Rates of employment and unemployment in the EU and the associated countries of the EU

Míra zaměstnanosti a nezaměstnanosti v EU a přístupových zemích EU

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Abstract: The paper is focused on the evaluation of the rates of employment and unemployment of women, men and in total in the EU, in associated countries of EU and for comparison in the USA and Japan. Rates of employment in the EU 15 together were evaluated in the period 1993–2002, in the associated states of the EU together in the period 1997–2002 and in the Czech Republic in the period 1998–2003. Rates of unemployment in the EU 15, USA and in Japan were evaluated in the period 1994–2003, in the associated states of EU in the period 1998-2003. Employment of males in the EU is higher then employment of females. Trends of rates of male, female and total employment is increasing. Trends of the rate of females are strongly increasing. Employment of males in the associated states of the EU is also higher than employment of females. Trends of the rates of male, female and total employment are increasing in the reference period. Unemployment in the EU is higher than unemployment in the USA and Japan, but lower then in associated states of the EU. Methods of regression and correlation analysis and development trends were applied for the mathematical-statistical analysis.

Key words: rate of employment, rate of unemployment, Czech Republic, associated countries of the EU, EU countries, statistical processing, development trends

Abstrakt: Příspěvek je zaměřen na posouzení míry zaměstnanosti a míry nezaměstnanosti žen, mužů a celkem v EU jako celku, přístupových zemích do EU jako celku a pro srovnání v USA a Japonsku. Míra zaměstnanosti v EU 15 byla hodnocena v období 1993–2002, v přístupových zemích do EU v období 1997–2002 a v České republice v období 1998–2003. Míra nezaměstnanosti v EU 15, USA a Japonsku byla hodnocena v období 1994–2003, v přístupových zemích do EU v období 1998–2003. Zaměstnanost mužů v EU je vyšší než zaměstnanost žen. Míry zaměstnanosti mužů, žen i celkem mají rostoucí tendenci. Míra zaměstnanosti žen roste rychleji. Zaměstnanost mužů v přístupových zemích do EU je taktéž vyšší než zaměstnanost žen, tendence je však u mužů i žen v daném referenčním období klesající. Nezaměstnanost v zemích EU je vyšší než v USA a Japonsku, ale nižší než v přístupových zemích do EU. Pro statistickou analýzu daného materiálu byly použito vývojových trendů a metod regresní a korelační analýzy.

Klíčová slova: míra zaměstnanosti, míra nezaměstnanosti, Česká republika, přístupové země do EU, statistické metody, trend

Labour as a conscious and useful activity of man belongs to primary production factors. In labour market, the offer of work of households can be accepted by demanding firms and thus an employment originates in dependent activities or as a household involved in an individual business. From the macroeconomic point of view, employment originates expressed by the indicator of employment rate. If part of the offer of work of households is not accepted by demanding firms, then unemployment originates expressed by the indicator of the rate of unemployment. Unemployment as one of accompanying phenomena of functioning of the market economy has become a serious economic, social and political problem even in modern economics. Therefore, governments try to reduce the already often high unemployment by specific tools of macroeconomic policy based on economic theories. Particularly the policy of employment is an important tool balancing the imbalance in the labour market. Its task is to achieve dynamic balance between labour offer and labour demand and to ensure the productive use of labour sources. However, it is necessary to emphasise that governments do not affect the labour market directly on the level of enterprises but they try to create such conditions for the labour market to operate better. It refers particularly to the improvement of services associated with labour market, offering sufficient information and surveys on vacancies, the use of public costs within regional policy, governmental retraining programmes and the creation of public job opportunities. Further it refers to legislative measures, tax, wage and

social policy including pension policy and other forms of employment policy. Thus, employment policy can only support or modify the development in the labour market but it cannot modify it in principle.

As a matter of fact, practical macroeconomic policy including employment policy based on theoretical findings of various trends in economic theories does not bring the necessary results in the field of reducing the unemployment to a tolerable level. Actually, it appears that it is generally little effective or even ineffective. The problem can also consist of the fact that governments of countries with unused production factors deal particularly with problems of unemployment while they ought to shift the main stress to measures of macroeconomic policy maximising the production and supporting free market. Naturally, civilizational progress is also of great importance. It reduced the need of human labour, thus it lowered the rate of employment. The trend will continue certainly also in the future. However, rich countries reaching the high level of productivity can rather afford to keep part of the population unemployed (thanks to direct support) than artificially create the co-called full em-

ployment using various methods. It is necessary to stress that unemployment is not the only problem of present economies and its solution is always related to the improvement of whole economics.

