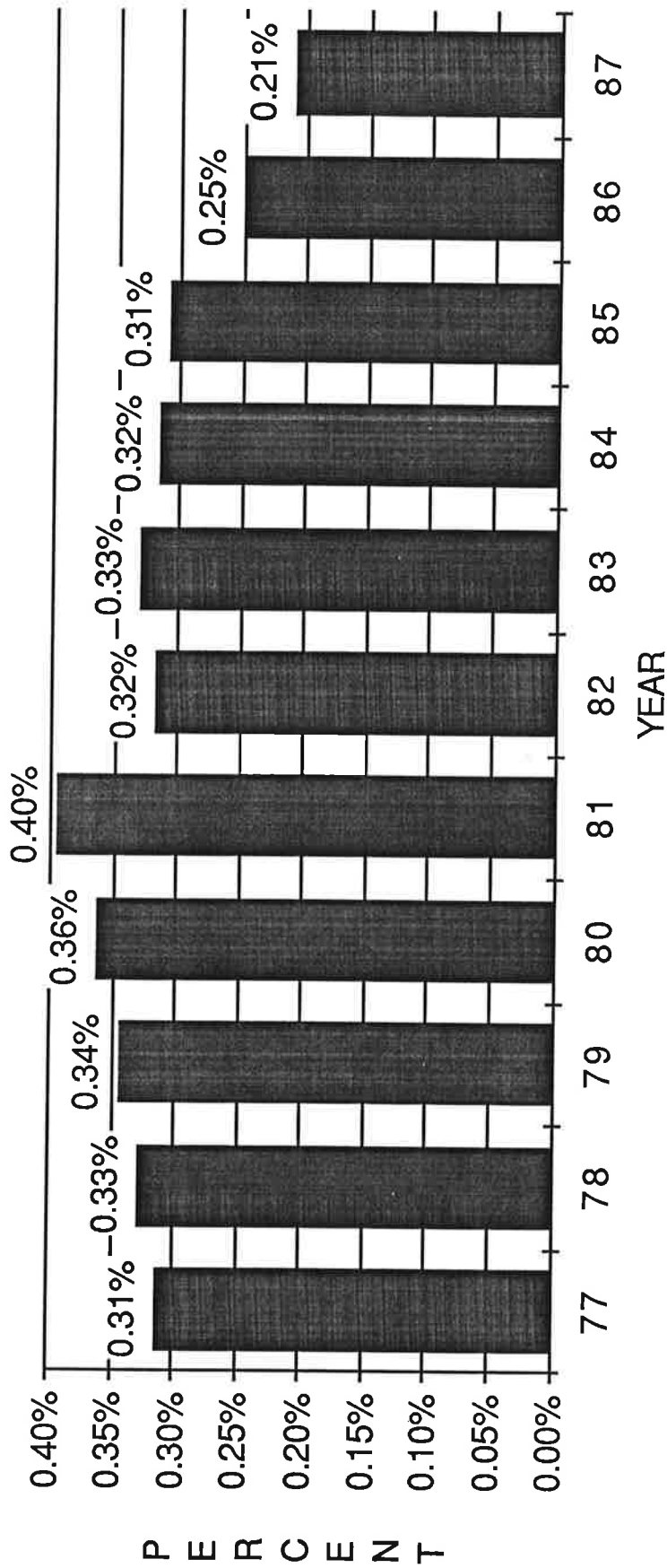
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-107 * WORLD AND USSR IMPORTS
OF SAWNWOOD
1977-87



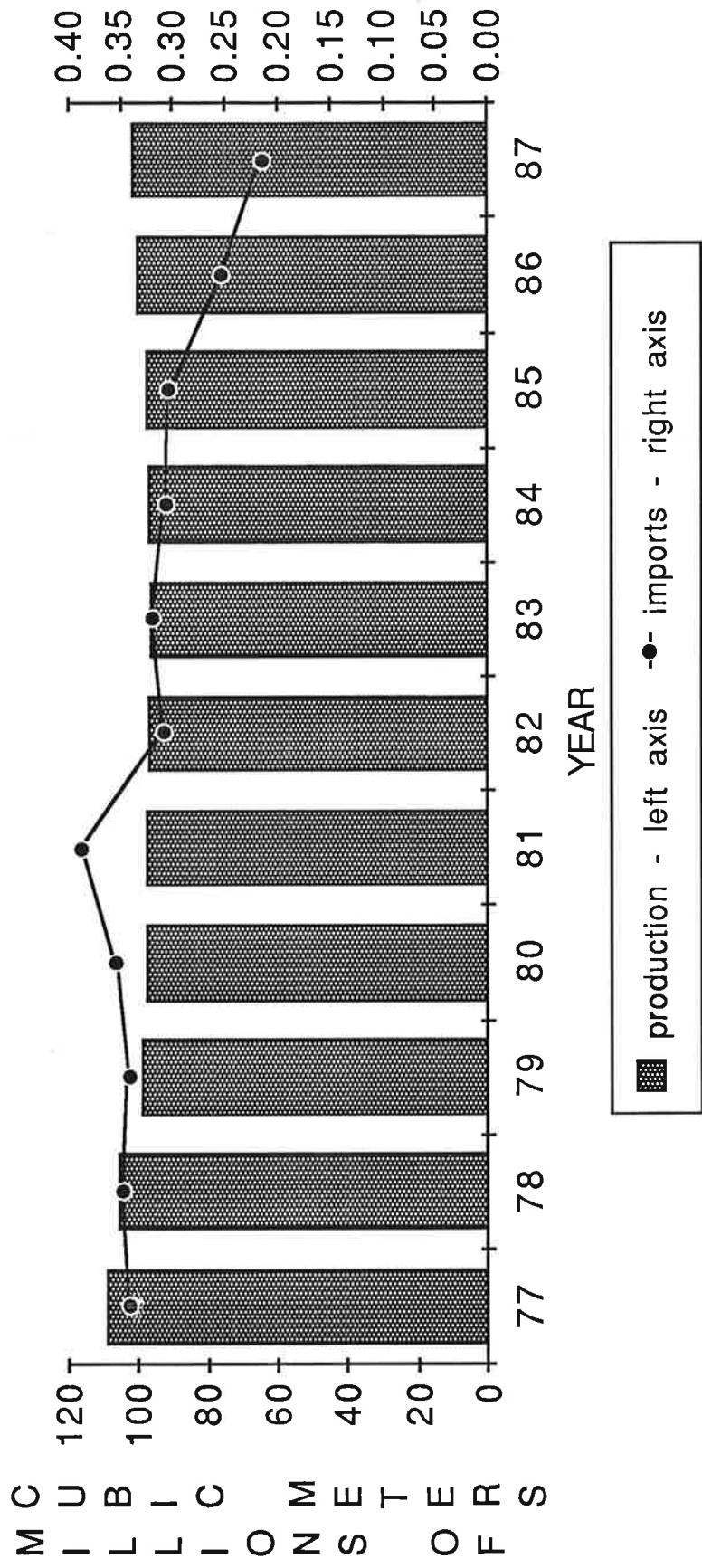
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-108 * USSR: SHARE OF DOMESTIC
SAWNWOOD PRODUCTION IMPORTED
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-109 * USSR IMPORTS AND DOMESTIC PRODUCTION OF SAWNWOOD 1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

from Mongolia.

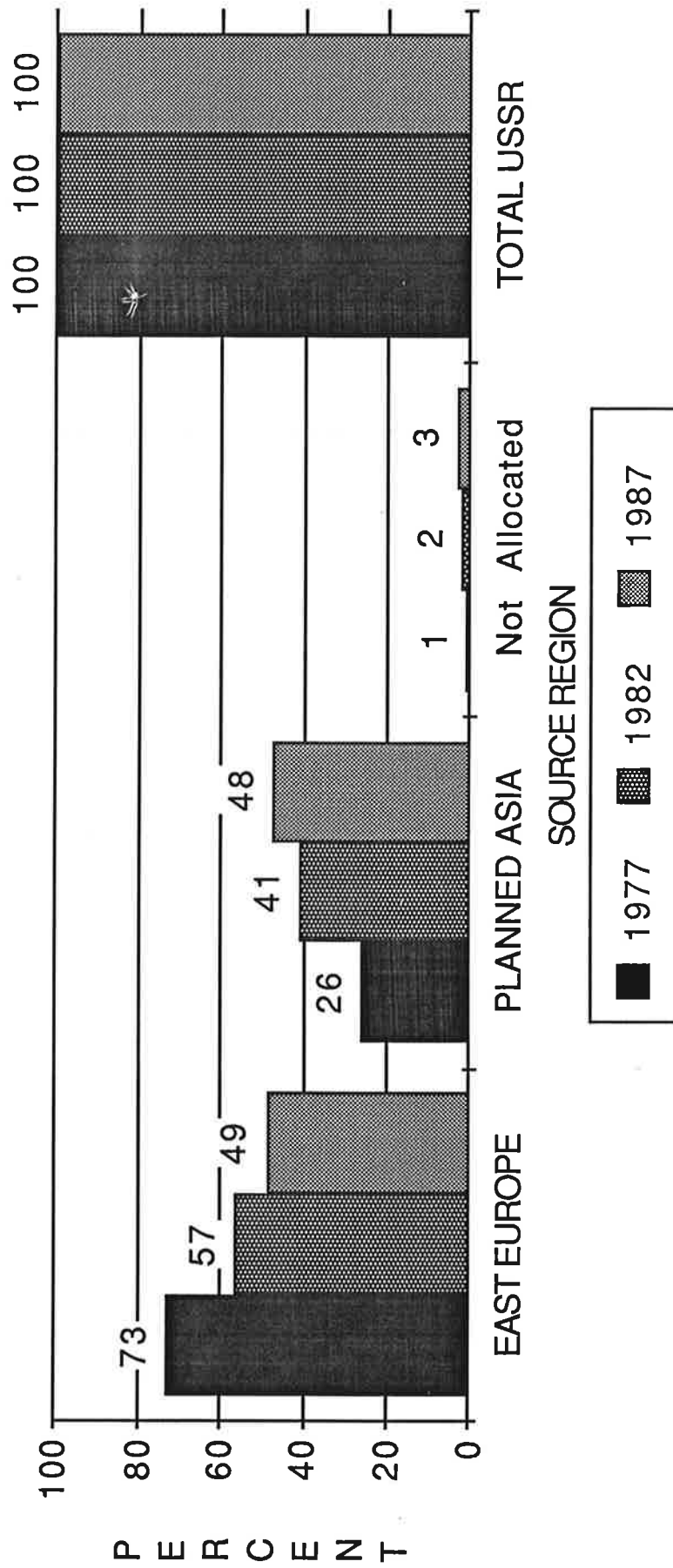
In 1977, imports from Eastern Europe accounted for 3 percent of Soviet imports. By 1987, this had declined to 49 percent. Figures 4.110 and 4.111 show the distribution of Soviet lumber imports on a percentage and volume basis respectively.

Plywood: The Soviet Union is a minor importer of plywood from world markets. It accounted for less than 1 percent of the imports between 1977 and 1987. Major importers in 1987 were the United States, Japan and the United Kingdom with 21 percent, 16 percent, and 11 percent of total world imports. Figures 4.112 and 4.113 show the share of world plywood imports accounted for by the Soviet Union and a comparison of the Soviet imports to total world imports on a volume basis.

Plywood imports also fluctuated between 1977 and 1987. A high of 64 thousand cubic meters was imported in 1977, but by 1987 imports had declined to a low of 30 thousand cubic meters. Imports as a share of domestic production has never exceeded 3 percent. Figures 4.114 and 4.115 show Soviet imports as a share of domestic production and contrast domestic production to import volume for the period 1977 to 1987.

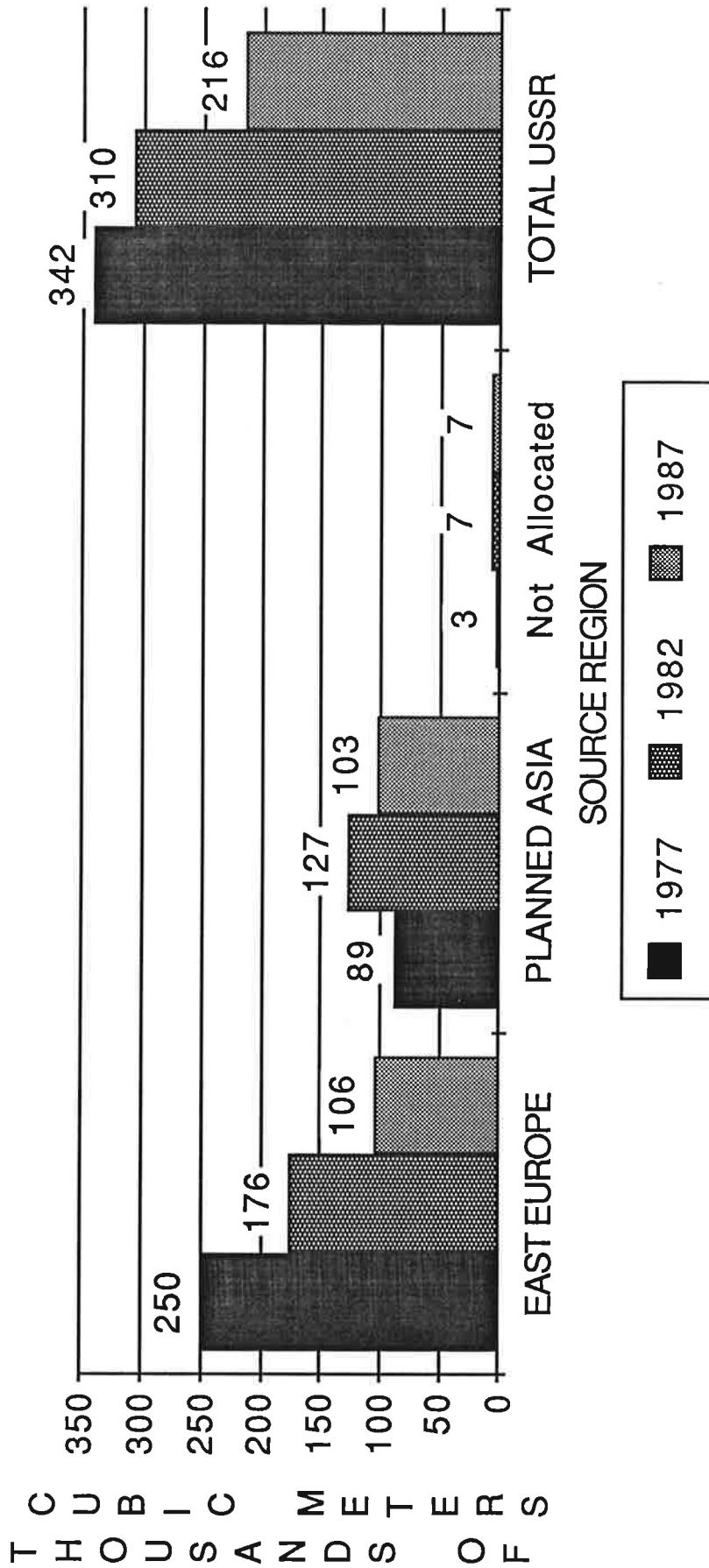
The majority of Soviet plywood imports come from Romania. All of the decline in Soviet imports occurred as fewer imports from East Europe. Figures 4.116 and 4.117 illustrate the distribution of Soviet plywood imports on a percentage and volume basis respectively.

**FIGURE 4-110: DISTRIBUTION OF USSR LUMBER IMPORTS
BY MAJOR SOURCE (Percent)
1977-87**



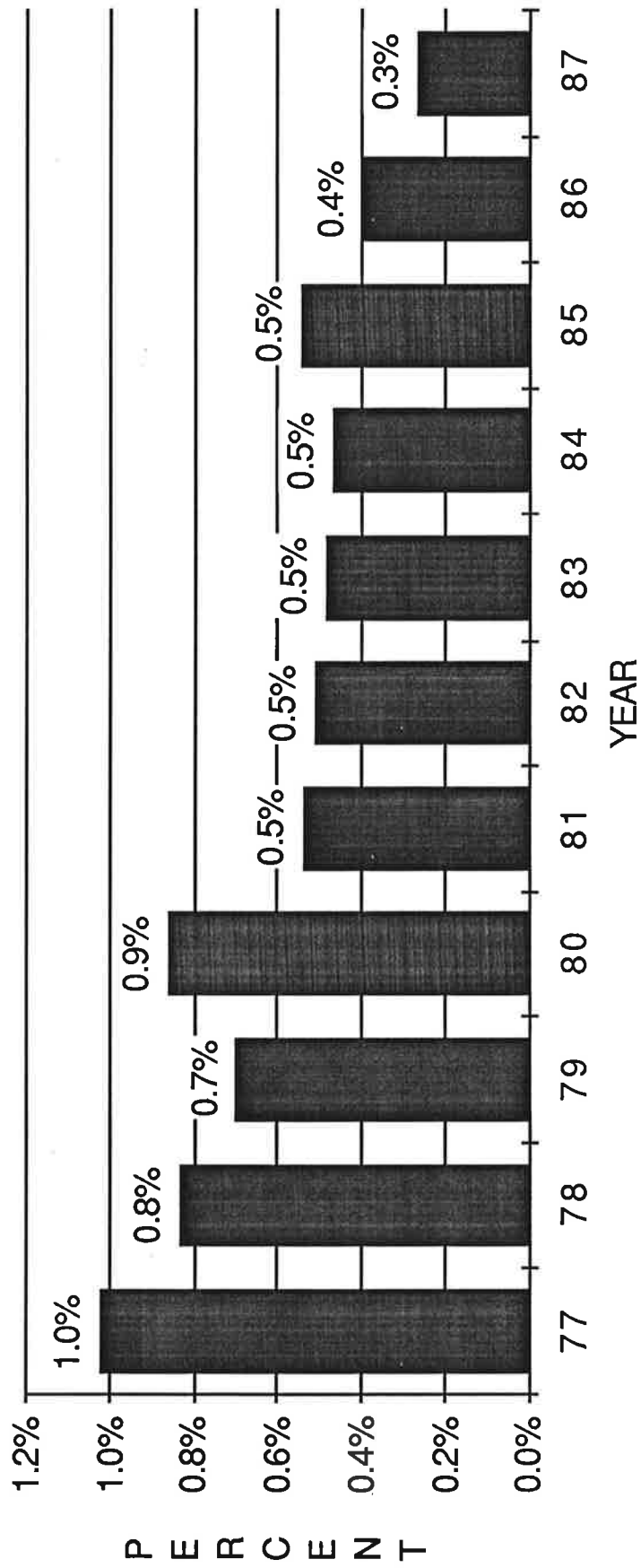
SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-111: USSR LUMBER IMPORTS
BY MAJOR SOURCE (Volume)
1977-87**



