Some issue related to theta_cov.

1. When theta_cov_form = 1 that means diagonal theta covariance matrix, we allocate a vector of dimension (sum(cv_S%num_theta_type),1) just one column. sum(cv_S%num_theta_type is also the number of rows we expect to have into the input file when we read the values.

   Now if we have one theta for each beta association there are no problems, but if we have 2 theta for all the beta association or a mix of one and two we need to decide how these value must be entered in the input file.

   I saw what you did but there was an error, so I changed the routine to create the theta covariance matrix (matrix that must contains only the covariance values of the theta we are going to optimized for). I will explain you with an example as we have to enter the covariance value now, if we don't like this way we need to change (no big deal).

```
BEGIN structural_parameter_cv TABLE
 nrow=4 ncol=7 columnlabels
 BetaAssoc prior_cov_mode var_type  struct_par_opt  trans_theta  alpha_trans
1                1              1              0               0            10.
2                1              2              1               0            10.
3                1              1              0               0            10.
4                1              1              1               0            10.
END structural_parameter_cv
```

```
BEGIN structural_parameters_data TABLE
 nrow=4 ncol=2 columnlabels
 BetaAssoc       theta_0_1       theta_0_2
 1                  A                -B
 2                  C                 D
 3                  E                - F
 4                  G                - H
END structural_parameters_data
```

In this example we have 5 structural parameters, 1 for BetaAssoc 1, 2 for BetaAssoc 2, 1 for BetaAssoc 3 and 1 for BetaAssoc 4. Right now the structural_cov Table must be as in the following:

```
BEGIN structural_parameters_cov TABLE
 nrow=5 ncol=1 columnlabels
 theta_cov_1
Cov A
Cov C
Cov D
Cov E
Cov G
END structural_parameters_cov
```

```
BEGIN epistemic_error_term KEYWORDS
 sig_0 = L   sig_opt = 1  sig_p_var = Cov L trans_sig =0 alpha_trans = 10.
END epistemic_error_term
```

With this example the theta covariance matrix will be 4x4 (we have 3 theta to be optimized and sigma):

Cov C	0	0	0
0	Cov D	0	0
0	0	Cov G	0
0	0	0	Cov L

The struct_par_opt_vec will be instead:

C
D
G
L

So this is the way right now, we have to decide if it's ok. I hope I was clear to explain.

2. If theta_cov_form = 0 means we don't have information about theta_cov, if we want to allow this option we need a modification into the structural parameters subroutine to avoid the calculation of the term $\theta - \theta^*\ Q_{\theta\theta}^{-1}\ \theta - \theta^*$ because we cannot calculate the inverse of $Q_{\theta\theta}^{1}$. Not big effort to do this but I want to be sure it is correct before to do this.

3. The same problem of point 2 could happen for sigma, but right now we don't a flag that can allow us to say to optimize for sigma but without considering the covariance of sigma. Need to discuss.

4. We can allow to use the full covariance matrix without much problems but after we decide how we want to enter the values.