MATERIAL A METHODS

Factographic material, i.e. the rate of male and female employment measured as the proportion of employed persons aged 15-64 years in the whole male and female population of the same age group and the rate of total employment measured as the proportion of employed persons aged 15–64 years in the whole population of the same age group and the rate of female and male unemployment measured as the proportion of unemployed persons in the whole active population of females and males and the rate of total unemployment measured as the proportion of unemployed persons in the whole active population for the reference period were obtained from the archive of structural indicators (SI) of an international comparison compiled by the Eurostat. The eval-
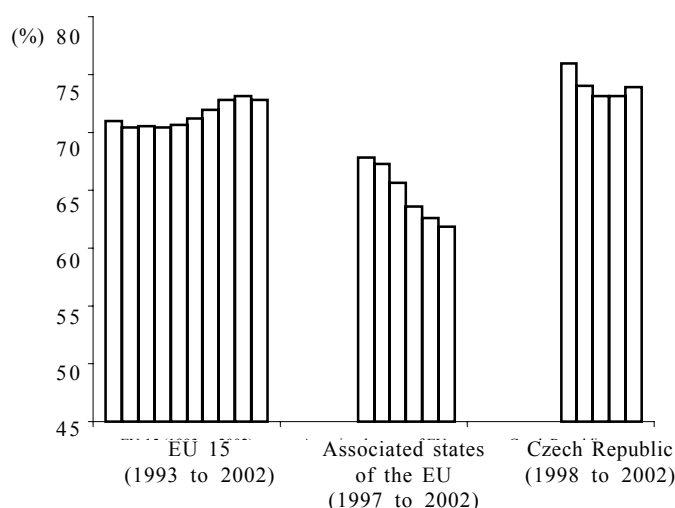

Figure 1. Rates of the male employment in the EU 15, associated states of the EU and in the Czech Republic in the reference period
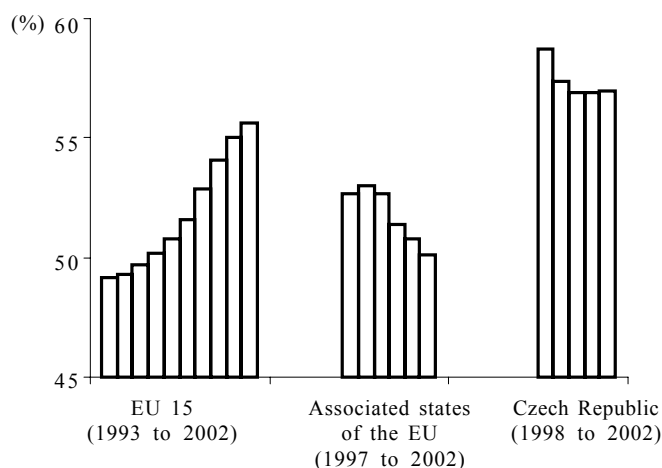

Figure 2. Rates of the female employment in the EU 15, associated states of the EU and in the Czech Republic in the reference period

uation is applied to the EU 15 (Belgium, Denmark, Finland, France, Ireland, Italy, Luxembourg, Germany, the Netherlands, Portugal, Austria, Greece, Spain, Sweden and the United Kingdom) and to ten associated states (the Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovenia and Slovakia). Rates of employment in the EU 15 were evaluated in the period 1993–2002, in associated states of the EU in the period 1997–2002 and in the Czech Republic in the period 1998–2003. Rates of unemployment in the EU 15, the USA and in Japan were evaluated in the period 1994–2003, in associated states of the EU in the period 1998–2003.

Problems of unemployment were dealt by Dufek (2002), Klíma, Maca (2002), Sojka, Klíma (2003). Problems of the employment were dealt by Jírová (1999). Mathematical-statistical processing of the data comes from the meth-odology given in papers of Minařík (1995–1996) and Seger et al. (1998) and Klíma, Palát (2003a, 2003b).

RESULTS AND DISCUSSION

Rates of male, female and total employment in the EU 15, associated states of the EU and in the Czech Republic in the reference periods are given in Figures 1, 2 and 3, respectively. Rates of male, female and total unemployment in the EU 15, associated states of the EU, the Czech Republic, the USA and Japan in the reference periods are given in Figures 4, 5 and 6, respectively.