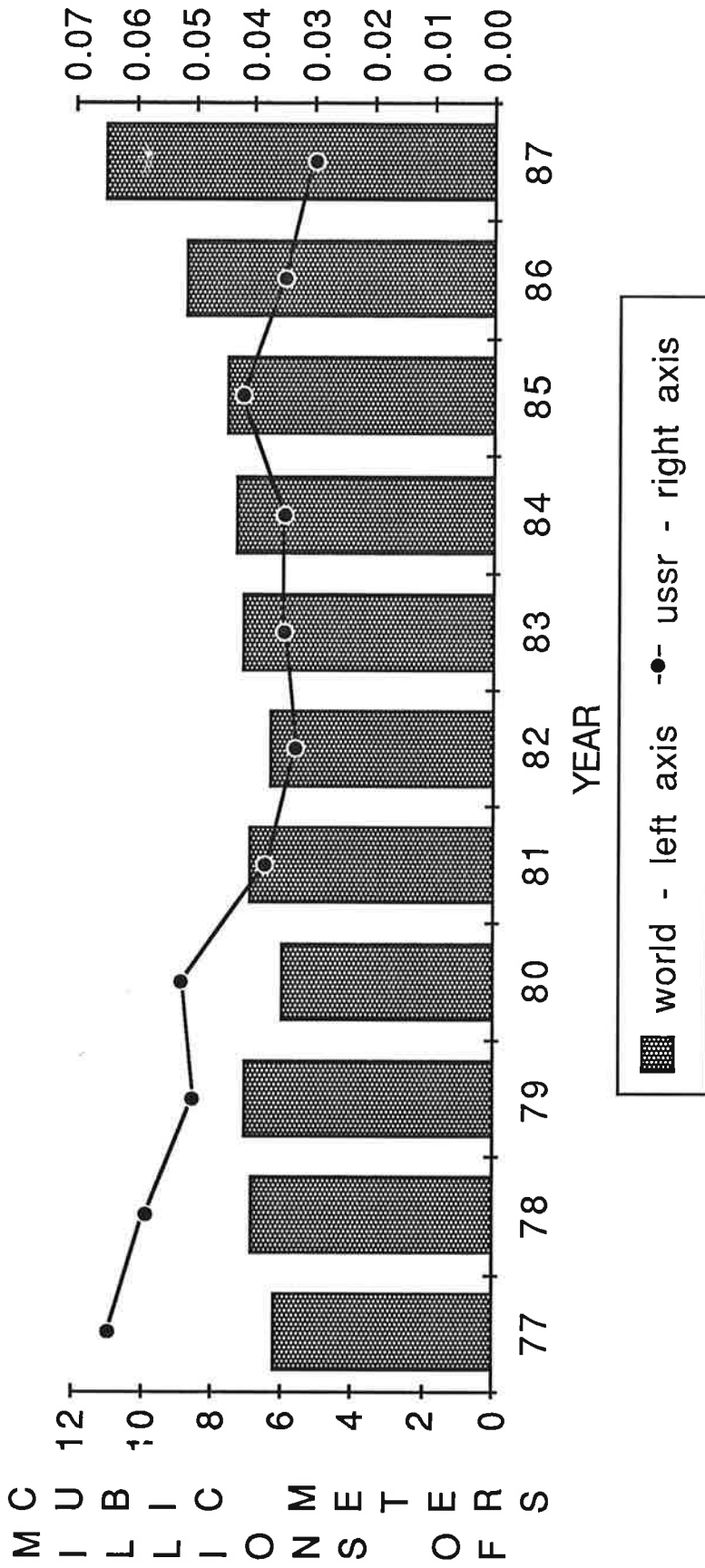
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-112 * USSR: SHARE OF WORLD
PLYWOOD IMPORTS
1977-87



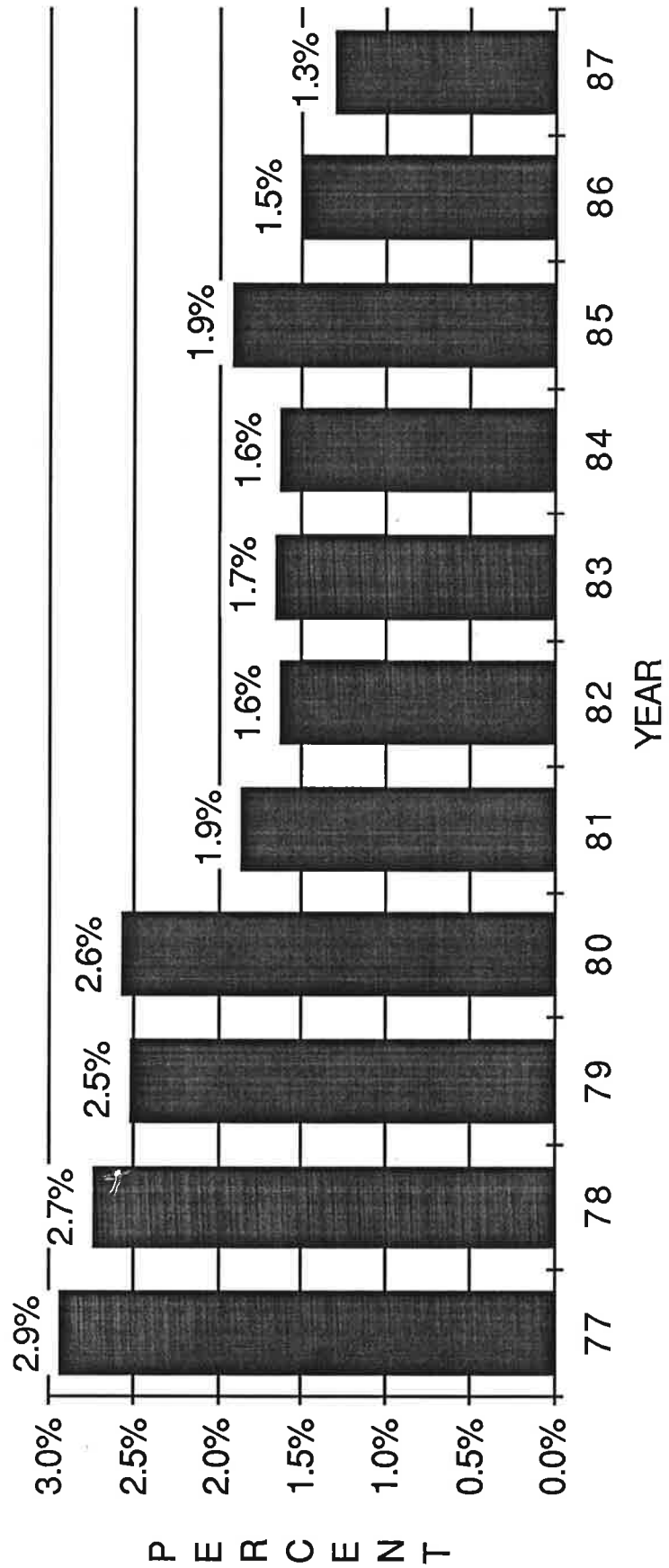
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-113 * WORLD AND USSR IMPORTS
OF PLYWOOD
1977-87



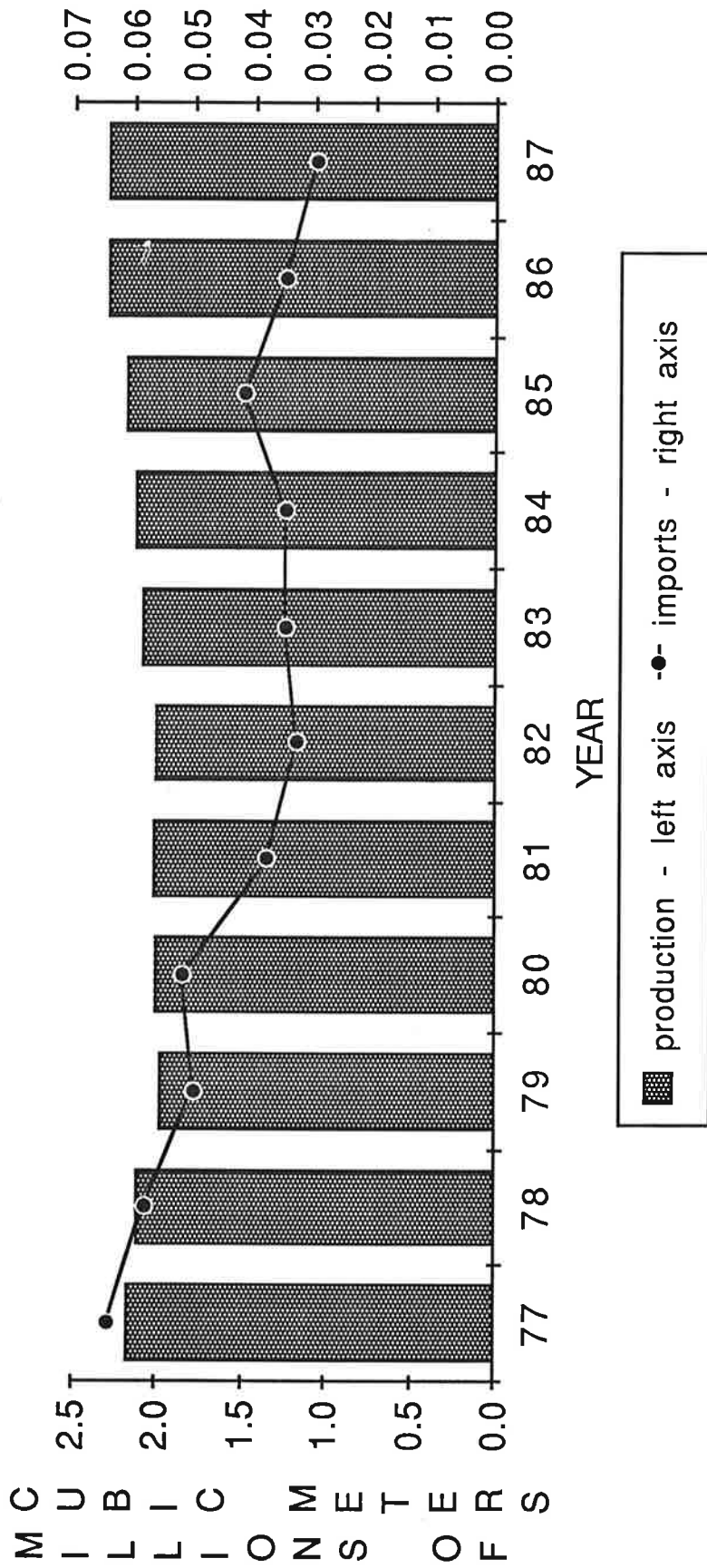
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-114 * USSR: SHARE OF DOMESTIC
PLYWOOD PRODUCTION IMPORTED
1977-87



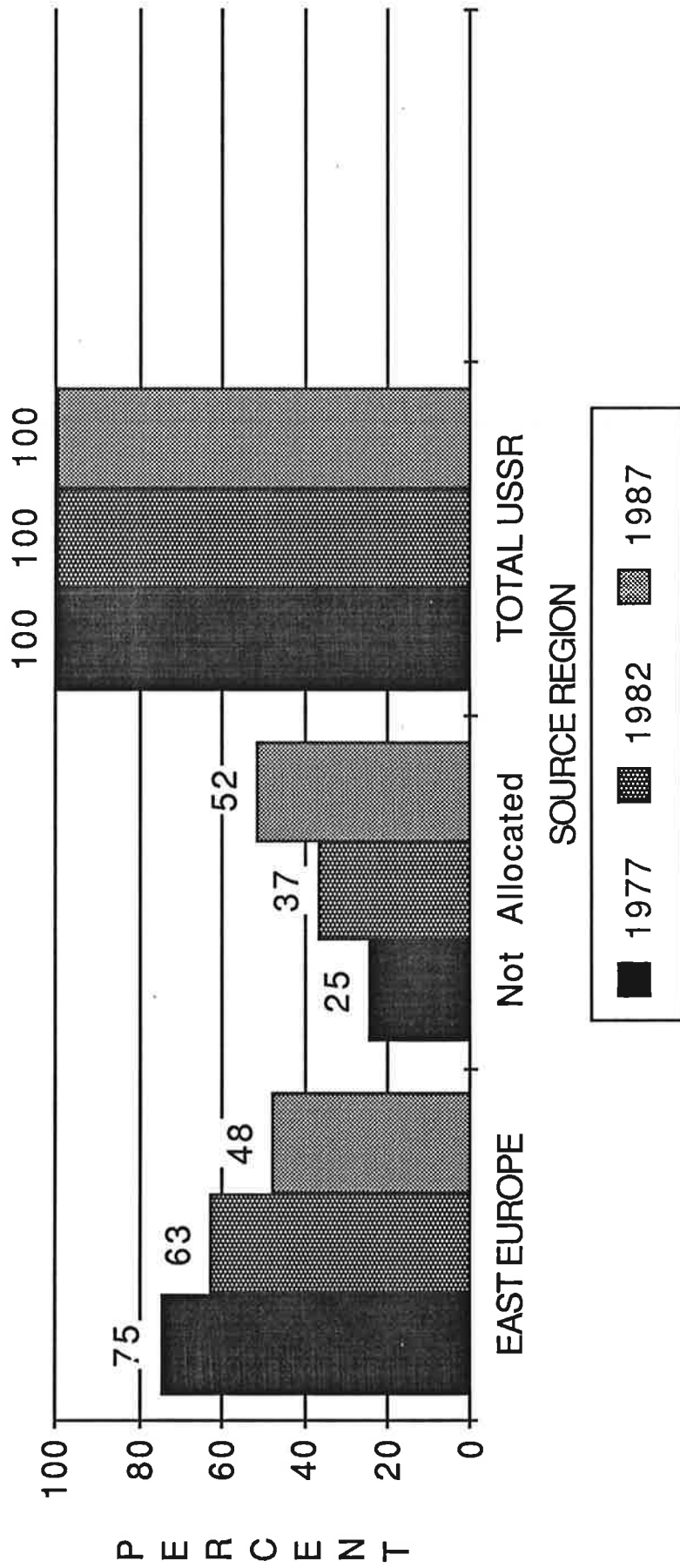
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-115 * USSR IMPORTS AND DOMESTIC
PRODUCTION OF PLYWOOD
1977-87



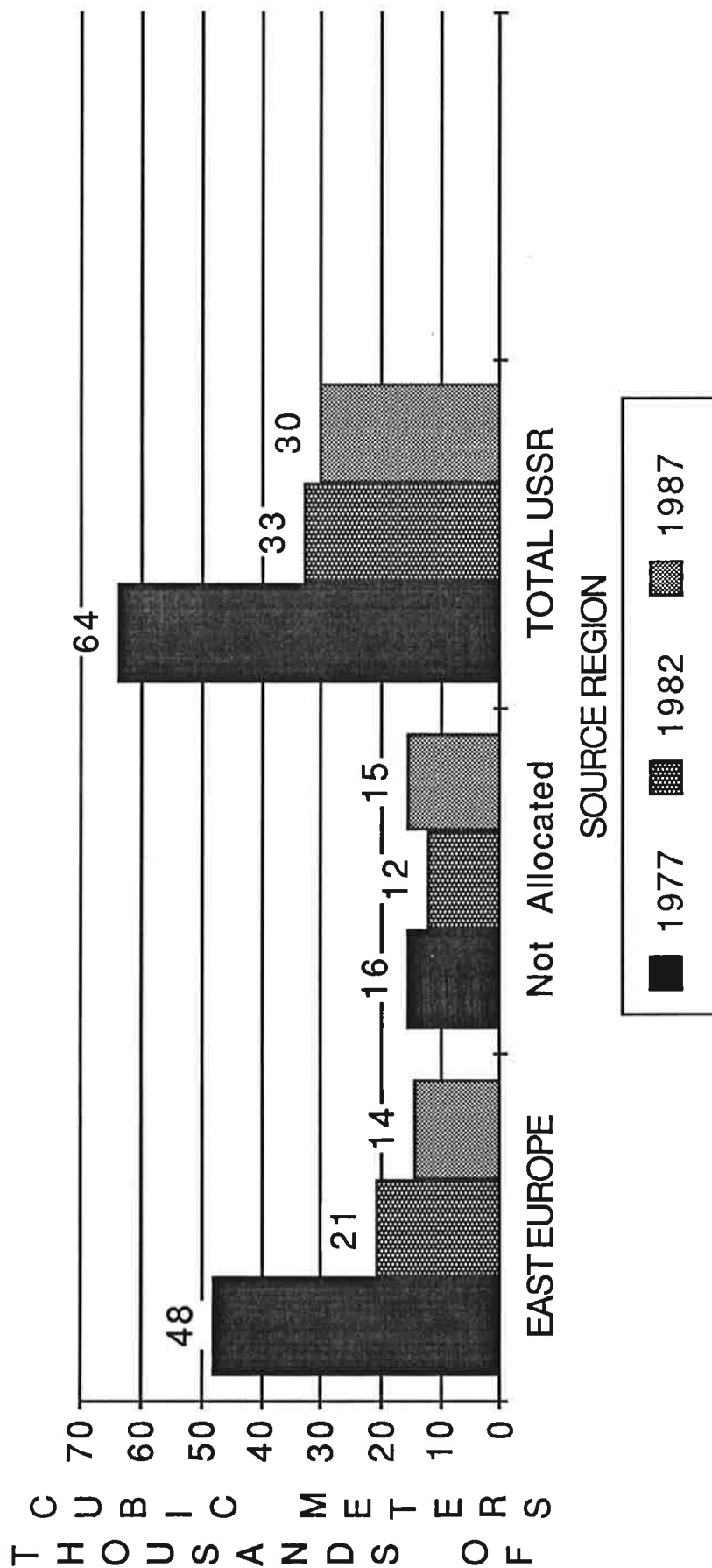
SOURCE: FAO Forest Products Annual Year Book for 1987

**FIGURE 4-116: DISTRIBUTION OF USSR
PLYWOOD IMPORTS BY MAJOR SOURCE (Percent)
1977-87**



SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-117: USSR PLYWOOD IMPORTS
BY MAJOR SOURCE (Volume)
1977-87**



SOURCE: Vneshnyaya Torgovlya, various years

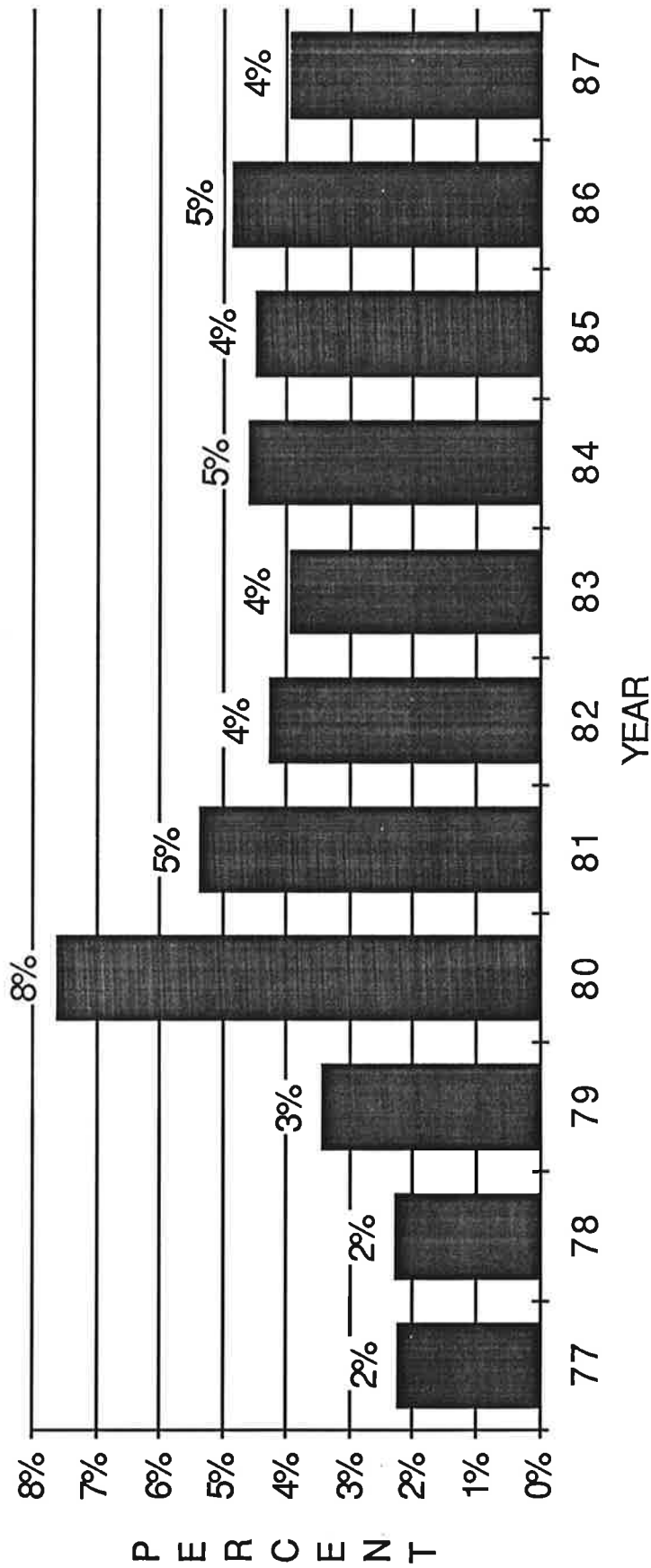
Planed Veneer: The Soviet Union is also a minor importer of planed veneer. It has accounted for between 2 percent and 8 percent of the world imports between 1977 and 1987. Major importers of veneers in 1987 were the United States and Japan, which accounted for 23 percent and 18 percent of total imports respectively. Figures 4.118 and 4.119 show the share of world plywood imports represented by the Soviet Union and a comparison of the Soviet imports to total world imports on a volume basis.