Parameters of models of development trends of rates of male, female and total employment in the reference periods are given in Table 1. Models of development
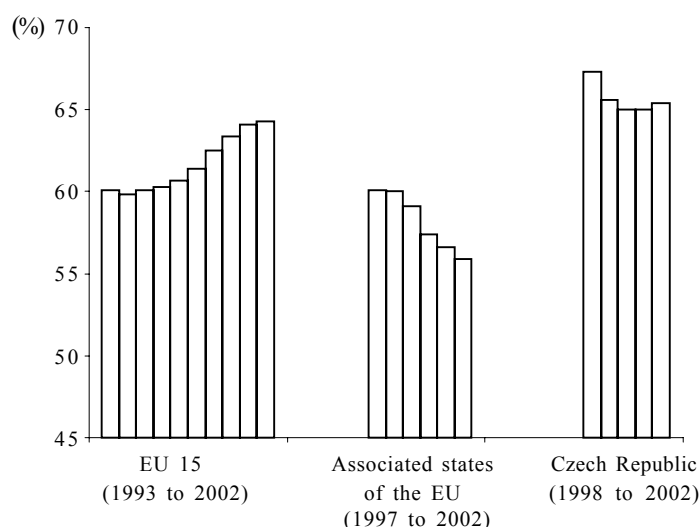

Figure 3. Rates of the total employment in the EU 15, associated states of the EU and in the Czech Republic in the reference period
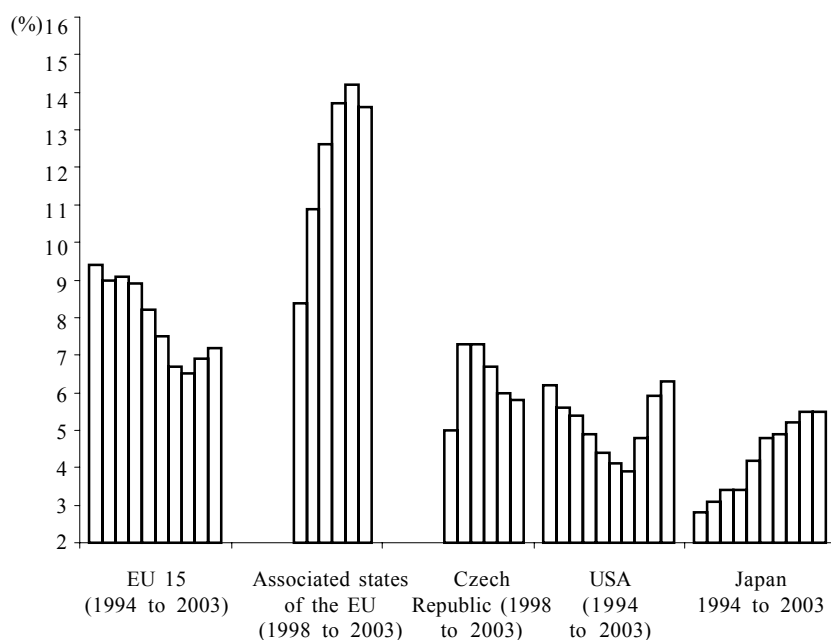

Figure 4. Rates of the male unemployment in the EU 15, associated states of the EU, in the Czech Republic, the USA and in Japan in the reference period

trends of the rates of male, female and total unemployment in the reference periods are given in Table 2. An equation for the linear model is $y_t = a_{yt} + b_{yt}t$. An equation for the quadratic model is $y_t = a_{yt} + b_{yt}x + c_{yt}t^2$. An equation for the cubic model is $y_t = a_{yt} + b_{yt}t + c_{yt}t^2 + c_{yt}t^3$. Most of correlation indices I_{yt} is significant on the level of $\alpha = 0.01$ or $\alpha = 0.05$. Linear trends of the rate of employment are slightly increasing in the EU 15 for variables males (y_1), females (y_2) and total (y_3) – see positive regression coefficients b_{yt} in Table 1. The cubic models show decreasing trends until 2001 and then slightly increasing.