The Soviet Union imports veneer as a raw material source for their plywood industry. These imports have increased from 13 million square meters in 1977 to 31.6 million square meters in 1987. Domestic production figures for veneers are not available for the USSR. Thus, it is not possible to derive estimates of imports as a share of total domestic production.

The major identified supplying region is East Europe with Yugoslavia and Romania providing 43 percent of the imports in 1987. West Germany provided 19 percent of the imports. In recent years, suppliers from West Europe have also captured a larger share of the Soviet import market.

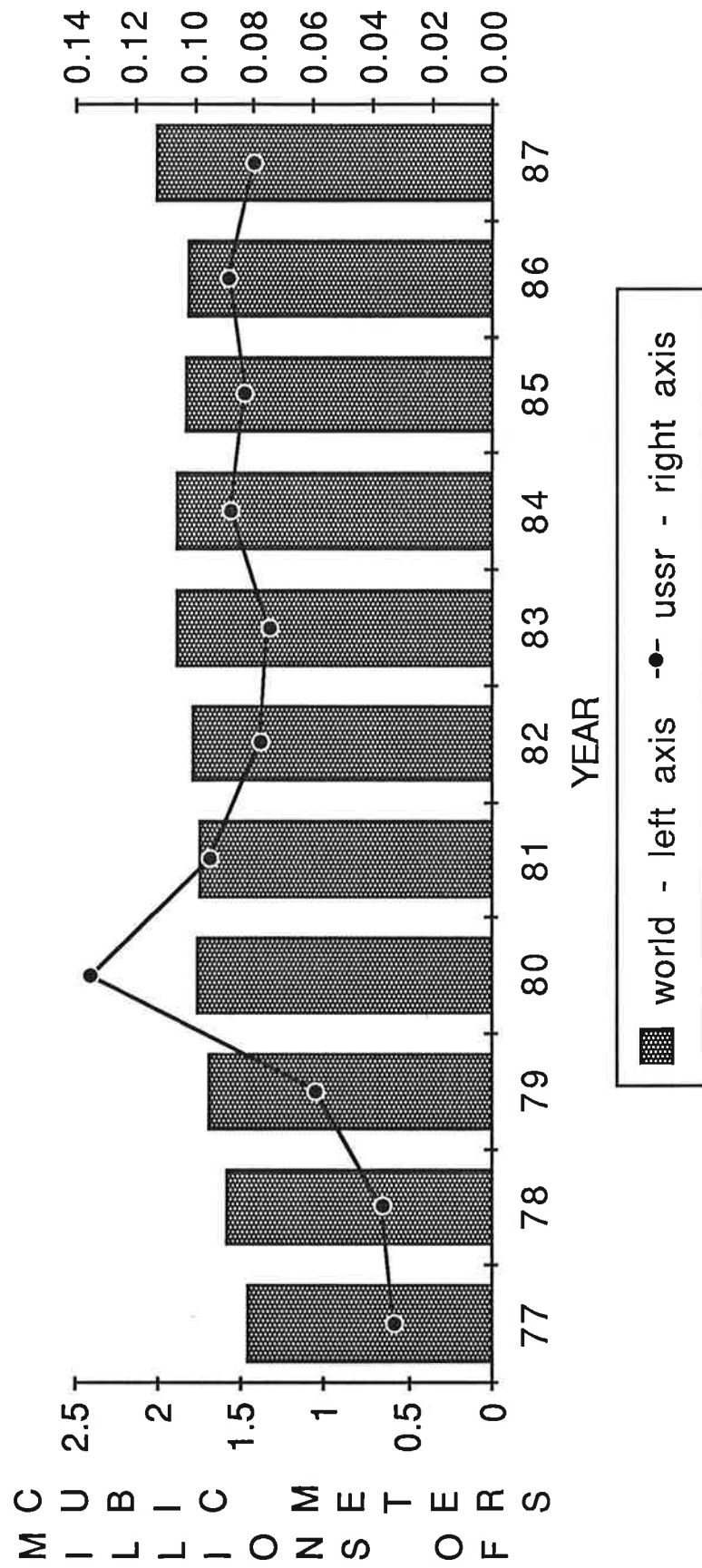
From a share of 81 percent in 1977, the East European proportion of veneer imports declined to 44 percent by 1987. At the same time, the West European share increased from 0 percent to 19 percent. Figures 4.120 and 4.121 indicate the distribution of Soviet veneer imports on a percentage and volume basis respectively.

FIGURE 4-118 * USSR: SHARE OF WORLD
 PLANED VENEER IMPORTS
 1977-87



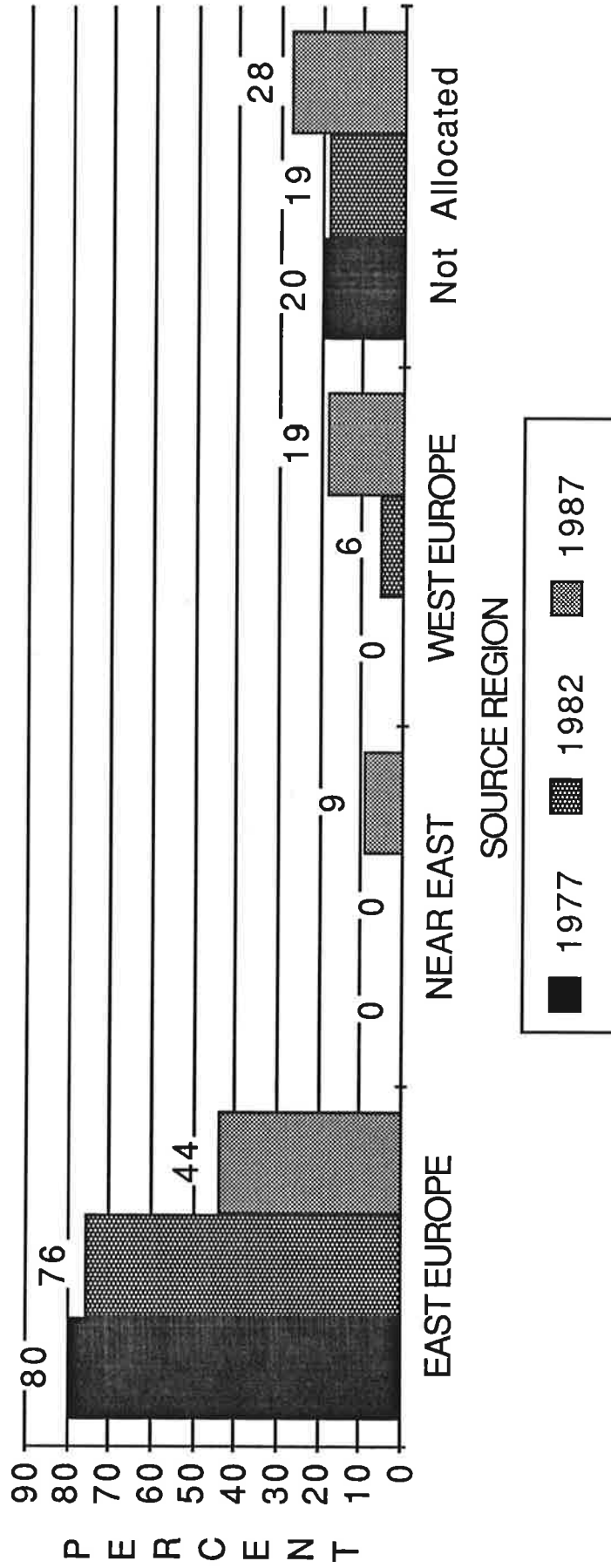
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-119 * WORLD AND USSR IMPORTS
OF PLANED VENEER
1977-87



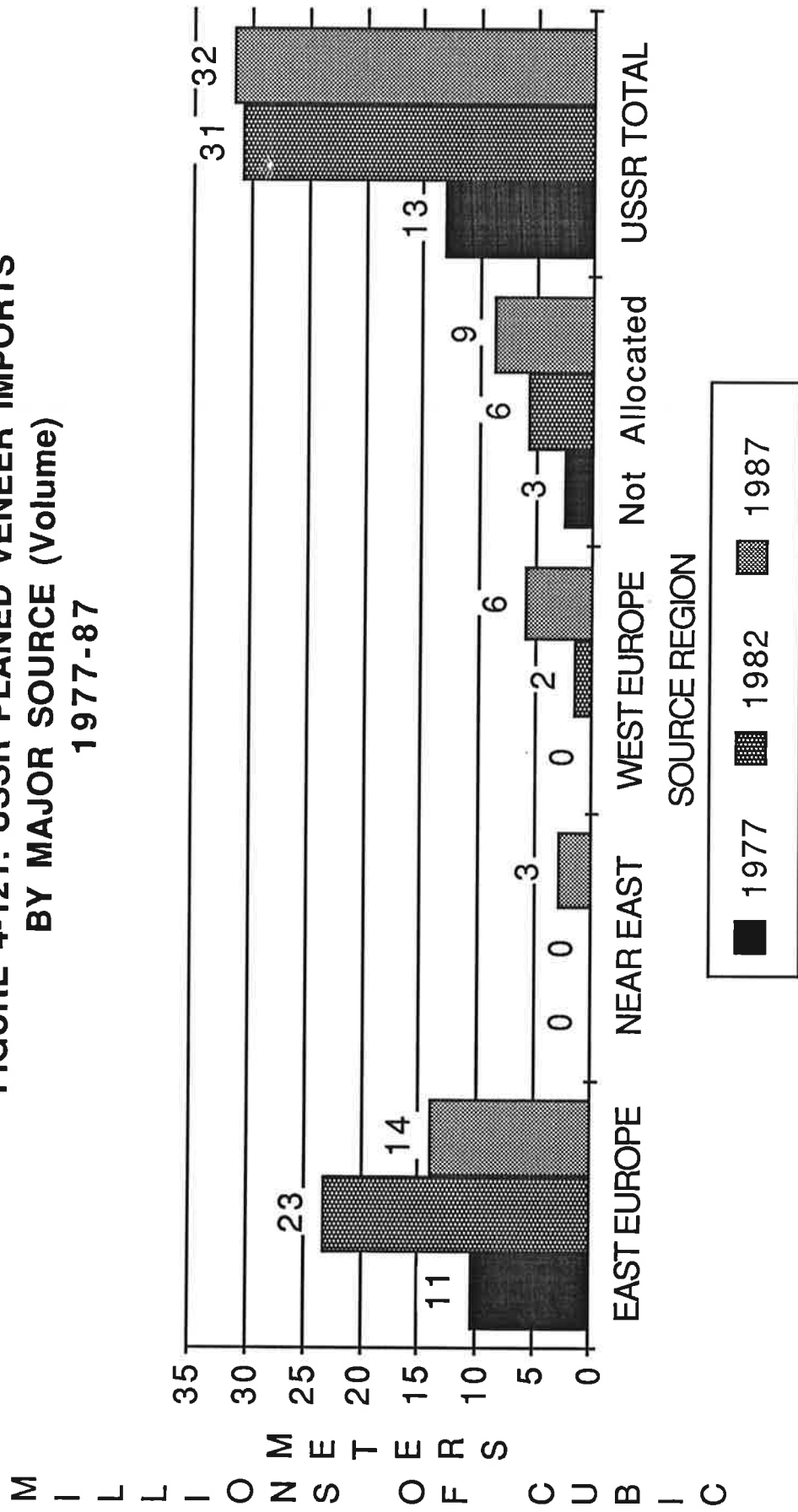
SOURCE: FAO Forest Products Annual Year Book for 1987

**FIGURE 4-120: DISTRIBUTION OF USSR
 PLANNED VENEER IMPORTS
 BY MAJOR SOURCE (Percent)
 1977-87**



SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-121: USSR PLANNED VENEER IMPORTS
BY MAJOR SOURCE (Volume)
1977-87**



SOURCE: Vneshnyaya Torgovlya, various years

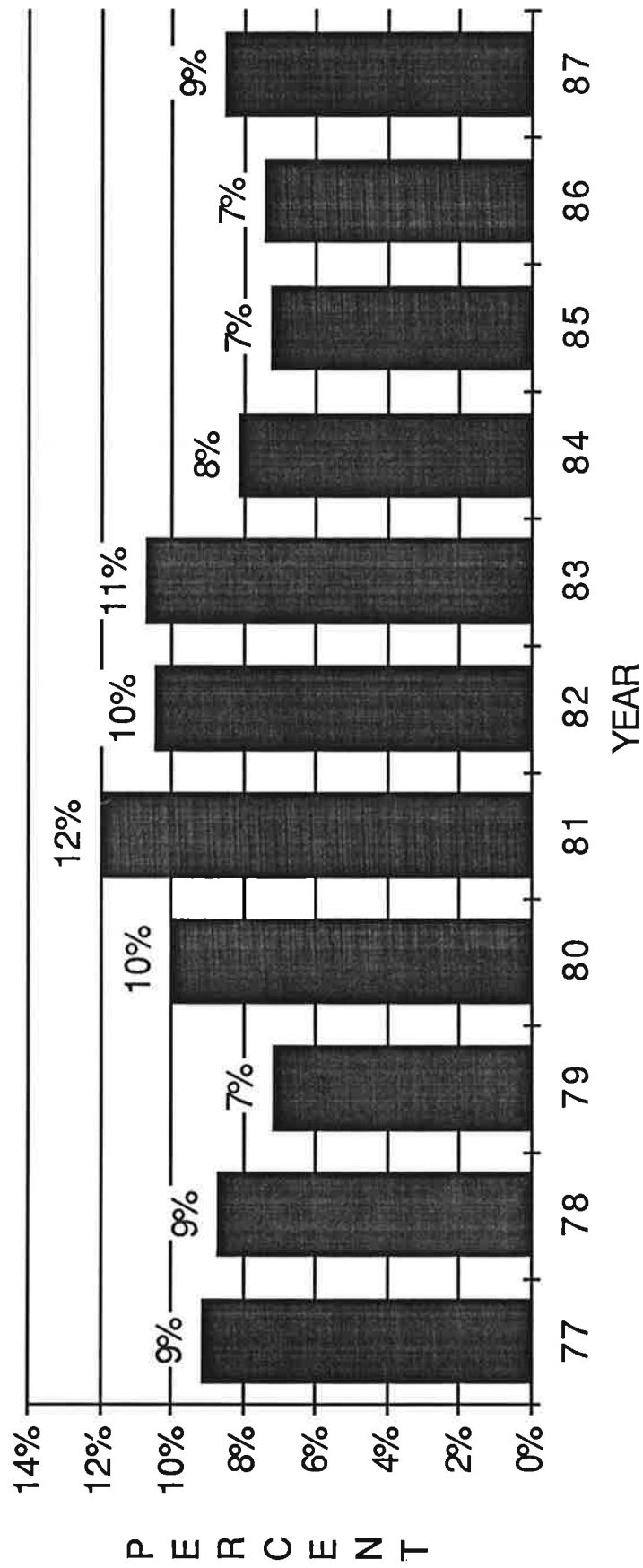
Bleached Sulfite Pulp: The Soviet Union is one of the major importers of bleached sulfite pulp from world markets. It imported between 7 and 11 percent of the total global imports between 1977 and 1987. Other major importers were the United States, Switzerland, United Kingdom, and Italy which in 1987 accounted for 12 percent, 11 percent, 10 percent, and 9 percent of total world imports. Figures 4.122 and 4.123 show the share of world bleached sulfite pulp imports accounted for by the Soviet Union and a comparison of the Soviet imports to total world imports on a volume basis.

When compared to total pulp imports, regardless of type, the Soviet Union is not a major importer, accounting for only approximately 1 percent of world imports. For total pulp imports, the major importers were the United States (18 percent), West Germany (13 percent) and Japan (11 percent). Soviet pulp imports are shown in Figures 4.124 and 4.125 in terms of percentage of world imports and volume respectively.

Pulp imports remained fairly constant between 1977 and 1987. Imports in 1977 were 200 thousand tons and in 1987 were 225 thousand tons. Imports as a share of total domestic pulp production has not exceeded 3 percent. Figures 4.126 and 4.127 show Soviet imports as a share of domestic production and contrast domestic production to import volume for the period 1977 to 1987.

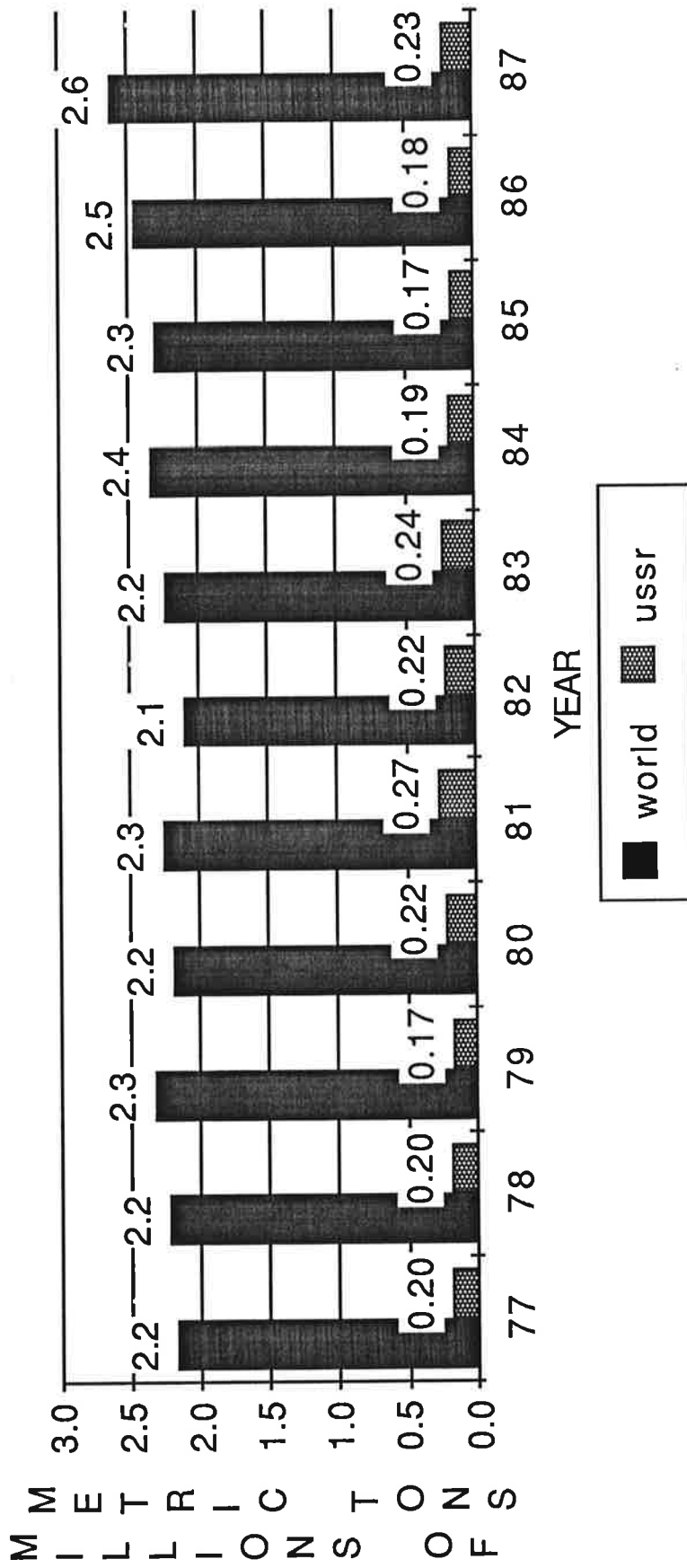
The major regions from which pulp is imported were market America and West Europe. The relative share of Soviet imports from these two regions has changed during this time. In 1977,