Linear trends are decreasing in associated states of the EU for variables males (y_4), females (y_4) and total (y_6) – see negative regression coefficients b_{yt} in Table 1.The quadratic models show increasing trends until 2002 and then slightly decreasing. Linear trends are slightly decreasing in the Czech Republic for variables males (y_7), females (y_8) and total (y_9). The cubic models show increasing trends to 2000, then slightly decreasing and finally slightly increasing. Selected developmental trends in the reference period are given in graphical form in Figures 7–9. Employment of males in EU is higher than em-
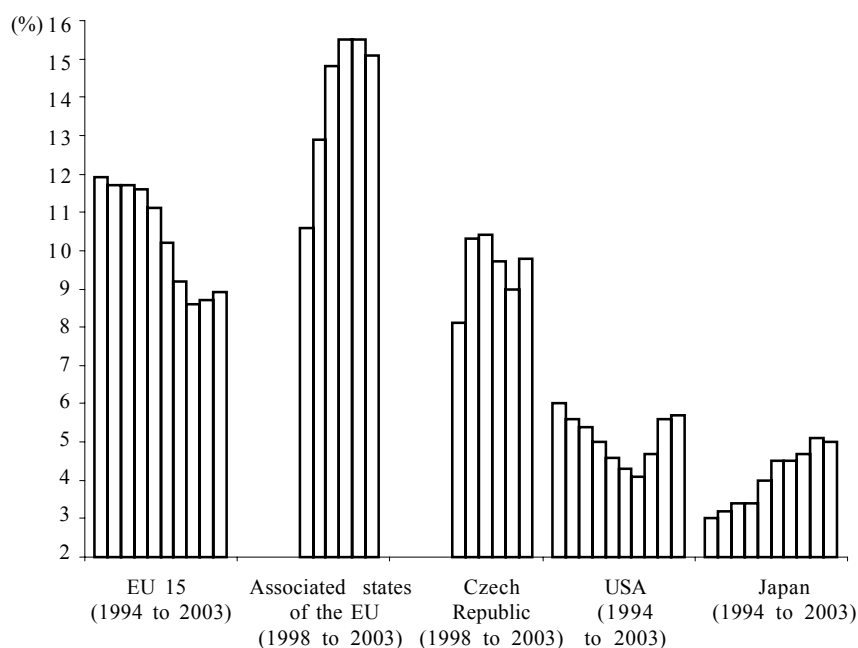

Figure 5. Rates of the female unemployment in the EU 15, associated states of the EU, in the Czech Republic, the USA and in Japan in the reference period
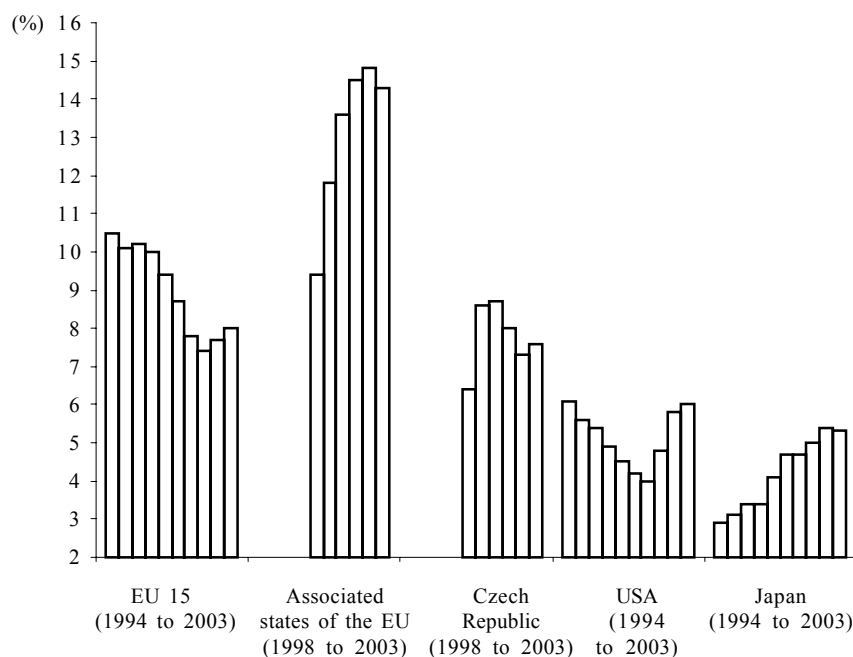

Figure 6. Rates of the total unemployment in the EU 15, associated states of the EU, in the Czech Republic, the USA and in Japan in the reference period

Table 1. Models of development trends of the rate of employment of males, females and total in the reference period.