FIGURE 4-122 * USSR: SHARE OF WORLD
BLEACHED SULFATE PULP IMPORTS
1977-87



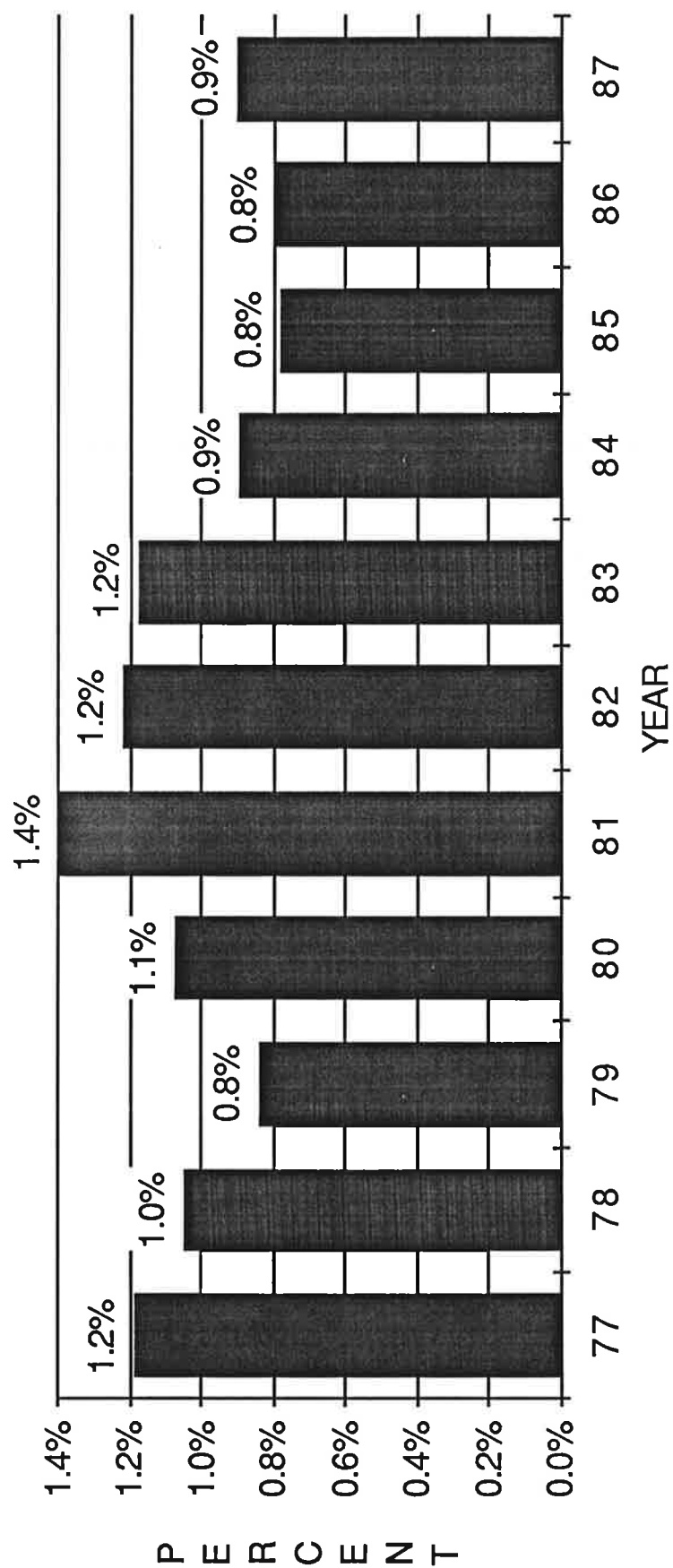
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-123 * WORLD AND USSR IMPORTS
OF BLEACHED SULFITE PULP
1977-87



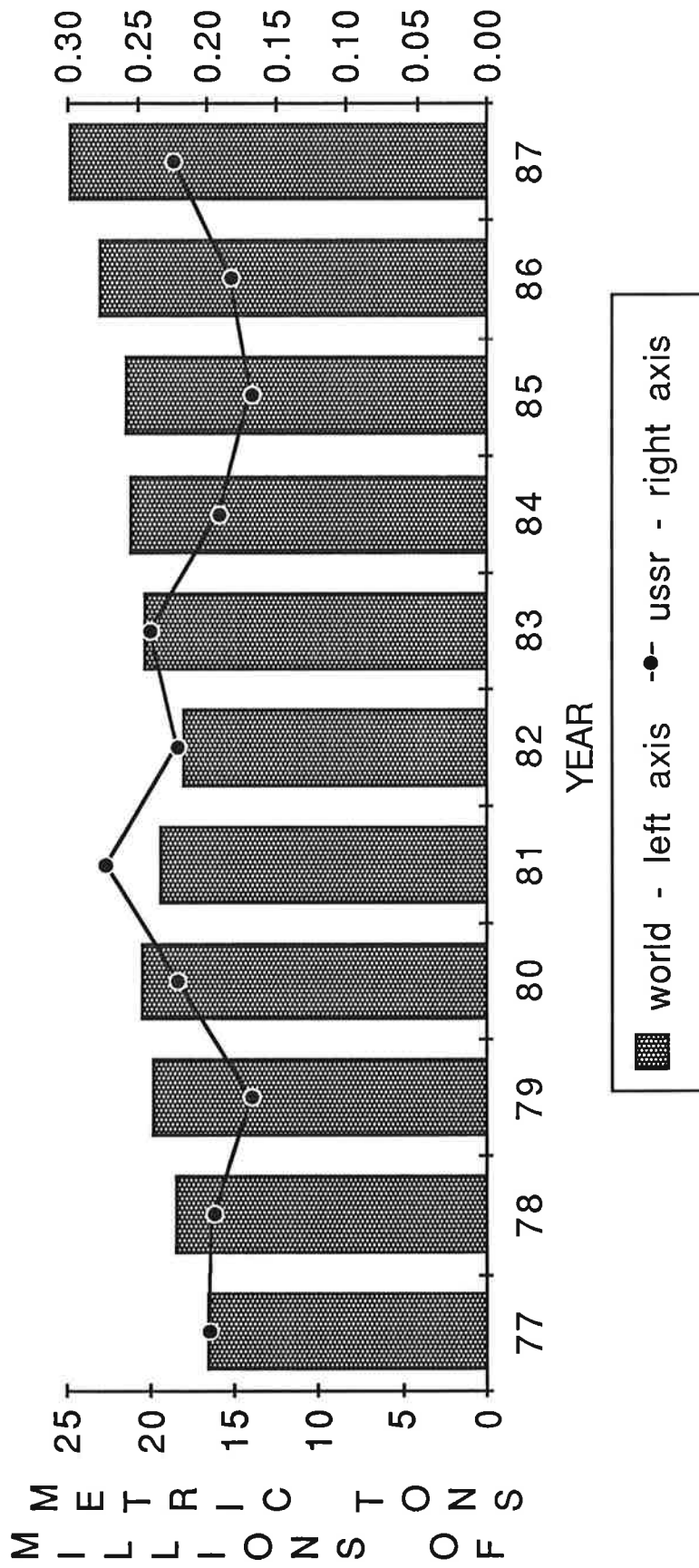
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-124 * USSR: SHARE OF WORLD TOTAL
PULP IMPORTS
1977-87



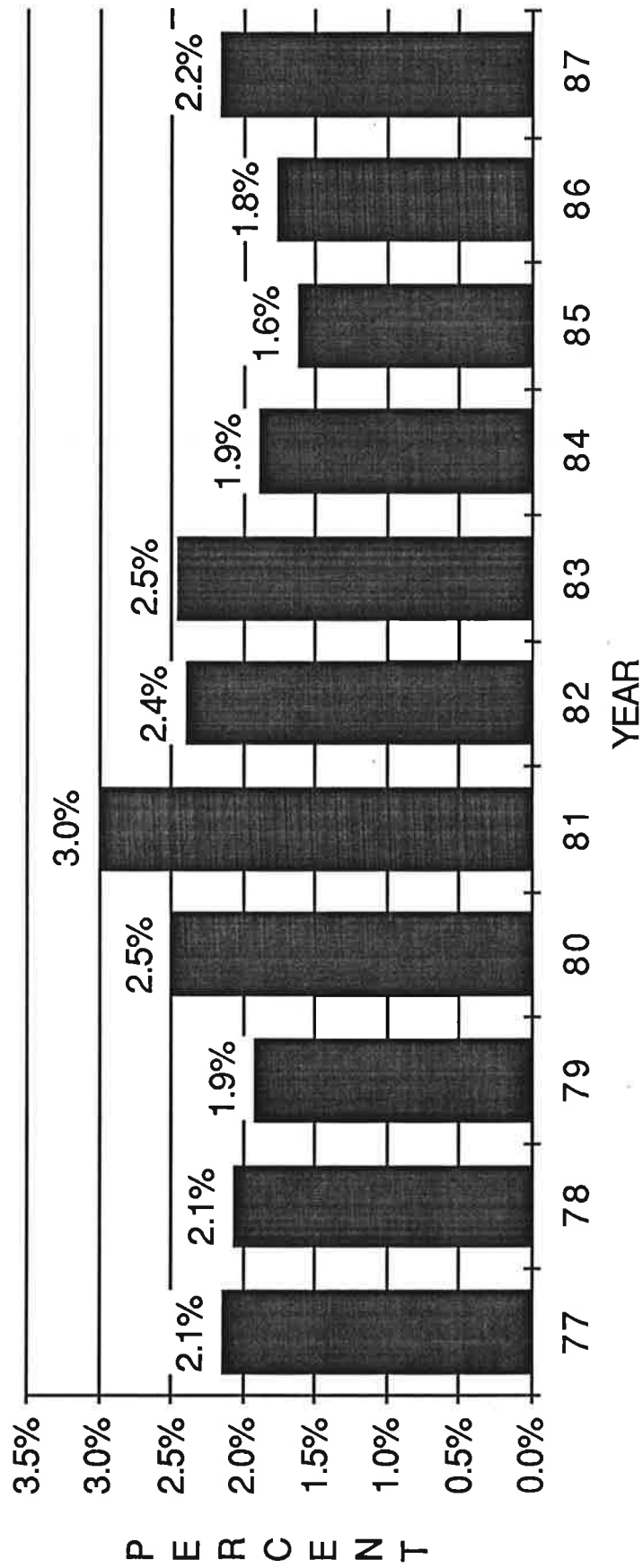
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-125 * WORLD AND USSR IMPORTS
OF ALL CATEGORIES OF PULP
1977-87



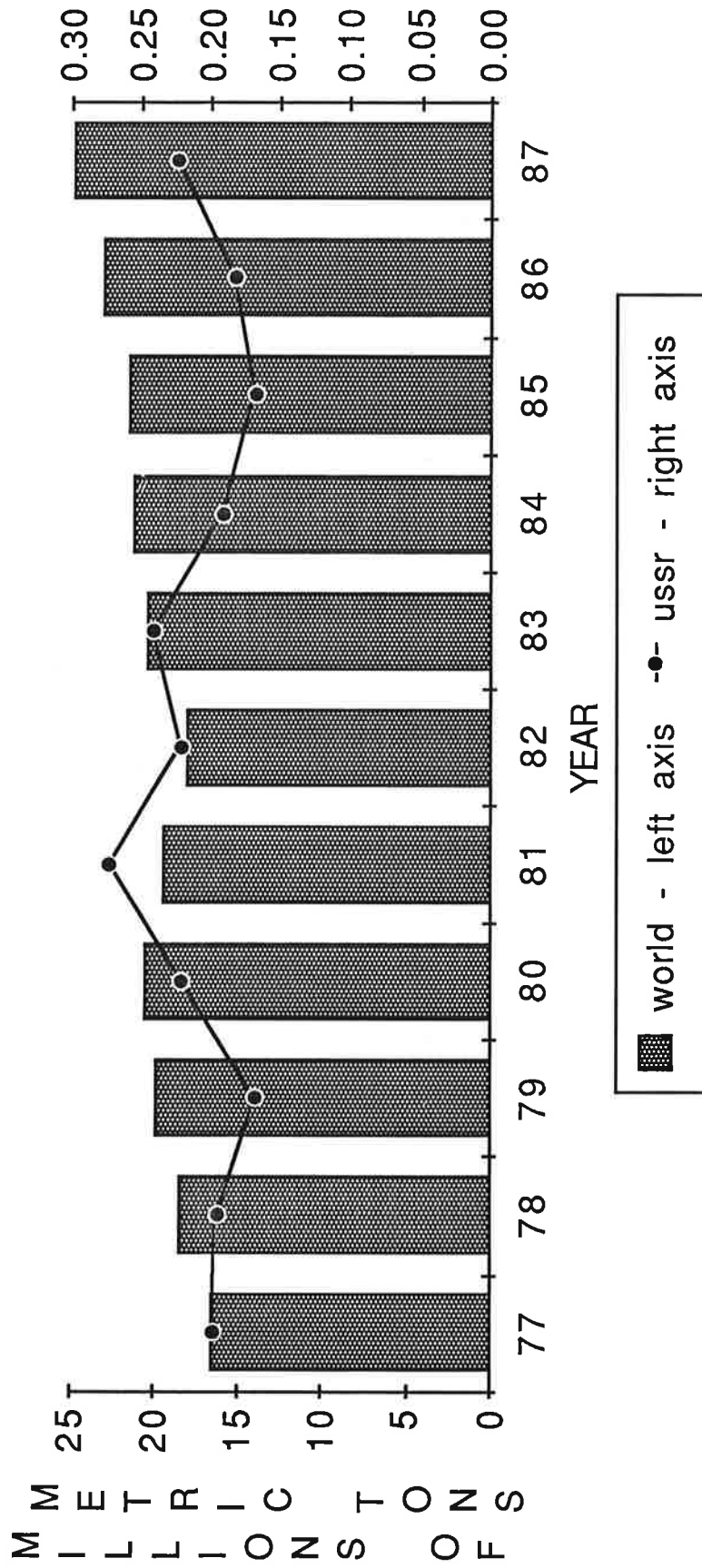
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-126 * USSR: SHARE OF DOMESTIC
PULP PRODUCTION IMPORTED
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-127 * WORLD AND USSR IMPORTS
OF PULP
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

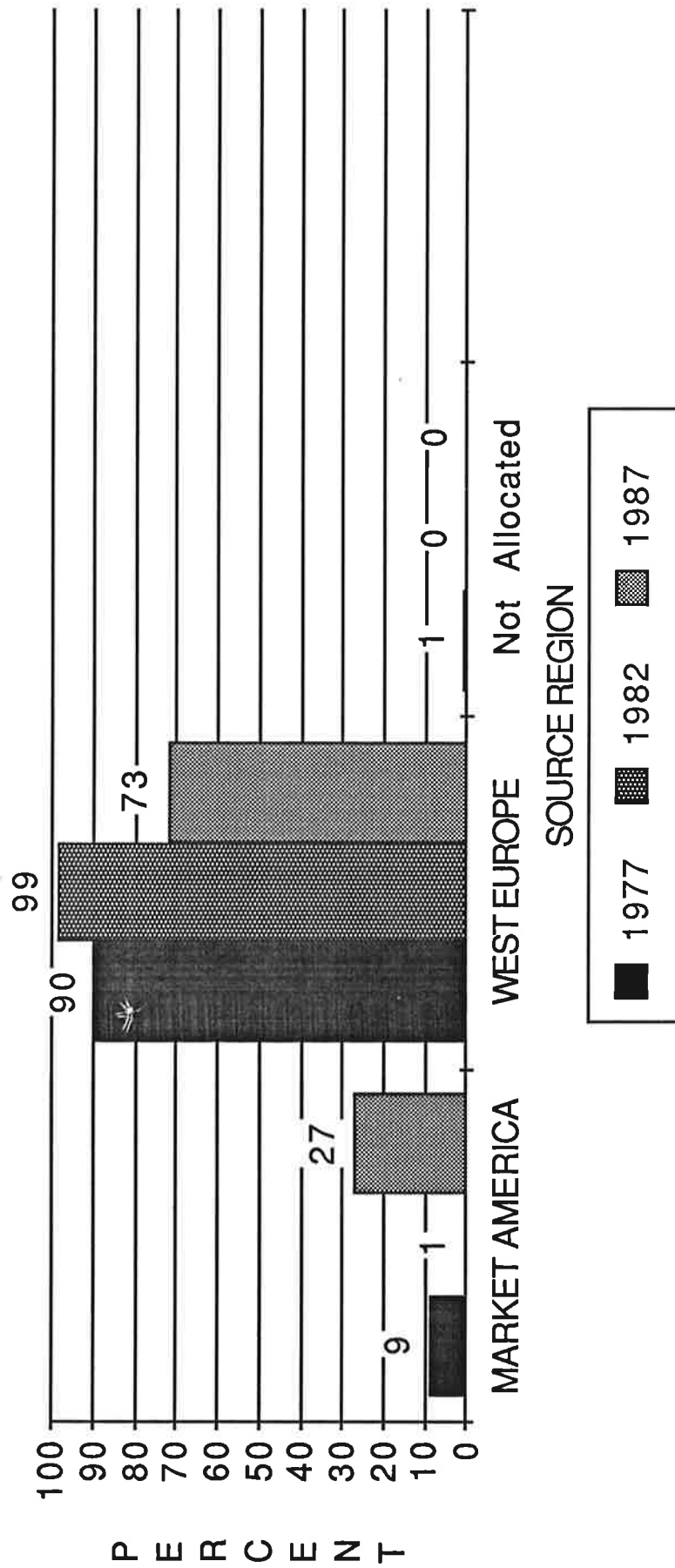
West Europe suppliers provided 90 percent of the imports (Finland - 62 percent and Sweden - 30 percent) while Market America provided 10 percent (United States - 8 percent). By 1987, the import share of West Europe had eroded to 72 percent (Finland - 46 percent and Norway - 27 percent) while that of Market America had increased to 28 percent (Canada - 16 percent and United States - 11 percent). Figures 4.128 and 4.129 show the distribution of Soviet pulp imports on a percentage and volume basis respectively.

Paper: Paper and paperboard production is not clearly separated in the FAO trade statistics. This discussion of the Soviet shares of world trade thus combines paper and paperboard into one category.

The Soviet Union is a minor importer of paper and paperboard, accounting for between 1 and 3 percent of imports between 1977 and 1987. The major importing countries have been the United States, United Kingdom, and West Germany, which in 1987 accounted for 25 percent, 11 percent, and 11 percent of world imports respectively. Figures 4.130 and 4.131 show the share of world paper and paperboard imports accounted for by Soviet imports and a comparison of Soviet imports to total world imports on a volume basis.

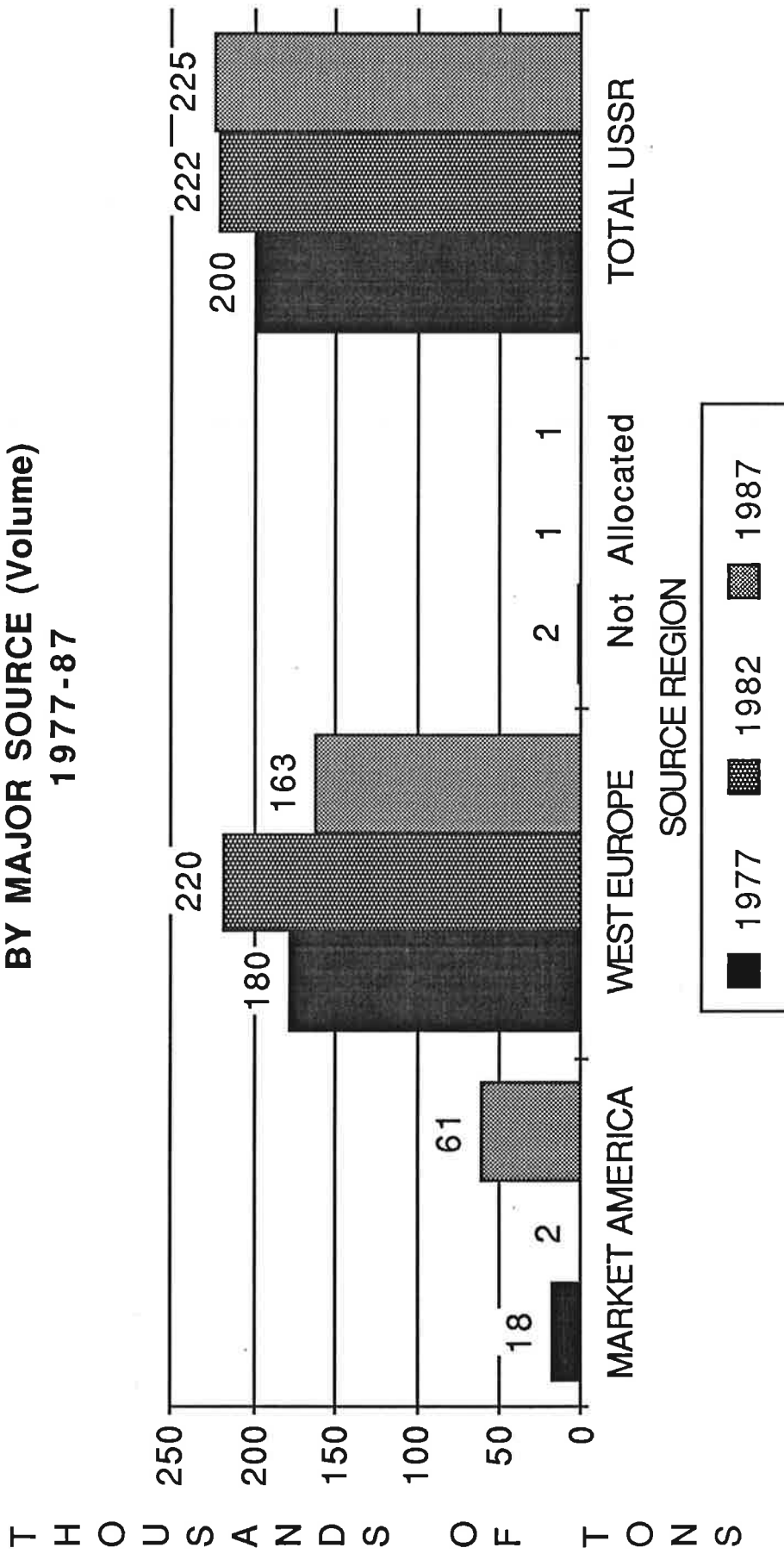
Soviet imports of paper and paperboard fluctuated widely between 1977 and 1987. Imports were 577 thousand metric tons in 1977 and 573 thousand metric tons in 1987. However, during the early 1980s, approximately 900 thousand metric tons were imported. Imports compared to domestic production

**FIGURE 4-128: DISTRIBUTION OF USSR PULP IMPORTS
BY MAJOR SOURCE (Percent)
1977-87**



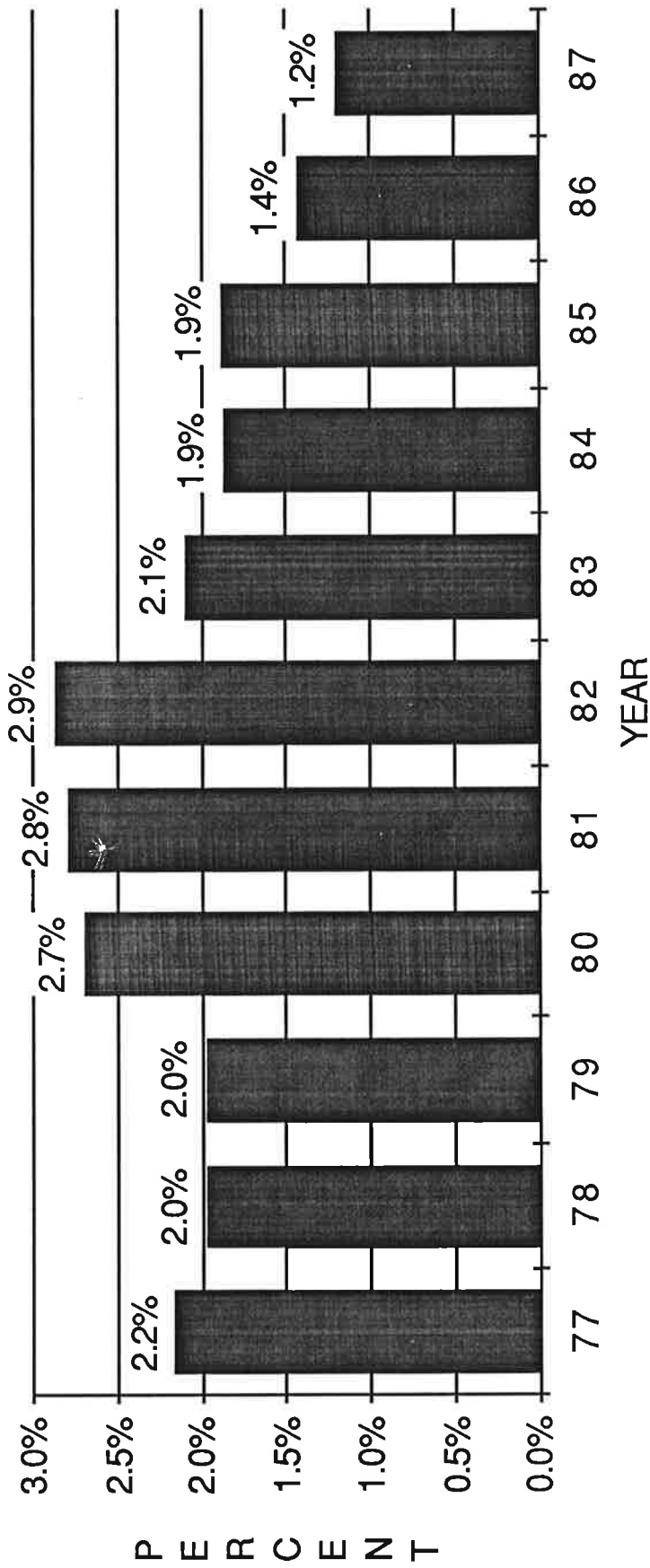
SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-129: USSR PULP IMPORTS
BY MAJOR SOURCE (Volume)
1977-87**



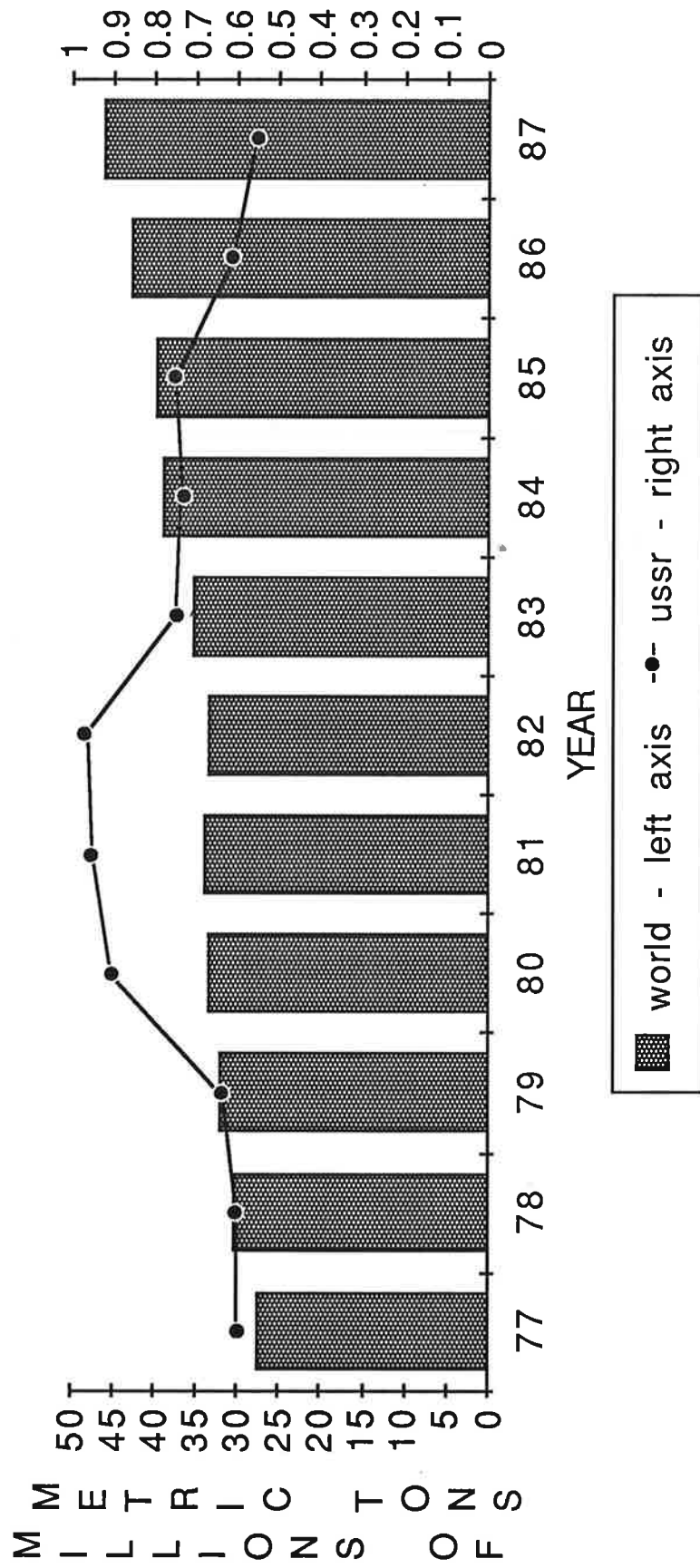
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-130 * USSR: SHARE OF WORLD
PAPER AND PAPERBOARD IMPORTS
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-131 * WORLD AND USSR IMPORTS
OF PAPER AND PAPERBOARD
1977-87



SOURCE: FAO Forest Products Annual Year Book for 1987

have not exceeded 11 percent. Figures 4.132 and 4.133 show Soviet imports as a share of domestic production and contrast domestic production to import volume for the period 1977 to 1987.

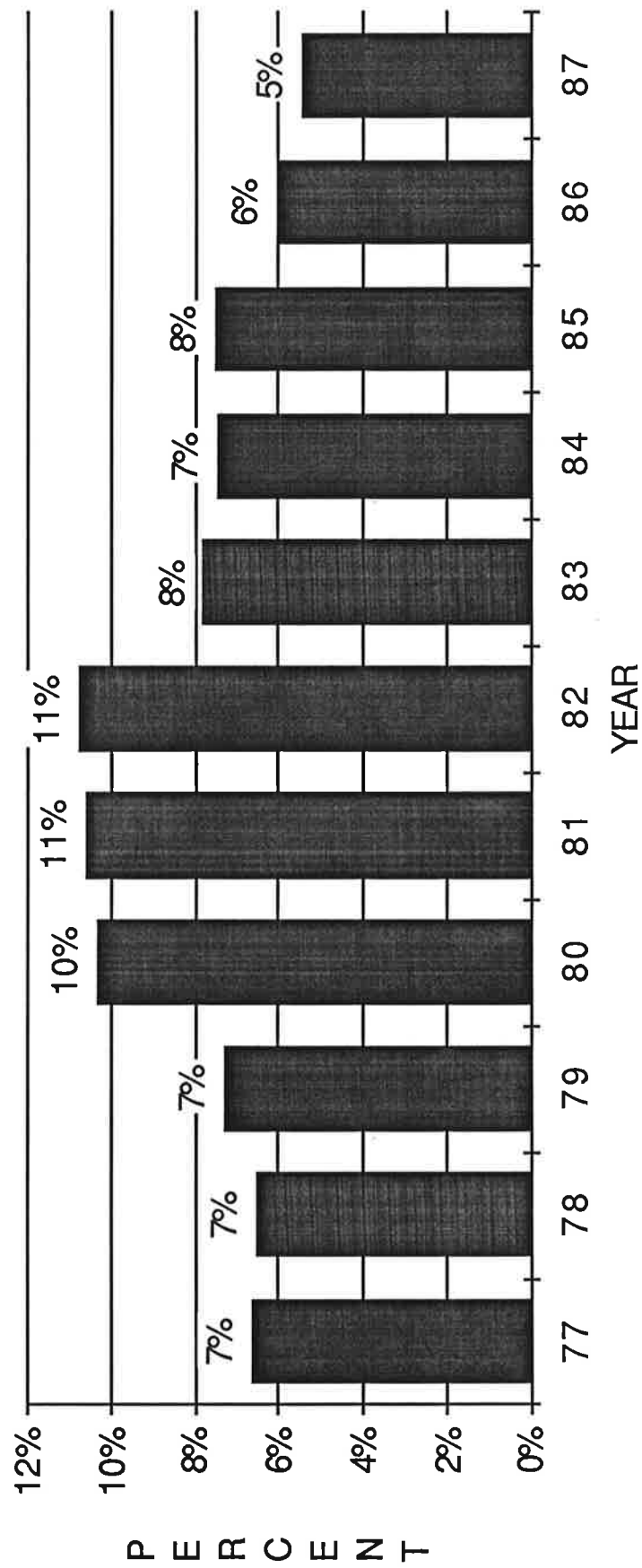
Imports of paper products, excluding paperboard, are obtainable from Soviet sources. Imports as a share of domestic production have not exceeded 13 percent. Figures 4.134 and 4.135 show Soviet imports as a share of domestic production and compare domestic production to import volume for the period 1977 to 1987.

Paper imports have fluctuated widely between 1977 and 1987. From a low of 450 thousand tons in 1977, imports increased to 690 thousand tons in 1980, before falling to 470 thousand tons by 1987.

The major regions from which paper products were imported were East and West Europe. While the relative importance of each has not changed over the last eleven years, the East European share has increased from 14 percent in 1977 to 18 percent in 1987. Much of the fluctuations in paper imports have occurred in the imports from West Europe.

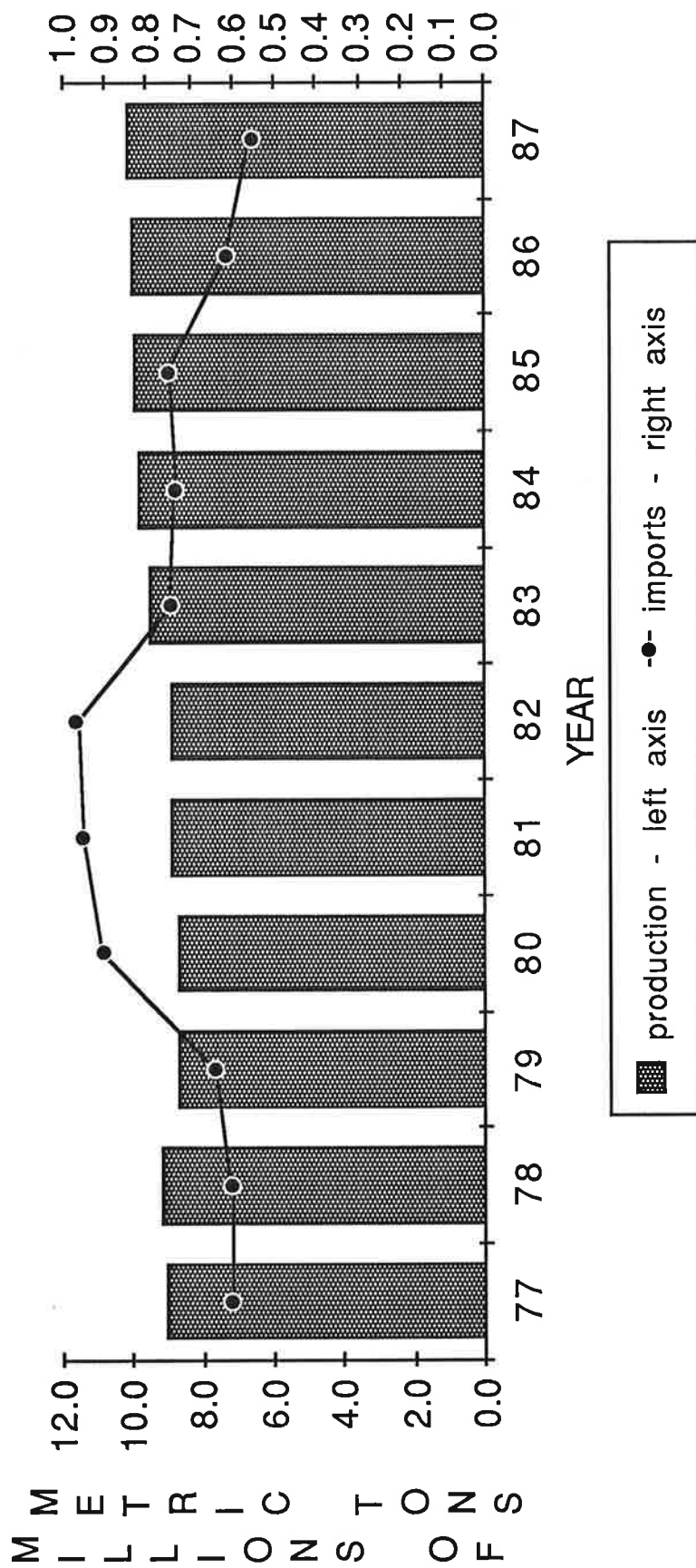
The major country exporting to the USSR was Finland which supplied 73 percent of Soviet imports in 1987. The major East Europe exporter to the USSR has been the GDR which in 1987 supplied 10 percent of Soviet imports.. Figures 4.136 and 4.137 show the distribution of Soviet paper imports on a percentage and volume basis respectively.