Rates of employment		Model type	Model parameters				I_{yt}
			a_{yt}	b_{yt}	c_{yt}	d_{yt}	
EU 15	Males (y_1)	1	−556.81454	0.31454545	–	–	0.8780[++]
		2	176 272.642	−176.73659	0.0443181	–	0.9321[++]
		3	152 361 941.6	−228 741.50	114.469874	−0.01909479	0.9875[++]
	Females (y_2)	1	−1 502.578181	0.778181818	–	–	0.9785[++]
		2	220 667.7649	−221.67068181	0.05568181818	–	0.9944[++]
		3	90 479 309.49	−135 779.41186	67.9194650911	−0.0113247865	0.9982[++]
	Total (y_3)	1	−1 048.455757	0.5557575757	–	–	0.9570[++]
		2	209 030.9843	−209.78704545	0.05265151515	–	0.9841[++]
		3	117 715 564.5	−176690.61987	88.4036146290	−0.0147435900	0.9963[++]
Associated states of the EU	Males (y_4)	1	2 704.14	−1.320000000	–	–	0.9829[++]
		2	66 957.66856	−65.589642849	0.016071428570	–	0.9865[++]
		3	−836 341 393.1	1 254 861.72448	−627.604755204	0.10462962851	0.9979[++]
	Females (y_5)	1	1 245.770476	−0.5971428571	–	–	0.9369[++]
		2	−441 389.6485	442.149285724	−0.110714285717	–	0.9707[++]
		3	−562 981 524.8	844 464.068106	−422.2273805444	0.07037037030	0.9937[++]
	Total (y_6)	1	1 937.713333	−0.9400000000	–	–	0.9786[++]
		2	−183 683.5914	184.727857151	−0.046428571431	–	0.9811[++]
		3	−710 760 691.6	1 066 317.67076	−533.2464244659	0.08888888820	0.9971[++]
Czech Republic	Males (y_7)	1	1 074.06	−0.5000000000	–	–	0.6886
		2	1 772 501.745	−1 771.9285714	0.442857142860	–	0.9975[++]
	Females (y_8)	1	837.38	−0.3900000000	–	–	0.8049
		2	943 694.0514	−943.24714286	0.235714285717	–	0.9895[+]
	Total (y_9)	1	945.66	−0.4400000000	–	–	0.7301
		2	1 372 373.545	−1 371.8685714	0.342857142860	–	0.9931[++]

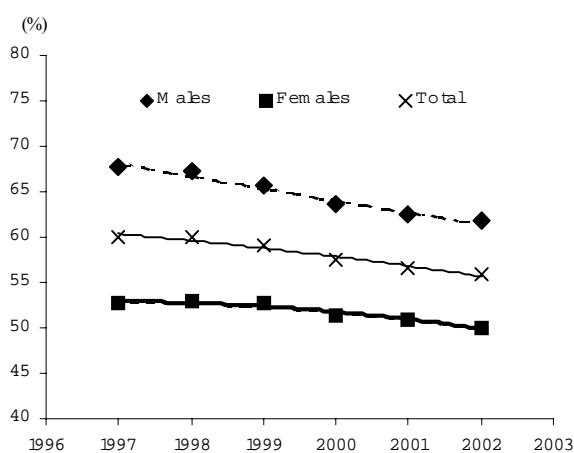Type of the function: (1) – linear, (2) – quadratic, (3) – cubic
Correlation index I_{yt} significant on the level: [+]$\alpha = 0.05$, [++]$\alpha = 0.01$

Figure 7. Rates of the employment of males, females and total in the EU 15 in the period 1993–2002
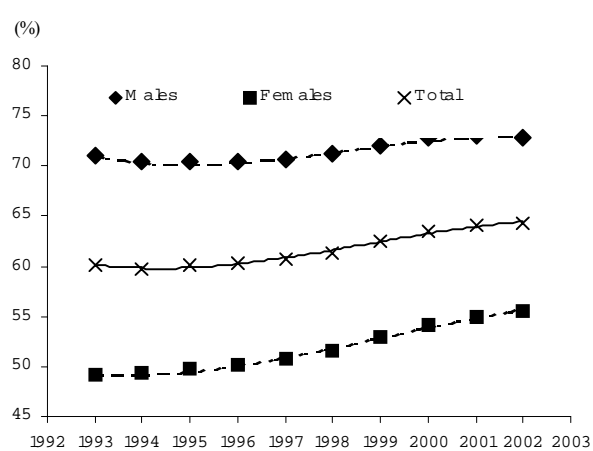

Figure 8. Rates of the employment of males, females and total in associated states of the EU in the period 1997–2002

Table 2. Models of development trends of the rate of unemployment of males, females and total in the reference period

Rates of employment		Model type	Model parameters				I_{yt}
			a_{yt}	b_{yt}	c_{yt}	d_{yt}	
EU 15	Males (y_{10})	1	671.6842424	–0.3321212121	–	–	0.9085[++]
		2	94 470.02818	–94.201060608	0.023484848485	–	0.9230[++]
		3	–162 088 039.8	243 362.751304	–121.7965051605	0.02031857059	0.9837[++]
	Females (y_{11})	1	877.5878787	–0.4339393939	–	–	0.9448[++]
		2	–33 918.57196	34.3884090881	–0.008712121211	–	0.9460[++]
		3	–170 123 988.7	255 361.613013	–127.768300205	0.02130924661	0.9877[++]
	Total (y_{12})	1	742.9745454	–0.3672727272	–	–	0.9311[++]
		2	49 155.02303	–48.815757578	0.012121212122	–	0.9343[++]
		3	–159 962 652.0	240 149.630615	–120.1773909503	0.02004662032	0.9747[++]
Associated states of the EU	Males (y_{13})	1	–2 102.580952	1.05714285714	–	–	0.8936[+]
		2	–1 452 826.614	1 451.41964286	–0.362500000003	–	0.9994[++]
		3	109 741 488.5	–165298.50590	82.99165930512	–0.0138888876	0.9996[++]
	Females (y_{14})	1	–1 757.804761	0.88571428571	–	–	0.8480[+]
		2	–1 509 653.228	1 508.40535715	–0.376785714289	–	0.9983[++]
		3	–112 703 973.2	168 258.338246	–83.73094868707	0.01388888827	0.9986[++]
	Total (y_{15})	1	–1 953.139047	0.98285714285	–	–	0.8783[+]
		2	–1 466 970.020	1 465.63464257	–0.366071428575	–	0.9999[++]
		3	5 945 980.809	–9 651.0217919	5.190869891442	–0.0009259254	0.9999[++]
Czech Republic	Males (y_{16})	1	34.92857142	–0.0142857142	–	–	0.0292
		2	–1 093 367.914	1 093.11607144	–0.273214285718	–	0.8175[+]
		3	–1 150 101 349	1 724 175.76752	–861.5995707986	0.14351851312	0.9940[++]
	Females (y_{17})	1	–213.3628571	0.11142857142	–	–	0.2400
		2	–729 148.5914	728.865000013	–0.182142857146	–	0.6210
		3	–1 512 971 903	2 268 527.95555	–1 133.798760915	0.18888888078	0.9991[++]
	Total (y_{18})	1	72.25333333	0.04000000000	–	–	0.0866
		2	–907 668.0771	907.409642871	–0.226785714289	–	0.7224
		3	–1 327 826 560	1 990 789.95152	–994.9198018871	0.16574073417	0.9993[++]
USA	Males (y_{19})	1	45.12	–0.0200000000	–	–	0.0704
		2	414 573.2851	–414.86015151	0.103787878788	–	0.9264[++]
		3	–85 793 337.82	128 944.379650	–64.6494760826	0.01080031089	0.9552[++]
	Females (y_{20})	1	116.5315151	–0.0557575757	–	–	0.2591
		2	296 640.3284	–296.80272727	0.074242424242	–	0.9105[++]
		3	–66 995 146.48	100 716.884578	–50.47057159257	0.00843045851	0.9415[++]
	Total (y_{21})	1	71.74666666	–0.0333333333	–	–	0.1335
		2	358623.4807	–358.85492424	0.089772727273	–	0.9195[++]
		3	–70189217.41	105542.591267	–52.90075800798	0.00883838391	0.9447[++]
Japan	Males (y_{22})	1	–664.3090909	0.33454545454	–	–	0.9799[++]
		2	–38 486.22197	38.1849242430	–0.009469696970	–	0.9824[++]
		3	57 175 038.11	–85 846.725121	42.96526888455	–0.0071678323	0.9908[++]
	Females (y_{23})	1	–499.7842424	0.25212121212	–	–	0.9768[++]
		2	–18 654.30245	18.4203030307	–0.004545454546	–	0.9778[++]
		3	43 705 502.61	–65 617.202166	32.83793776827	–0.0054778555	0.9864[++]
	Total (y_{24})	1	–603.8284848	0.30424242424	–	–	0.9782[++]
		2	–26 322.72924	26.0425000005	–0.006439393940	–	0.9796[++]
		3	54 086 197.81	–81 203.859227	40.63904524189	–0.0067793319	0.9887[++]

For explanations see Table 1

ployment of females. Trends of rates of male, female and total employment are increasing. Trends of rate of female are strongly increasing. Employment of males in associated states of the the EU is also higher than employment of females. Trends of the rate of male, female and total employment is increasing in the reference period.