FIGURE 4-132 * USSR: SHARE OF DOMESTIC PAPER AND PAPERBOARD
 PRODUCTION IMPORTED
 1977-87



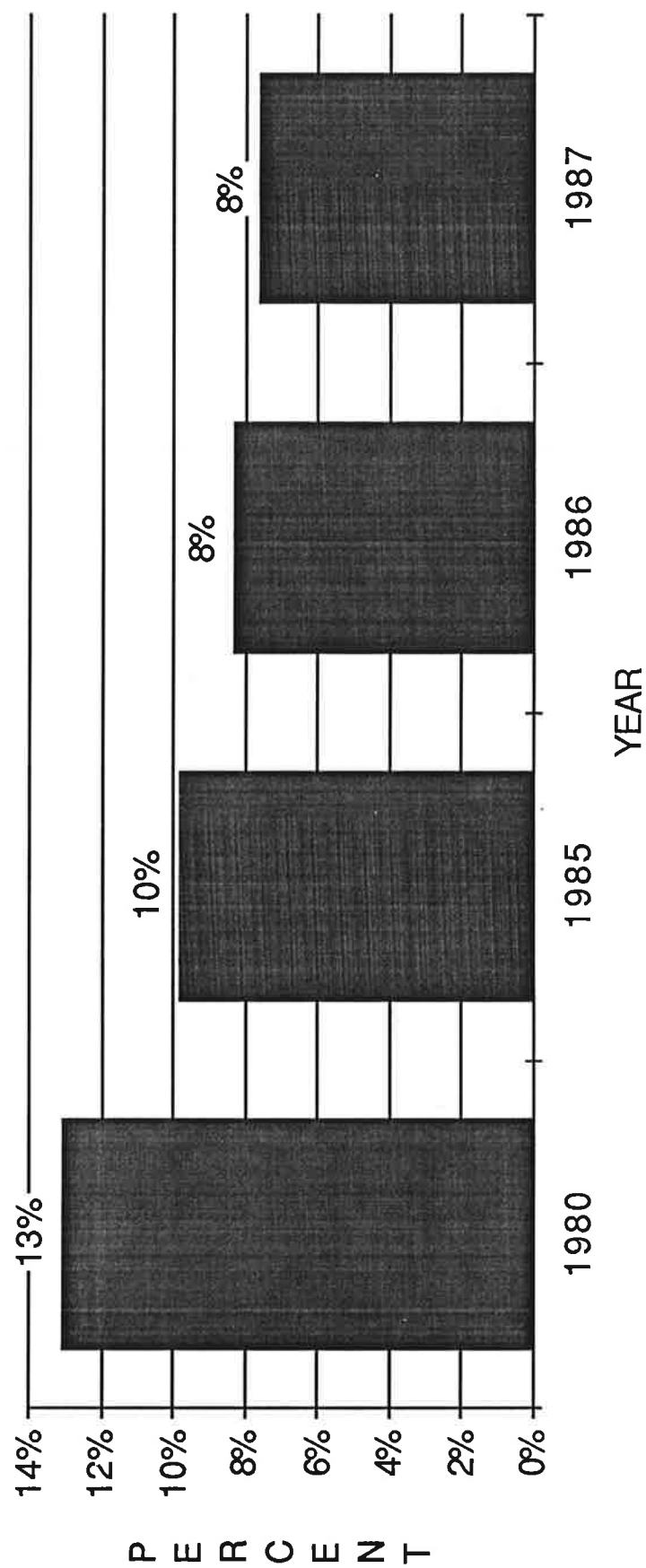
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-133 * USSR IMPORTS AND DOMESTIC PRODUCTION OF PAPER AND PAPERBOARD
1977-87



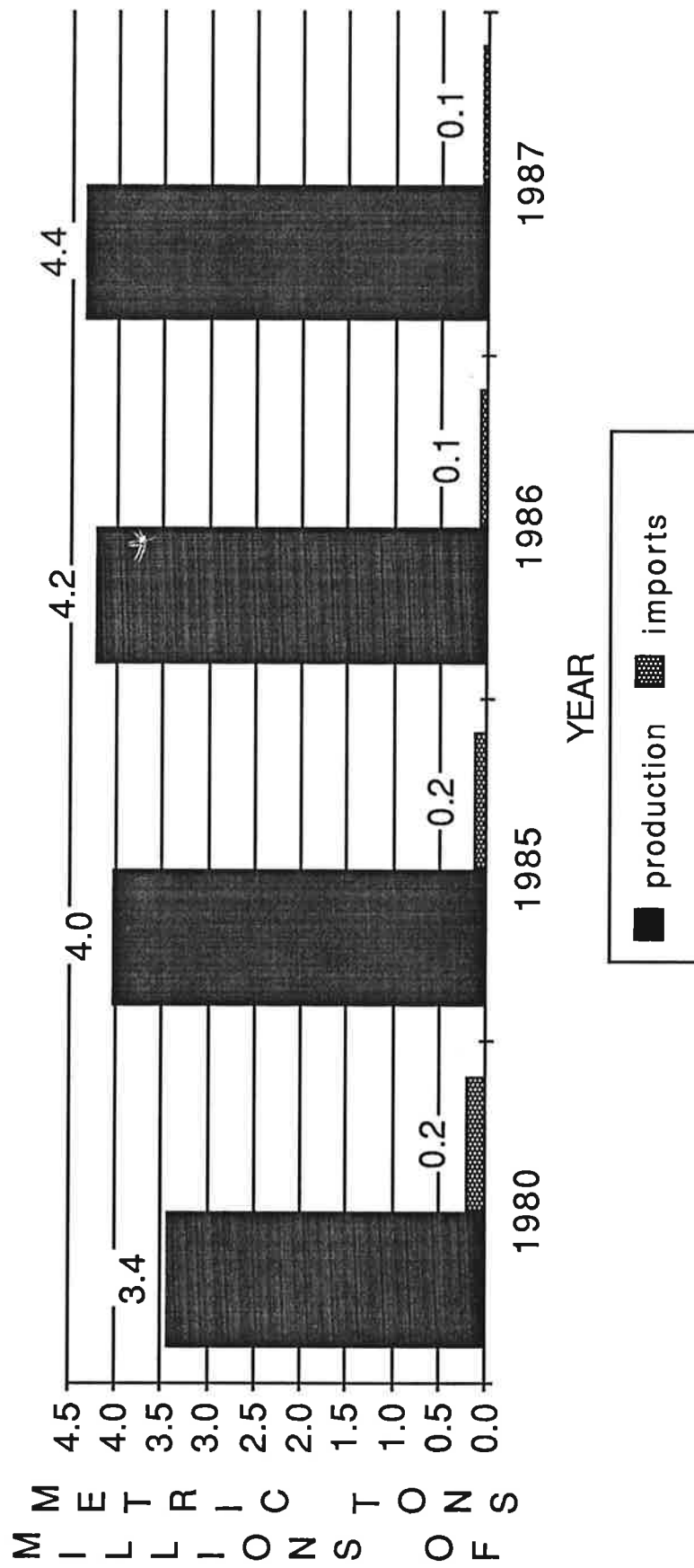
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-134 * USSR: SHARE OF DOMESTIC
PAPER PRODUCTION IMPORTED
1977-87



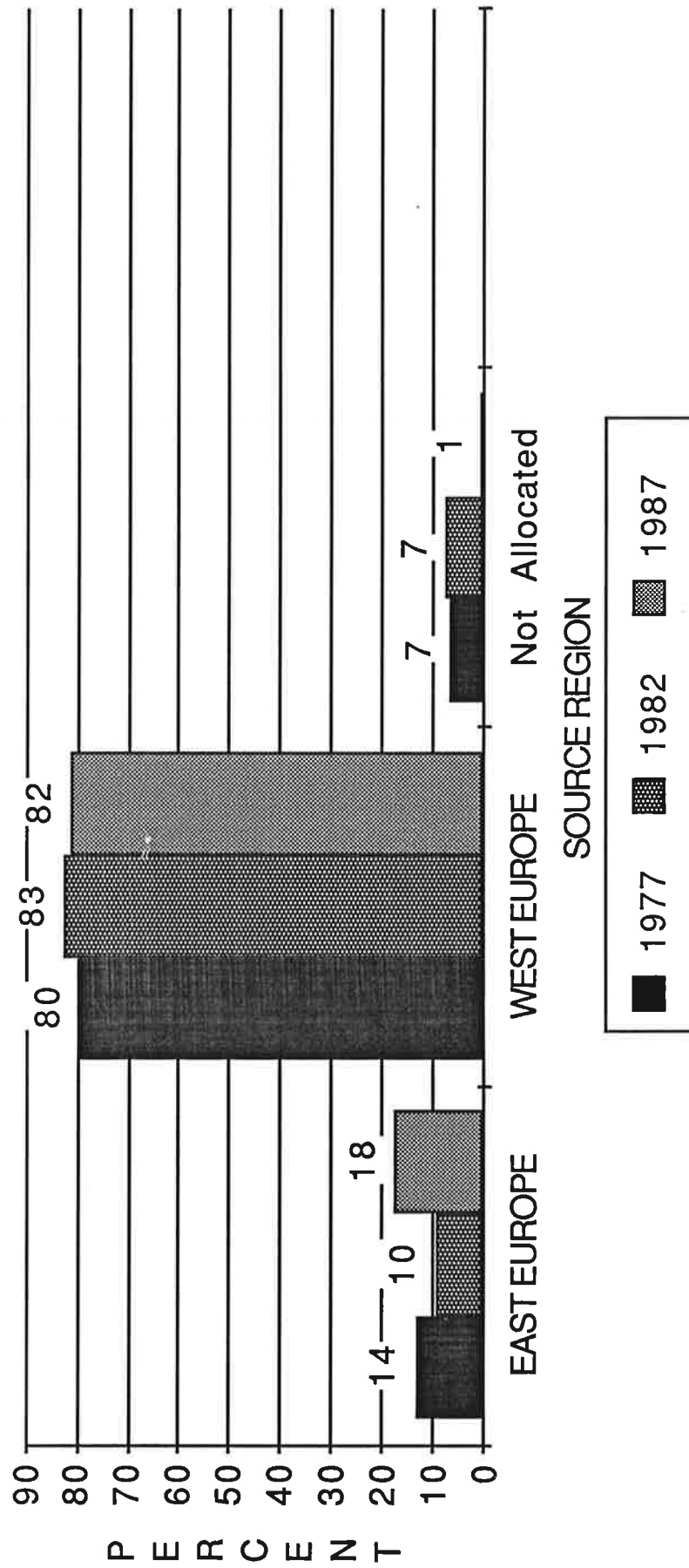
SOURCE: Narodnoye Khozaustvo SSSR v 1987 g, Vneshnyaya Torgovlya, various years

FIGURE 4-135 * USSR IMPORTS AND DOMESTIC PRODUCTION OF PAPER 1977-87



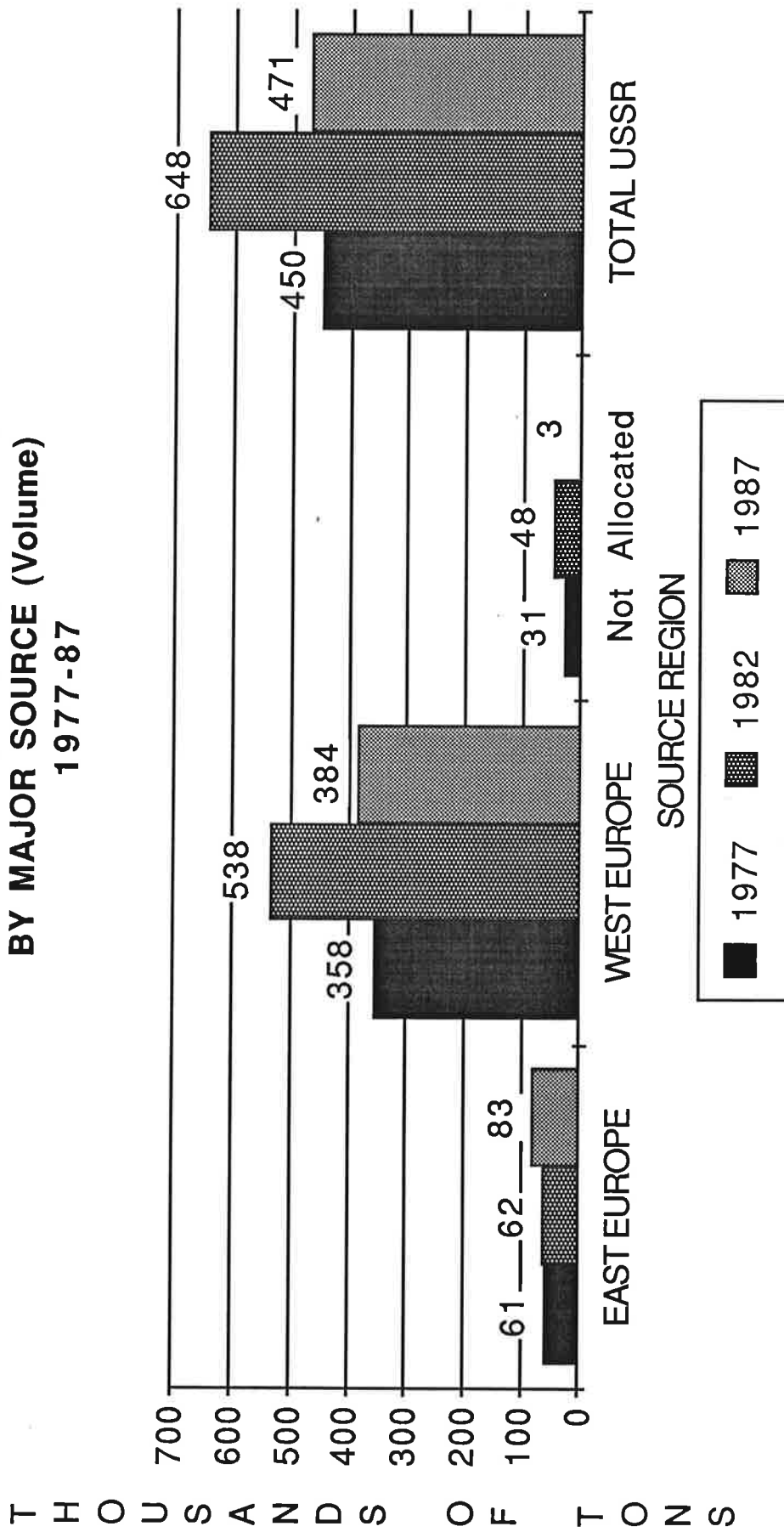
SOURCE: FAO Forest Products Annual Year Book for 1987

FIGURE 4-136: GEOGRAPHIC DISTRIBUTION OF PAPER IMPORTS INTO THE USSR (PERCENT)



SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-137: USSR PAPER IMPORTS
BY MAJOR SOURCE (Volume)
1977-87**



SOURCE: Vneshnyaya Torgovlya, various years

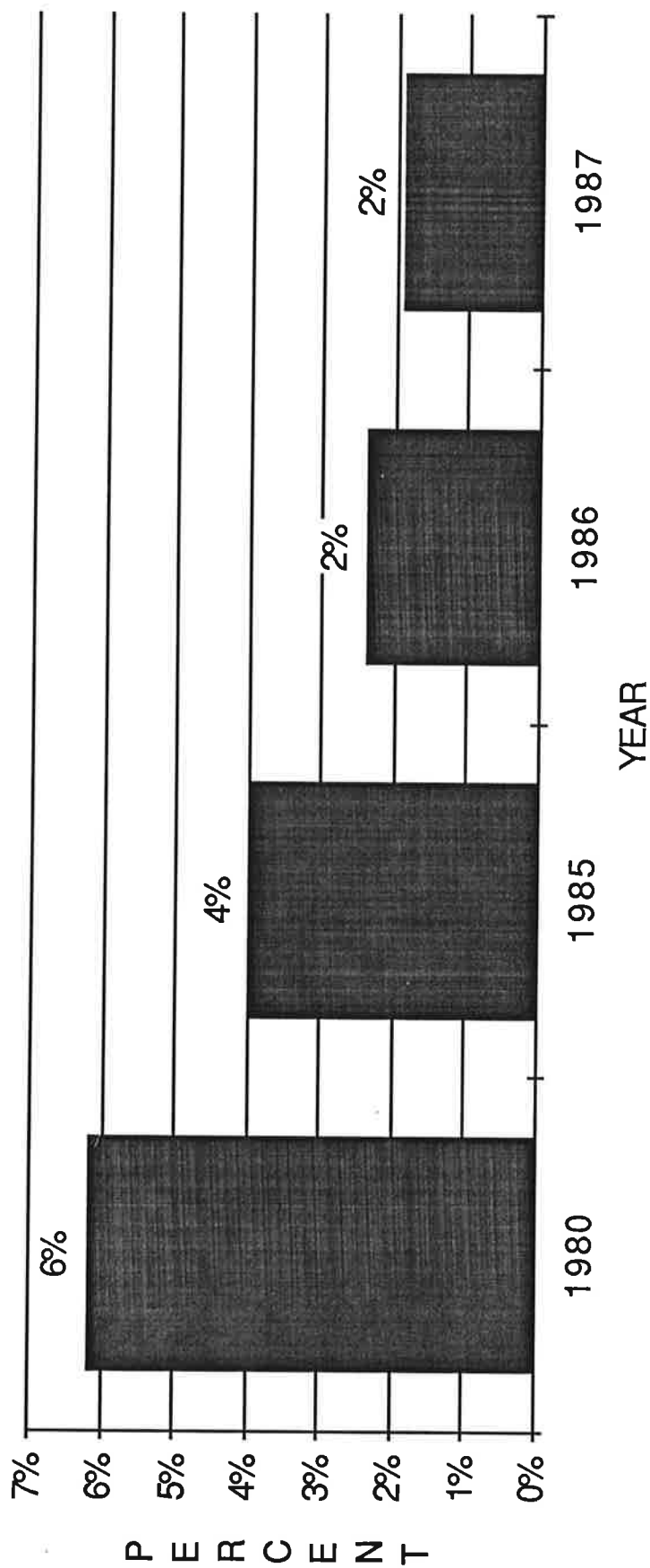
Paperboard: Import data for paperboard, excluding paper, are obtainable from Soviet sources. Imports as a share of domestic production has not exceeded 6 percent. Figures 4.138 and 4.139 show Soviet imports as a share of domestic production and contrast domestic production to import volume for the period 1977 to 1987.

Paperboard imports have declined in recent years. From a high of 212 thousand tons in 1982, imports fell to 84 thousand tons in 1987. Imports in 1977 were 157 thousand tons, nearly all originating from West Europe.

The major exporting country was Finland which supplied 98 percent of the volume imported by the Soviet Union in 1987. Figures 4.140 and 4.141 show the distribution of Soviet paperboard imports on a percentage and volume basis respectively.

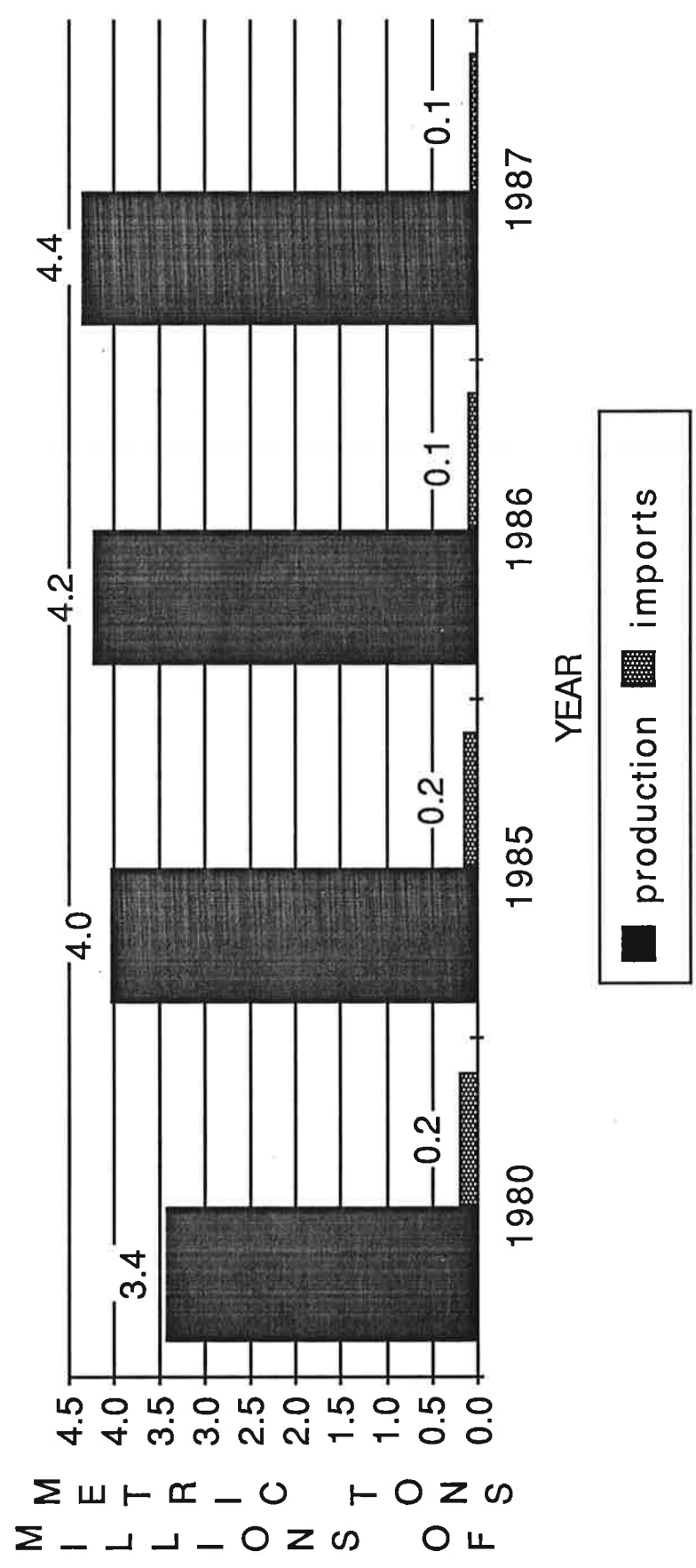
Industrial Paper: The Soviet Union imports various categories of industrial paper. This includes Kraft bags, parchment, carmel paper, and cardboard boxes. West Europe is the major source of the products for all product categories, with the major exporting country being Finland. Figures 4.142 and 4.143 illustrate the distribution of Soviet industrial paper imports on a percentage and volume basis respectively.