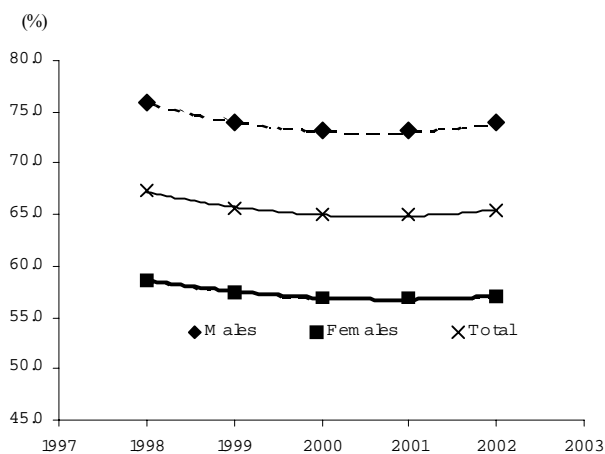Linear trends of the rate of unemployment are decreasing in the EU 15 for variables males (y_{10}), females (y_{11}) and

Figure 9. Rates of the employment of males, females and total in the Czech Republic in the period 1998–2002
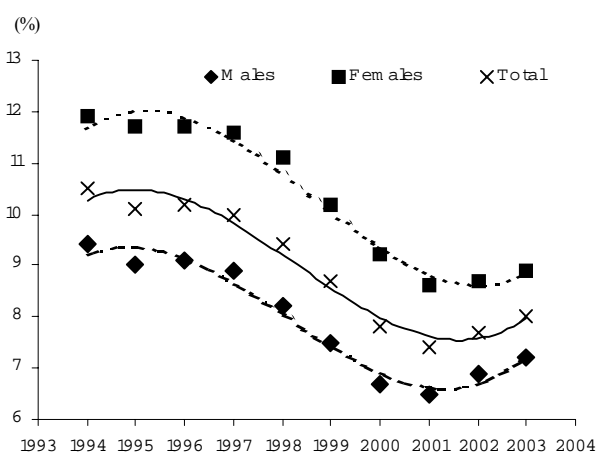

Figure 10. Rates of the unemployment of males, females and total in the EU 15 in the period 1994–2003
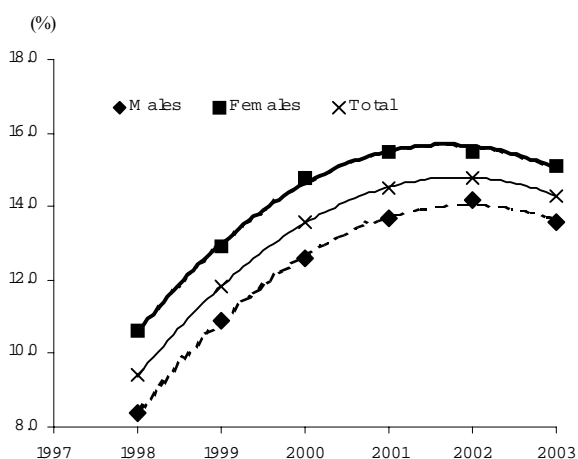

Figure 11. Rates of the unemployment of males, females and total in associated states of the EU in the period 1998–2003
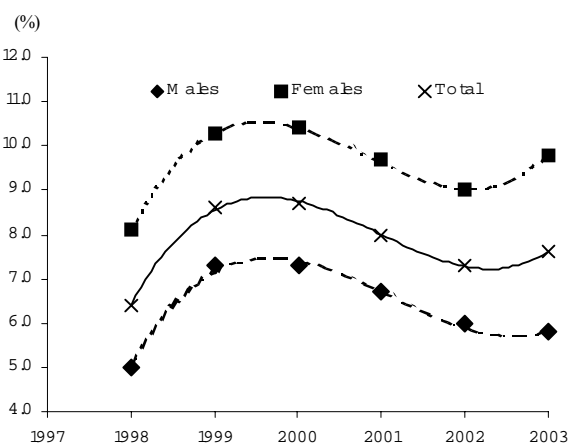

Figure 12. Rates of the unemployment of males, females and total in the Czech Republic in the period 1998–2003
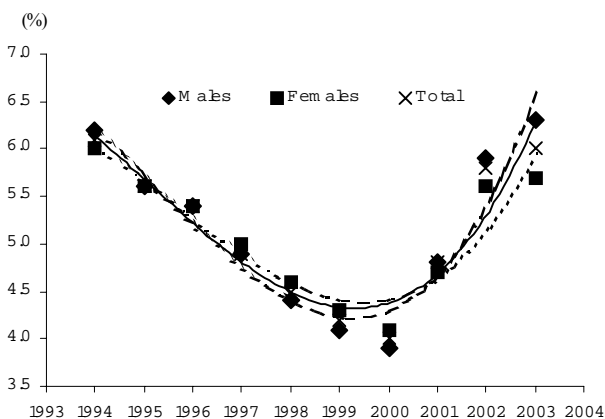

Figure 13. Rates of the unemployment of males, females and total in the USA in the period 1994–2003
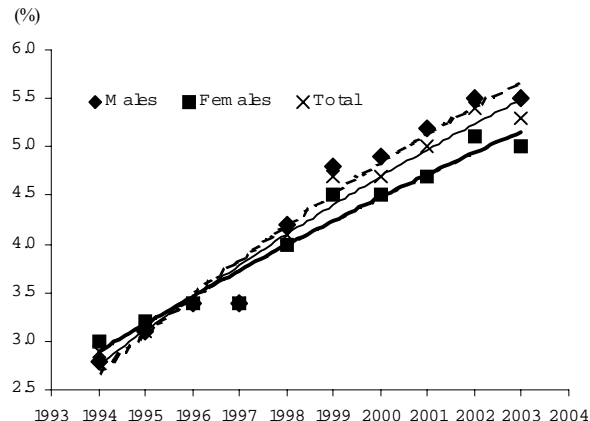

Figure 14. Rates of the unemployment of males, females and total in Japan in the period 1994–2003

total (y_{12}) – see negative regression coefficients b_{yt} in Table 2. Most of correlation indices I_{yt} are significant on the level of α = 0.01 or α = 0.05. Linear trends are increasing in associated states of EU for variables males (y_{13}), females (y_{14}) and total (y_{15}) – see positive regression coefficients b_{yt} in Table 1. In the Czech Republic, trends for variables males (y_{16}), females (y_{17}) and total (y_{18}) are increasing until 2000 and then slightly decreasing and from 2002 slightly increasing except of males. In the USA, the rate of unemployment is decreasing from 6.0% in 1994 to 4.0% in 2000 and then strongly increasing to 6.5% in 2003. In Japan the rates of unemployment are increasing from 2.5% in 1994 to 5.5% in 2003. Differences in the rate of unemployment for males and females in the USA and Japan are less than in the EU 15 and associated states of the EU. Selected developmental trends of the rate of unemployment in the reference period are given in graphical form in Figures 10–14. Unemployment in the EU is higher then unemployment the USA and Japan, but lower than in associated states of the EU.

CONCLUSION

The paper is focused on the evaluation of the rates of employment and unemployment of women, men and as a whole in the EU, in associated countries of the EU and for comparison in the USA and Japan. Rates of employment in the EU 15 together (Belgium, Denmark, Finland, France, Ireland, Italy, Luxembourg, Germany, the Netherlands, Portugal, Austria, Greece, Spain, Sweden and United Kingdom) were evaluated in the period 1993–2002, in associated states of the EU together (the Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovenia and Slovakia) in the period 1997–2002 and in the Czech Republic in the period 1998–2003. Rates of unemployment in the EU 15, the USA and in Japan were evaluated in the period 1994–2003, in associated states of the EU in the period 1998–2003. Employment of males in the EU is higher than employment of females. Trends of the rate of male, female and total employment is increasing. Trends of the rate of female employment are strongly increasing. Employment of males in associated states of the EU is also higher then employment of females. Trends of rates of male, female and total employment is increasing in the reference period. Unemployment in the EU is higher than unemployment the USA and Japan, but lower than in associated states of the EU.

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