FIGURE 4-138 * USSR: SHARE OF DOMESTIC PAPERBOARD
 PRODUCTION IMPORTED
 1977-87



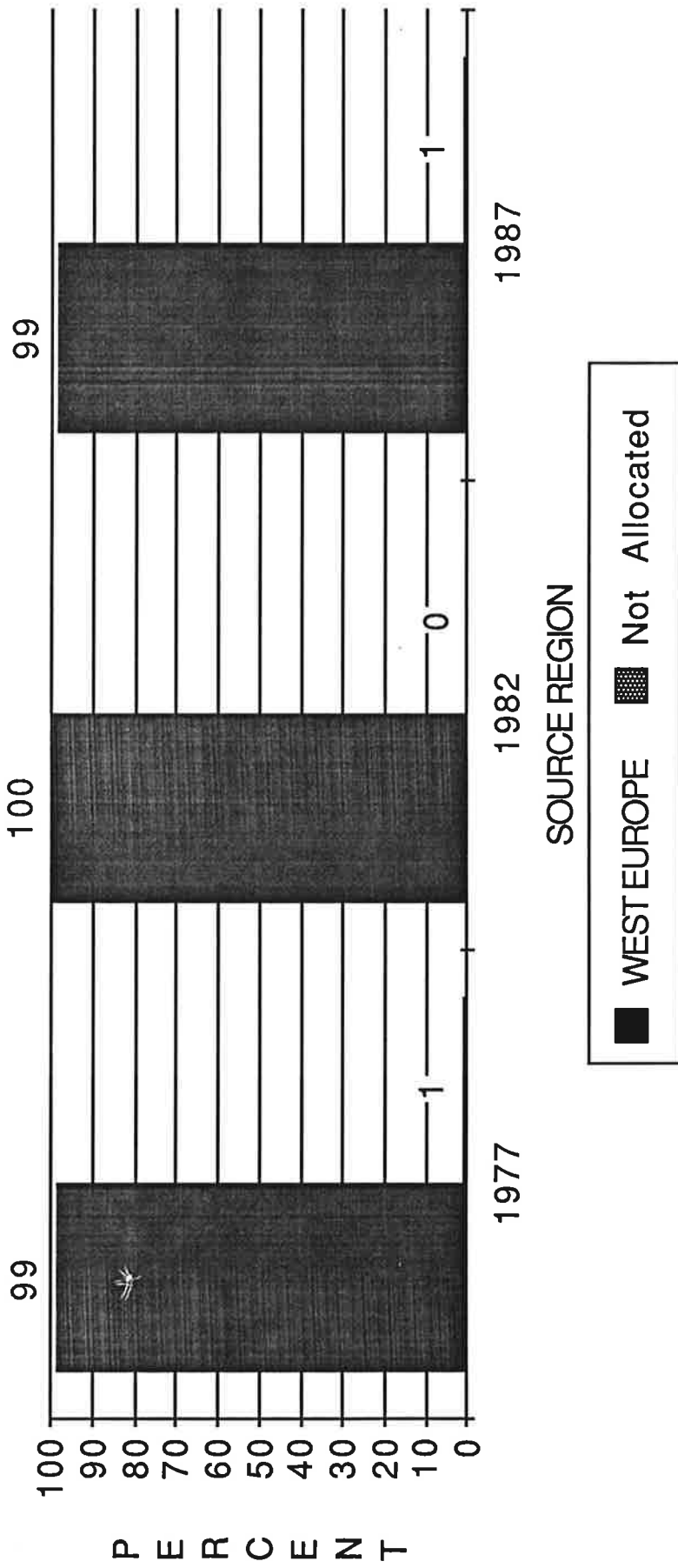
SOURCE: Narodnoye Khozaustvo SSSR v 1987 g, Vneshnyaya Torgovlya, various years

FIGURE 4-139 * USSR IMPORTS AND DOMESTIC PRODUCTION
OF PAPERBOARD
1977-87



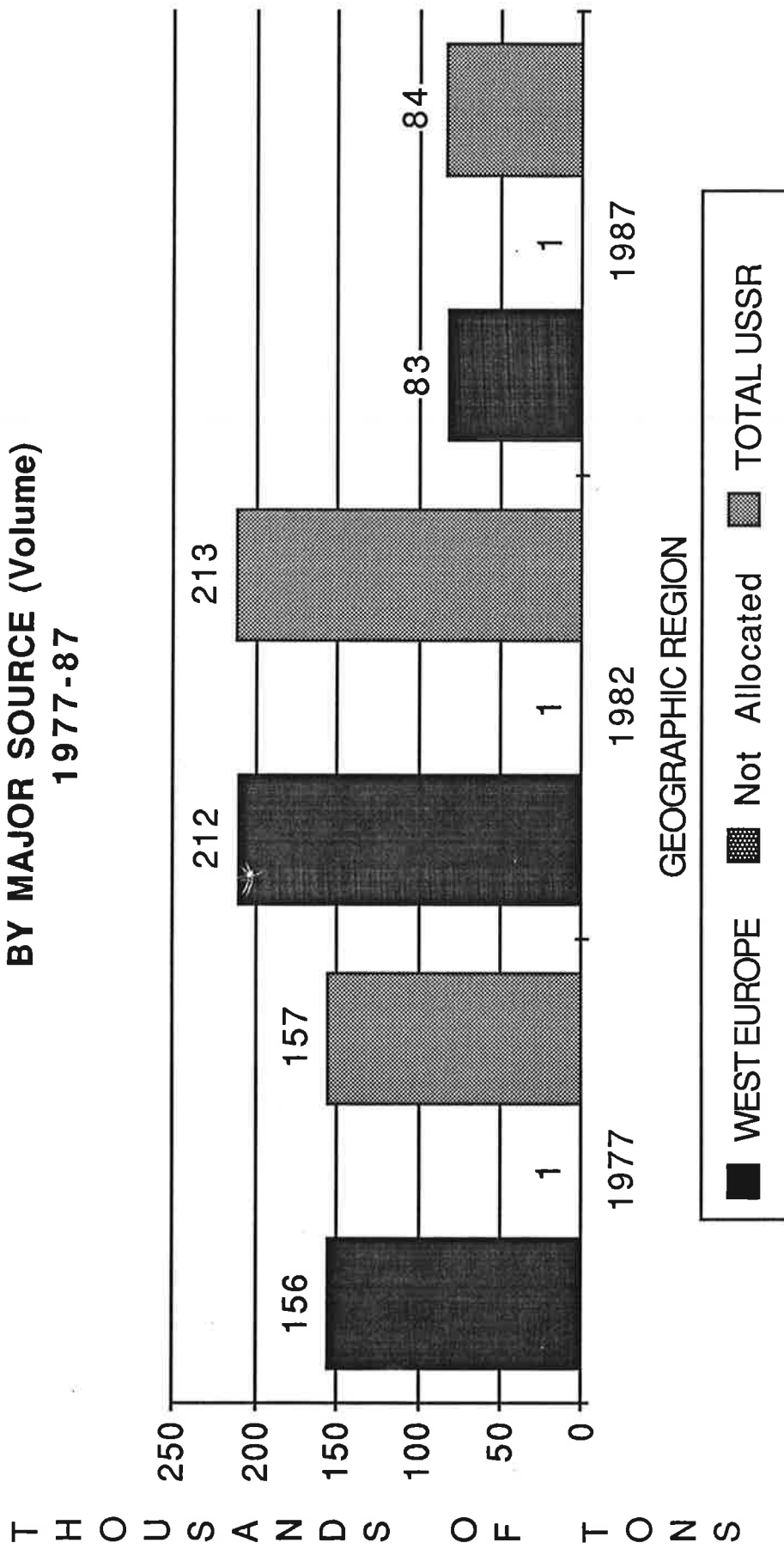
SOURCE: FAO Forest Products Annual Year Book for 1987

**FIGURE 4-140: DISTRIBUTION OF USSR PAPERBOARD IMPORTS
BY MAJOR SOURCE (Percent)
1977-87**



SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-141: USSR PAPERBOARD IMPORTS
BY MAJOR SOURCE (Volume)
1977-87**



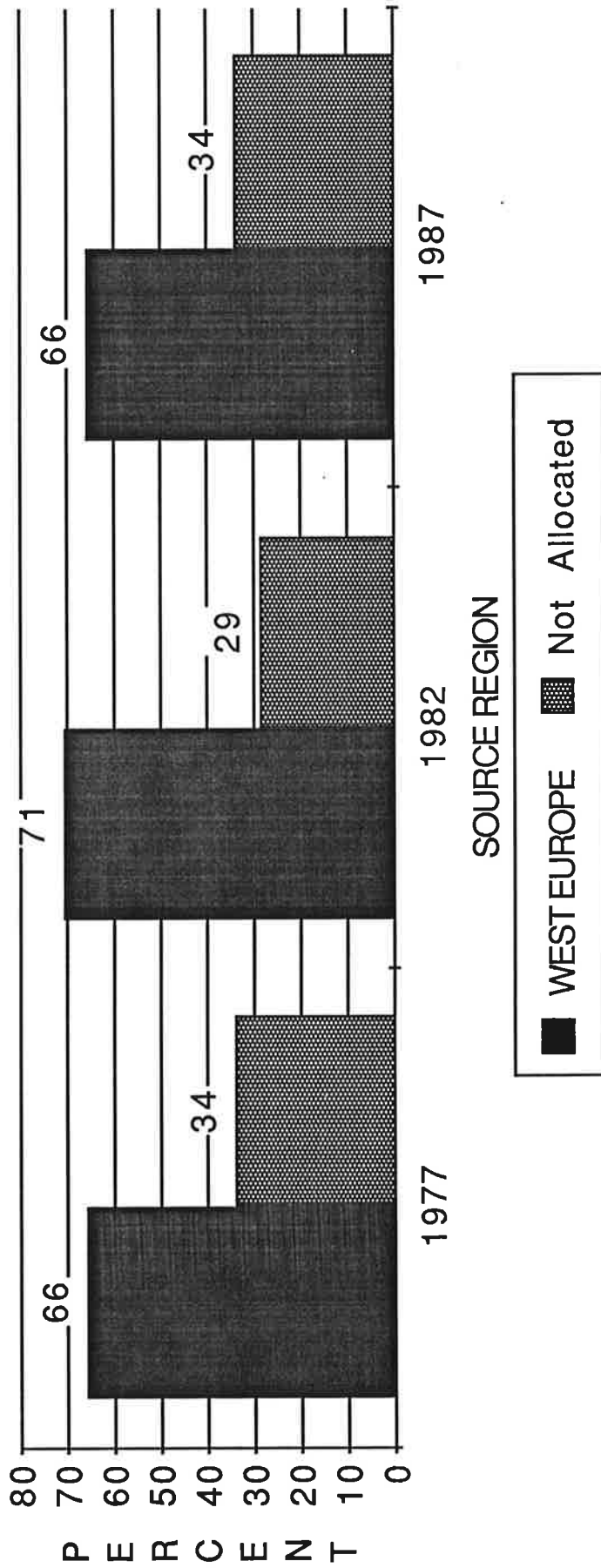
SOURCE: Vneshnyaya Torgovlya, various years

FIGURE 4-142: DISTRIBUTION OF USSR INDUSTRIAL PAPER

IMPORTS

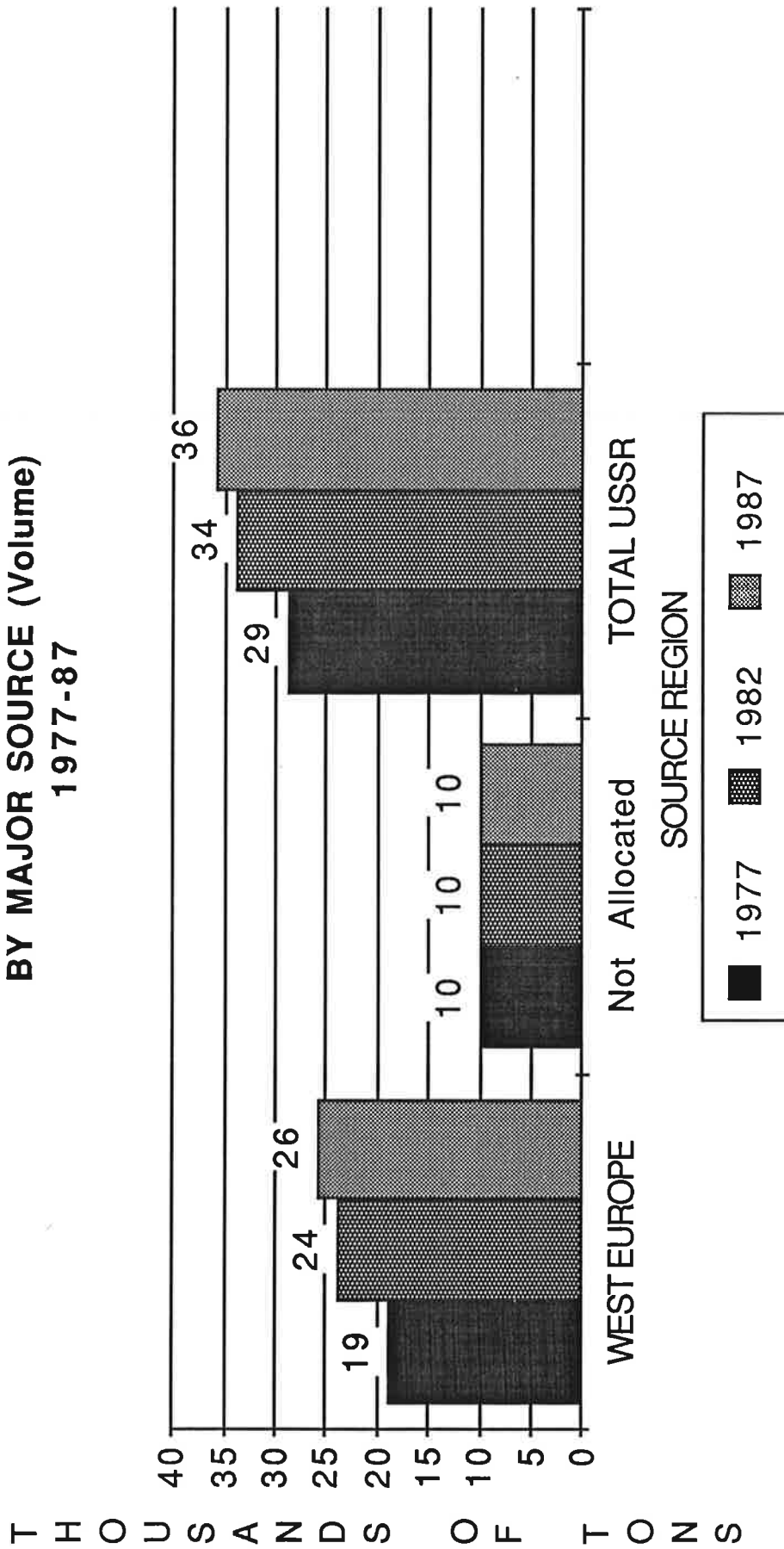
BY MAJOR SOURCE (Percent)

1977-87



SOURCE: Vneshnyaya Torgovlya, various years

**FIGURE 4-143: USSR INDUSTRIAL PAPER IMPORTS
BY MAJOR SOURCE (Volume)
1977-87**



SOURCE: Vneshnyaya Torgovlya, various years

NOTES

- 1 On May 16, 1990, The Soviet Union was accepted as an observer in the world organization that oversees international trade, The General Agreement on Tariffs and Trade. (The New York Times, pg. C2, May 17, 1990). This is only the most recent of a series of overtures designed to draw the USSR more closely into the world economic system.
- 2 CMEA, or COMECON was formed in 1949 in order to promote increasing integration of the USSR with Eastern Europe. Its members were the USSR, Czechoslovakia, Hungary, Poland, East Germany, Rumania, Bulgaria and Albania (which subsequently withdrew). Mongolia, Cuba, and Vietnam were added later. Yugoslavia is an associate member. For its first 15 years, it provided an institutional link and discussion center. Most trade was bilaterally negotiated between members.
- 3 Nikolai Shmelev and Vladimir Popov, The Turning Point-Revitalizing The Soviet Economy, page 222.
- 4 Contribution of foreign trade to the national economy of the Soviet Union appears to be measured in terms of the proportion of national income. Shmelov and Popov provide comparisons between measurements of foreign trade as a National Income and as a corresponding percent of GNP (as calculated by Western methods). In order to relate foreign trade to GNP to foreign trade to national income, simply divide the percentage of national income by 2. (Nokolai Shmelev and Vladimir Popov, The Turning Point -Revitalizing the Soviet Economy, page 222)
- 5 Paul Gregory and Robert Stuart, Soviet Economic Structure and Performance, Third Edition, page 295.
- 6 This may in fact be changing with current discussions ongoing, inter alia, over giving the Soviet Union most favored nation trading status for entry of imports into the United States.
- 7 In fact, these impediments are changing as the USSR tries to shift to a decentralized market style of economy, and in the process bringing the producer closer to the foreign customer.
- 8 These categories are: (1) machines, equipment, and transport facilities; (2) fuel and electrical energy; (3) ore and its concentrate, metal and things made of them; (4.) chemical products, fertilizers and rubber; (5) lumber and pulp-paper products; (6) textile raw materials and semi-finished products; (7) food goods and raw material for their production; (8) consumer goods; and

(9) unallocated.

- ⁹ Forest products in this context includes forestry equipment used for manufacture of lumber, pulp, paper, and so forth.
- ¹⁰ For purposes of this report, soft currency trade in forest products has been defined to include all trade with countries in East Europe, Mainland China (Planned Asia), and Cuba (Planned America). Hard currency is the balance of trade with countries utilizing convertible currencies. While soft and hard currencies are usually used in the context of whether the transaction currency is exchangeable in international markets, it is also possible to view this distinction in terms of the quality of goods exchanged under the two different currency types. Hard currency transactions generally represent goods of a higher quality than soft currency transactions.
- ¹¹ FAO Forest Products Yearbook Annual for 1987, FAO, Rome, 1988.

INVESTMENT OPPORTUNITIES

The potential investment opportunities in the forest products sector can be examined in terms of the contribution of the U.S.S.R. to the world forest economy.

Size of Demand Increase in the USSR

The Soviet Union contains 24 percent of the world's forest resource (in terms of volume)¹, harvests 18 percent of the industrial round-wood, produces 21 percent of its lumber, 7 percent of its pulp production, 5 percent of its paper production, and 11 percent of the wood based panel production. In terms of exports, it is one of the major players in the export of industrial wood (17 percent of total world trade) and in lumber (9 percent of world sawn-wood volume)². It has hitherto been a minor importing nation, choosing to selectively import forest products to balance deficiencies in their internal production.

Table 5.1 shows percent of world total production, exports, imports, and inferred consumption for products of industrial wood harvest, sawn-wood, wood based panels, wood pulp, and paper and paper board taking place in each of USSR, East Germany, West Germany and the USA.

To get some idea of the magnitude of the changes involved, let us examine the differences of consumption of common forest products within the Soviet Union and consumption of forest products in selected countries.

Table 5.1

**Forest Products Production, Export, Import and Apparent
Consumption: World and Selected Countries 1986
(Percent)**

<i>INDUSTRIAL WOOD</i>	PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
USSR	18%	17%	0%	17%
EAST GERMANY	1%	1%	1%	1%
WEST GERMANY	2%	4%	3%	2%
USA	24%	18%	3%	23%
WORLD	100%	100%	100%	100%
<i>SAWNWOOD</i>	PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
USSR	21%	9%	0%	19%
EAST GERMANY	1%	0%	2%	1%
WEST GERMANY	2%	2%	5%	3%
USA	20%	7%	39%	26%
WORLD	100%	100%	100%	100%
<i>WOOD BASED PANELS</i>	PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
USSR	11%	5%	1%	11%
EAST GERMANY	1%	0%	1%	1%
WEST GERMANY	6%	6%	9%	6%
USA	29%	7%	18%	31%
WORLD	100%	100%	100%	100%
<i>TOTAL WOOD PULP</i>	PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
USSR	7%	4%	1%	7%
EAST GERMANY	1%	0%	1%	1%
WEST GERMANY	2%	1%	13%	4%
USA	37%	17%	18%	37%
WORLD	100%	100%	100%	100%
<i>PAPER AND PAPER BOARD</i>	PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
USSR	5%	3%	2%	5%
EAST GERMANY	1%	0%	1%	1%
WEST GERMANY	5%	7%	11%	6%
USA	32%	9%	24%	35%
WORLD	100%	100%	100%	100%

Source: FAO, Yearbook of forest products for 1986, FAO, Rome, Italy, 1988

In 1986, the USSR consumed per capita 0.97 m³ of round-wood, 0.33 m³ of lumber, 0.05 m³ of wood based panels, 0.03 tons of pulp, and 0.03 tons of paper. While the USSR per capita consumption for industrial round-wood and lumber is higher than East Germany and West Germany, it lags in the consumption of more sophisticated products such as pulp, paper and paper board, and wood based panels, higher consumption of which is expected in developed economies.

Table 5.2 shows per capita consumption figures for industrial harvest, lumber, wood based panels, pulp, and paper and paper board for each of USSR, East Germany, West Germany, and the USA.

Per capita round wood consumption is a function of natural endowment of forest resource. As mentioned previously, the Soviet Union contains 24 percent of the world's forest resource; thus it is not surprising to see the higher per capita consumption of round-wood here. The lower per capita consumption of pulp and paper, and wood based panel products are related to the lower level of economic activity in the USSR. The per capita GNP for the USA and West Germany in 1986 was \$16,026 and \$11,163 respectively; while it was \$7,145 for the USSR.

Table 5.3 shows population, GNP, and per capita GNP for each of the USSR, East Germany, West Germany, and the USA.

Thus, with the stated desire of the Soviet leadership to

Table 5.2

**Forest Products Production, Export, Import and Apparent
Consumption: World and Selected Countries 1986**

PER CAPITA CONSUMPTION (CUBIC METERS PER PERSON)				
<i>INDUSTRIAL WOOD</i>	PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
USSR	1.04	0.07	0.00	0.97
EAST GERMANY	0.62	0.06	0.05	0.61
WEST GERMANY	0.44	0.07	0.05	0.42
USA	1.59	0.08	0.01	1.52

PER CAPITA CONSUMPTION (CUBIC METERS PER PERSON)				
<i>SAWNWOOD</i>	PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
USSR	0.35	0.03	0.00	0.33
EAST GERMANY	0.15	0.00	0.11	0.25
WEST GERMANY	0.16	0.02	0.07	0.21
USA	0.40	0.02	0.14	0.51

PER CAPITA CONSUMPTION (CUBIC METERS PER PERSON)				
<i>WOOD BASED PANELS</i>	PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
USSR	0.05	0.00	0.00	0.05
EAST GERMANY	0.07	0.00	0.02	0.09
WEST GERMANY	0.11	0.02	0.03	0.12
USA	0.14	0.01	0.02	0.16

PER CAPITA CONSUMPTION (METRIC TONS PER PERSON)				
<i>TOTAL WOOD PULP</i>	PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
USSR	0.04	0.00	0.00	0.03
EAST GERMANY	0.04	0.00	0.01	0.05
WEST GERMANY	0.04	0.00	0.05	0.08
USA	0.22	0.02	0.02	0.22

PER CAPITA CONSUMPTION (METRIC TONS PER PERSON)				
<i>PAPER AND PAPER BOARD</i>	PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
USSR	0.04	0.00	0.00	0.03
EAST GERMANY	0.08	0.01	0.02	0.09
WEST GERMANY	0.15	0.05	0.08	0.19
USA	0.27	0.02	0.04	0.30

Source: FAO, Yearbook of forest products for 1986, FAO, Rome, Italy, 1988

Table 5.3

**Population, GNP, and Per Capita GNP for Selected Countries
1987**

COUNTRY	POPULATION ('000)	GNP (TRIL. \$)
USSR	279,904	2
EAST GERMANY	16,692	0.093
WEST GERMANY	60,734	0.678
USA	240,856	3.86

Source: World Almanac

focus more on satisfying the consumer, we would expect these desires to be eventually translated into higher per capita consumption of forest products. To approach the per capita consumption of West Germany, let alone the United States, would require additional import/production of 14 million metric tons of pulp. This is the equivalent of 135 percent increase in existing capacity; and represents an impressive 60 percent of the 1986 world exports of wood pulp. For paper, this would require 45 million metric tons of new capacity. This represents more than a 400 percent increase over the current production level; and more than 100 percent of the 1986 world paper and paper board trade. For wood based panels, an increase in capacity or imports of nearly 20 million cubic meters is required. This is nearly 150 percent above the current capabilities; and is nearly 100 percent of current world export volume.

Table 5.4 shows production, export, import, and inferred consumption figures for 1986 for industrial harvest, sawnwood, wood based panels, and paper and paper board for the World, USSR, East Germany, West Germany, and the USA.

Expected Sources for Meeting Increased Demand

The additional demand could be met through:

- extensive development;
- intensive development;
- fewer exports;
- larger imports;

Table 5.4

**Forest Products Production, Export, Import and Apparent
Consumption By Product: World and Selected Countries 1986
(Volume)**

		WORLD			
PRODUCT		PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
INDUSTRIAL WOOD	000 M3	1,573,904	110,580	103,783	1,567,107
SAWNWOOD	000 M3	474,688	86,955	87,477	475,210
WOOD BASED PANELS	000 M3	119,152	20,542	20,685	119,295
TOTAL WOOD PULP	000 MT	140,489	23,265	23,012	140,236
PAPER AND PAPERBOARD	000 MT	201,621	43,408	43,586	201,799

		USSR			
PRODUCT		PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
INDUSTRIAL WOOD	000 M3	290,800	18,267	212	272,745
SAWNWOOD	000 M3	99,000	8,045	280	91,235
WOOD BASED PANELS	000 M3	13,535	1,041	118	12,612
TOTAL WOOD PULP	000 MT	10,374	965	169	9,578
PAPER AND PAPERBOARD	000 MT	10,068	1,103	753	9,718

		EAST GERMANY			
PRODUCT		PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
INDUSTRIAL WOOD	000 M3	10,306	944	860	10,222
SAWNWOOD	000 M3	2,491	17	1,776	4,250
WOOD BASED PANELS	000 M3	1,219	0	278	1,497
TOTAL WOOD PULP	000 MT	729	0	178	907
PAPER AND PAPERBOARD	000 MT	1,327	149	314	1,492

		WEST GERMANY			
PRODUCT		PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
INDUSTRIAL WOOD	000 M3	26,616	4,137	2,811	25,290
SAWNWOOD	000 M3	9,800	1,322	4,511	12,989
WOOD BASED PANELS	000 M3	6,825	1,234	1,956	7,547
TOTAL WOOD PULP	000 MT	2,219	127	3,067	5,159
PAPER AND PAPERBOARD	000 MT	9,406	3,021	4,901	11,286

		U.S.A			
PRODUCT		PRODUCTION	EXPORTS	IMPORTS	CONSUMPTION
INDUSTRIAL WOOD	000 M3	382,589	20,328	2,731	364,992
SAWNWOOD	000 M3	95,330	5,662	33,680	123,348
WOOD BASED PANELS	000 M3	34,908	1,361	3,808	37,355
TOTAL WOOD PULP	000 MT	51,927	4,013	4,106	52,020
PAPER AND PAPERBOARD	000 MT	64,444	3,913	10,555	71,086

Source: FAO, Yearbook of forest products for 1986, FAO, Rome, Italy, 1988

- some combination of the above four.

Extensive Development

Growing interest for intensive development of the forest resource rather than extensive development (which has characterized economic development in general in the Soviet Union in the past) in conjunction with an increasing emphasis placed on self-financing of the individual enterprise should lead to a rationalization of the wood flow within the USSR. Accordingly, It is believed that extensive development will not receive much support unless it can be demonstrated that there are clear benefits from the development. This should mitigate against allocation of financial resources designed to achieve political development objectives independent of rigid cost-benefit analysis.

It stands to reason that much of the accessible forest resource would have already been developed in one form or another. Development of hitherto virgin stands of timber may occur but probably only in conjunction with a foreign joint-venture partner. This would not likely be a major contributor to meeting higher domestic demand.

Intensive development

Intensive development could take two forms. First, upgrading of existing facilities to make better use of the raw material. Further more, foreign firms may decide to form joint-ventures with their current suppliers to guarantee their export supplies by improving the utilization of the raw

material of the supplying mill. In other words, through improved utilization, the volume that was to be re-directed to the domestic market at the expense of the foreign purchaser is being compensated for by improved output of product from a given unit of input. This has relevance in so far as the timber trade is concerned.

Second, construction for new facilities to use hitherto unused raw material or raw material directed to export. Raw material in this context can be viewed as by-product chips from wood processing or logging waste hitherto left at the harvest site as well as round logs. It is within this context that changes will most likely be felt.

In 1986, the USSR exported over 18 million cubic meters of roundwood. There is no compelling reason why part or all of this volume could not be processed in the USSR. In 1986, roundwood exports generated only one percent of total export earnings for the USSR.

As noted, the Soviet Union does not utilize the hardwood resource to the same degree as the conifer resource. In 1982, the hardwood component was utilized at 37 percent verses 57 percent for conifers compared to the AAC. The same contrast is apparent when the AAC is examined in the European and Asian (Eastern) part of the country. In the European region, while the conifer AAC is 89 percent utilized, only 63 percent of the hardwood AAC is utilized. For the Asian region, the corresponding utilization rates are 41 for conifers and 16 for hardwoods.

Fewer exports

Soviet contribution to world trade of these three products (pulp, paper, and paperboard products, wood based panel products) is minor, and structured around importing of more sophisticated products which cannot be completely produced domestically, or importing products which are not available locally such as tropical hardwoods. Thus it is unlikely that there would be a major impact stemming from withdrawal of Soviet exports in pulp, paper, and wood based panel products.

However, impacts may be expected in the export of round-wood as discussed in the immediately preceding section.

Higher imports

Higher imports of forest products would require increased export (of any goods) trade or gold sales. It is not clear whether the USSR would aggressively enter the market in the short term to purchase forest products given the general shortages of goods throughout the USSR. Foreign exchange may be the limiting factor; thus leading to the setting of priorities for imports. Forest products would not be expected to rank ahead of food or other basic goods currently in short supply in the Soviet Union.

Higher consumption cannot be legislated; but will evolve as the economy of the USSR becomes more balanced. Investment opportunities exist for firms willing to manufacture wood residues or utilize deciduous tree species. Additional opportunities may exist for firms interested in forming

joint-ventures with domestic firms in order to modernize their (the domestic mills) manufacturing facility. This particular avenue may serve two purposes. First, to gain access to the domestic market. Second, as a way for an already established importer of Russian products to guarantee his supply in the face of tight internal demands inside the Soviet Union. By modernizing the mill, greater utilization of a given input is achieved. Thus, the increased output can be directed to the internal market without impeding the flow of products to the foreign importer.

Obstacles

Four of the impediments to investing in the USSR are:

- There is no central repository for information about potential business partners resident in the USSR;
- There are unclear bureaucratic responsibilities which are leading to fragmented relationships with suppliers and a deteriorating international credit rating.
- Unclear regulations governing the export of products from the USSR are placing added uncertainty on whether a foreign firm can recoup its hard currency investment.
- A culture which has no understanding of basic business concepts of profit, loss, depreciation, or marketing makes international communication by management perilous.

Information: Finding background information and determining the credit worthiness of a new Soviet partner is a major

hurdle. No information system exists which collects - let alone verifies - data on enterprise financial status. The USSR Chamber of Trade and Industry is expanding its services but can offer only general information, with no details on enterprise turnover or other data crucial to evaluation of a potential trade partner by a Western firm. Further, even the little information available is limited to enterprises which are chamber members-and membership is voluntary. Assurance of financial performance is only one aspect of a new trading relationship. A Western partner will also want to know details which will have a bearing on the Soviet enterprises ability to perform on time and to contract specifications. Are the raw materials available? Is quality consistent? Does management take delivery dates seriously? These points go beyond the issue of payment and are far harder to cover with risk insurance, government or private.

Unclear Bureaucratic Responsibilities: Ever since the unexpected and abrupt abolition of the Ministry of Foreign Trade in January 1988, it has been remarkably difficult to track down decision makers. Whereas Vneshekonombank used to be the sole bank with external ties, now several hundred commercial banks compete in the Soviet market. Many of these, plus ministries and even local authorities are seeking business with the outside world.

Individual Soviet enterprises, being given the right to deal directly with foreign sellers, have experienced problems of matching inflows and outflows of foreign currency. Under

the system of centrally controlled foreign trade, Soviet government guaranteed payment, leading to a reputation for promptness and reliability; and low costs of borrowing on the international market. The Bank for Foreign Economic Affairs, which handles the Kremlin's foreign currency transactions, reportedly insists it will no longer step in to sort out liquidity problems that are the foreign trade organizations (FTOs) own making.

Apparently, obligations backed by the State continue to be met, such as letters of credit or foreign debt payments. As well, the Bank is providing bridging loans for trade organizations that request them well in advance and meet the Bank's strict criteria. However, other FTOs are chronically far behind for payments for goods imported outside the State system. This has lead some trade organizations to noticeably reduce their purchases this year, and increased the reluctance of foreign firms to do business with the Soviets.

Delinquent payments have in many cases required diplomatic pressure for resolution. This played an important role in helping resolve one major dispute concerning back payments of almost 100 million dollars to a French consortium that is building a huge oil refinery complex in Soviet Central Asia.

New associations are being formed in response to the vacuum left by the disappearing industry ministries. The new associations often include new banks or FTO's. Relations between the new associations and their former ministries have

occasionally been strained, with disagreements over supplies, payments of fees, and contributions to various funds. It is more likely that the more profitable enterprises have organized themselves to avoid subsidizing the inefficient loss-makers under the ministerial control. These associations have greater clout in internal negotiations in regards to supplies etc. Any single independent enterprise which does not have substantial turnover and/or exports may be liable to discontinuous supply of raw materials. It is unclear the extent of the property laws recently passed and how this will affect the joint stock companies. In the absence of guarantees from Vneshekonombank and ministerial guarantee (unlikely since these associations are outside ministerial system), it is difficult to assess the risk of a business relationship with these associations.

These factors have all lead to a changing perception about the future capacity of the Soviet Union to repay and service its debt. In addition to the increasing number of trade organizations, other factors which are contributing to the changing perceptions are an anticipated decline in exports of some major commodities and finished goods and the likelihood of an imminent recession.

Unclear Export Regulations: In the case of exporting products from the USSR, the passage of the law permitting individual enterprises to deal directly on the world market did not prove the watershed date expected in foreign Soviet trade. Since that date, Soviet organizations have in theory

been able to conduct their own imports and exports, working via the FTO system or bypassing it at their own discretion. What is holding them back are bureaucratic obstacles ranging from license requirements to limits on hard currency (a product of the non-convertibility of the rouble).

On the surface, the licensing process is straightforward. All that an interested enterprise must do is fill out a simple form, and submit it to any of about 30 offices scattered around the USSR. The Ministry of Foreign Economic Relations then has to issue the registration within one month.

Enterprises other than the traditional FTOs still have to get an ad hoc import and export license for each individual transaction. On the surface, this is not a problem. But, the bureaucracy has found a number of methods to frustrate the new found freedoms.

The authority to issue licenses in many cases has been assigned to the industrial ministries, allowing them to impose their wishes on any enterprise doing trade in their sector. A good example, is the setting of price. The instructions confirmed by the State Foreign Economic Commission specifically allow the licensing Ministry to "make recommendations on prices when necessary".

In practice, the power to set prices is past onto the FTO that belongs to that ministry, since it has familiarity with the issue of foreign trade pricing. Yet the FTO is the very organization which the enterprise is trying to by-pass.

Banking procedures has introduced yet another hurdle for Soviet enterprises seeking foreign trade independence. All enterprises are not allowed to freely dispose of the hard currency in their current accounts. They must show a feasibility plan that demonstrates the efficiency of the intended expenditures. This document in turn requires the authorization from the enterprises superior organizations.

Managerial Culture: The Soviets lack a common managerial culture that recognizes profit, loss, depreciation, and above all else the concept of marketing has no meaning in a country that has functioned on shortages and lack of choices. The current crop of managers were successful in the Soviet system because they were more politically reliable and knew how to navigate a system which discouraged innovation and exceeding the standard. Motivation and discipline may be an insurmountable obstacle.

Near-Term Outlook

The Soviet Union, together with the forestry sector, is in a continuing state of flux. The outcomes of *perestroika* and *glasnost* are far from certain. However, it is clear that the future will not be "business as usual" within the forestry sector, and that fundamental relationships of harvesting, production, distribution and consumption, and international trade will all be significantly affected. The following points reflect the near-term prospects for this sector.

1. The Soviet Union from a forest sector viewpoint will increasingly be segregated into two distinct geographic regions. First, the European region, lying west of the Ural mountains, is where the majority of the population, consumption, and forest products manufacturing facilities are situated. Second, an Asian region, lying east of the Yenisey River, has a low population, very limited manufacturing capacity and infrastructure, but has more abundant forest resources. Lying between the two, immediately east of the Ural mountains, is a transition region called West Siberia. Development in the Asian region will be driven by cultivating potential export markets in the Pacific basin, while the European region will be driven by greater internal consumption and increasingly limited timber resources.
2. There will be a greater emphasis on developing the forest resource within the European region of the country. This will result in increasing emphasis on development of products which utilize low quality wood material (hardwood and softwood) and waste material from other manufacturing processes (lumber and plywood manufacturing). This will lead to increasing capacity for production of fibreboard, particleboard, pulp, paper, and paperboard.
3. The high level of roundwood production in the Asian region of the country relative to the manufacturing capacity will

lead to a rationalization of manufacturing capacity throughout the country to minimize transportation of the roundwood resource. Thus, the intensification of utilization of the resource throughout the country will result in roundwood hitherto imported to European USSR from the Asian region being reduced in preference for more intensive utilization of the European resource. In the short term, this will mean that there will be a higher volume of roundwood available for export to Pacific Rim markets from the Asian region.

4. In the long-term, the roundwood harvest level will not increase at the same rate as the growth in manufacturing capacity. The lower levels of growth will be compensated for by more intensive utilization of the forest resource rather than higher harvests. Thus, the overall increase in harvest can be expected to be muted, but will be larger in the Asian region.
5. There will be a shift away from an emphasis on the export of logs and lumber to higher value added products. While there is still a need to generate hard currency to compensate for the import of equipment and higher value added products (which the USSR can not itself produce at this time) , the same level of foreign exchange can potentially be earned with a lower roundwood equivalents if the wood is manufactured pulp, paper, fibreboard or other higher valued products.
6. Exports of forest products which are of a quality and

standard which can be sold in market economies will increasingly be shifted away from countries which do not trade in hard currency. This applies to the CMEA countries which have to date not traded with the USSR for goods and services in hard currencies. Should the CMEA countries move toward freer multidirectional trade and not limit trade to bilateral flows with the USSR as has been the case to date, then this shift (away from non-market economies) will potentially decline.

7. West Europe will be the main source for forest product imports into the European part of the Soviet Union. Opportunities for the sale of manufacturing machinery into the Asian part of the country will also be available for firms based in Japan and North America.
8. Joint venture opportunities will continue to emerge for participation in the intensification of forest resource utilization. This will take two directions, likely incorporated within a single joint venture. The Western partner will be expected to provide the technology and management assistance for a more intensive and rational utilization of the resource. Second, the Western partner will also need to provide marketing expertise, and thus a window to the world markets as an alternative to relying on the marketing services available through Exportles, the major Soviet marketing organization for forest products. Further, export marketing of products will likely substitute for the repatriation of profits due the the

non-convertability of the Rouble.

9. Increasing consumption within the Soviet Union can be expected in light of moves to restructure the economy, promote economic development, and improve the standard of living for the Soviet citizens. As levels of per-capita consumption increase, there will be added pressures on the efficient utilization of the Soviet timber resource, and may well provide opportunities for niche marketing of forest products from other supplier countries. Increased domestic consumption may additionally limit the potential and incentives for wood product exports in favor of domestic utilization. Export flows to traditional customers in Eastern Europe may well decline in the future due to both increased Soviet consumption and declining supplies in the Soviet European region.
10. Doing business in the Soviet Union will remain difficult, expensive, time consuming, and bureaucratic. In the near term, lines of responsibility will remain confused, infrastructure will be limited, and risk will remain high.

NOTES

- ¹ Lesnaya Entsiklopediya II, "Miroviye Lesniye Resursy", page 63.
- ² FAO, Yearbook of forest products for 1986, FAO, Rome, Italy, 1988.

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